STATEMENT OF BASIS

CSX TRANSPORTATION INC. FACILITY

(Former Beazer East Facility)

RICHMOND, VIRGINIA

July 2009

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GLOSSARY

AL – Action Level
AOI - Areas of Interest
AOCP – Area of Contamination Policy
AOC – Area of Concern
bgs – Below ground surface
BTEX – Benzene, toluene, ethylbenzene and xylene
cm/sec – Centimeters per second
CMS – Corrective Measures Study
COC – Contaminants of Concern
COPC – Contaminants of Potential Concern
EPA- U.S. Environmental Protection Agency
gpm – Gallons per minute
HH – Human health
IM – Interim Measures
MCL - Maximum Contaminant Levels
OSHA - Occupational Safety and Health Administration
PAHs – Polycyclic Aromatic Hydrocarbons
ppb – Parts per billion
RBC – Risk Based Concentrations
RCRA – Resource Conservation and Recovery Act
RG – Remedial Goals
RFA - RCRA Facility Assessment
RFI - RCRA Facility Investigation
ug/l – Micro grams per liter
SB – Statement of Basis
VADEQ - Virginia Department of Environmental Quality

1. INTRODUCTION

The United States Environmental Protection Agency ("EPA") has prepared this Statement of Basis ("SB") to describe the remedy (corrective measures) being proposed by EPA to address environmental conditions at a former wood treating facility located at 2401 Charles City Road in Henrico County, Virginia (hereinafter the "Facility" or the "Site"). EPA is issuing this SB pursuant to the Resource Conservation and Recovery Act, as amended ("RCRA"), 42 U.S.C. §§ 6901 - 6939(e). Upon completion of corrective action construction, EPA proposes to make a corrective action complete with controls[1] determination consistent with EPA guidance entitled "Final Guidance on Completion of Corrective Action at RCRA Facilities (February 25, 2003)."

The purpose of this SB is to solicit public comment regarding 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 SB summarizes the investigation activities that have been completed at the Site, the nature of the conditions found at the Site and the elements of the proposed remedy for the Site. The information presented in this SB can be found in greater detail in the work plans and reports for the Facility that have been submitted to EPA and the Virginia Department of Environmental Quality ("VADEQ"). The public comment process is described in greater detail in Section 8 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 decision regarding the selection of the remedy for the Site after considering information submitted during the public comment period. The final remedy decision with be set forth in a document issued by EPA entitled Final Decision and Response to Comments ("FDRTC"). 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.

[1] A complete with controls determination means that final cleanup objectives have been met but on-going operation, maintenance and/or monitoring of controls is necessary to ensure protection of human health and the environment.

2. FACILITY BACKGROUND

The Site is located in eastern Henrico County, Virginia approximately 2.5 miles east of the Richmond city limits as shown in **Figure 1**. The Site consists of approximately 52 acres of industrial property. The Site lies within a general industrial zone situated between Charles City Road to the north and the double track rail line operated by CSX Transportation, Inc. ("CSXT") that borders the Site to the south. As shown in **Figure 1**, the topography at the Site is nearly level to gently sloping with surface elevations ranging from approximately 163.7 feet (ft) above mean sea level ("amsl") at the center of the cap over a former surface impoundment which was closed as a RCRA-regulated unit in accordance with applicable closure requirements in 1984 to 153.1 ft amsl at the southwest corner of the Site. Generally, the Site slopes gently from north to south.

The layout of the Site is shown in **Figure 2**. The Site has been unused since wood treating operations ceased in 1983. The Site currently contains seven buildings, a pond, several concrete slabs, and a closed surface impoundment. The Site is fully enclosed within a six (6)-foot high, chain-link fence. Ground cover consists of a mixture of gravel, exposed soil, and grasses in the areas containing former drip tracks and surface roads separated by linear tracts of pine trees and hardwoods.

2.1 Operational and Ownership History

The Site was owned by Chesapeake and Ohio Railroad until it was purchased by Koppers Company, Inc. ("Koppers") in 1948. Koppers produced creosote-treated railroad ties at the Site from 1949 to 1983 when operations ceased. When the regulations implementing RCRA went into effect the wood treatment plant began operating as an interim status facility because a surface impoundment at the Site qualified as a hazardous waste management unit. The wood treatment plant was subsequently decommissioned and the equipment was removed from the Site. Thereafter, through a series of corporate transactions, ownership of the Site passed to Beazer East, Inc. ("Beazer"). To address RCRA corrective action requirements applicable to the Site, Beazer entered into an Administrative Order on Consent ("AOC") with EPA on April 24, 1991, pursuant to Section 3008(h) of RCRA, 42 U.S.C § 6928(h). The AOC required Beazer to implement certain interim measures, to complete a RCRA Facility Investigation ("RFI") and to complete a Corrective Measures Study ("CMS") in connection with the Site. CSXT subsequently acquired the Site from Beazer on March 21, 1997. The obligations of the AOC were transferred from Beazer to CSXT effective April 22, 1998, and CSXT has been implementing the requirements of the AOC since that time.

2.2 Adjacent Land Uses

Current land uses surrounding the Site consist of mixed agricultural, light industrial, business, and residential uses to the north and general industrial uses to the east, south, and west. The current property uses directly surrounding the Site are as follows:

- West: a closed Browning Ferris Industries ("BFI") landfill (currently owned by BFI Waste Systems);

- South: CSXT rail lines (double-track);

- East: Eastport Industrial Park; and

- North: agricultural and light industrial facilities.

The area in which the Site is located is predominantly zoned for light industrial and general industrial uses. A small area north of Charles City Road is zoned as an agricultural district. Agricultural zoning includes single-family dwellings, agriculture facilities, and manufactured homes as permitted uses. One developed and occupied residential property (single family home) is located north of the Site on the other side of Charles City Road.

3. SUMMARY OF PREVIOUS INVESTIGATION ACTIVITIES AND INTERIM MEASURES

3.1 Summary of RFI

The AOC requires that both an RFI and a CMS be performed at the Site. EPA approved an RFI Work Plan for the Site in 1993, which provided for undertaking the RFI in two phases, referred to as Phase I and Phase II. The goals of the RFI were the following:

- To provide a detailed geologic and hydrogeologic characterization of the area surrounding and underlying the Site;
- To characterize the nature and extent of hazardous waste or hazardous constituents at the Site; and
- To determine the need for corrective measures.

The scope of the investigation activities undertaken as part of the RFI included reviewing historical aerial photographs, drilling soil borings, installing monitoring wells, collecting soil and groundwater samples, performing physical and chemical analyses of samples collected at the Site, conducting aquifer characterization tests, and collecting data and information relating to the environmental setting and surrounding land uses.

A Final RFI Report was submitted to EPA in October 1996 (Dames & Moore, 1996) and combined the contents of the Phase I and II RFI Reports that had been previously submitted to EPA in 1994 and 1995, respectively. EPA approved the Final RFI Report in January 1997.

3.2 Summary of Areas of Concern

Seven (7) Areas of Concern ("AOCs") were identified at the Site based upon former wood treating activities. The seven (7) AOCs consist of the following:

- AOC 1 – Closed surface impoundment
- AOC 2 – Creosote Unloading Area and Treatment Area (2A), Drip Tracks (2B), and Former Tanks (2C)
- AOC 3 – Container Storage Areas
- AOC 4 – Temporary Drum Storage Areas
- AOC 5 – Landfill and Landfarm Areas

- AOC 6 – Water Supply Pond
- AOC 7 – Treated Wood Storage Areas

The location of each AOC is shown in **Figure 2**.

AOC 1 is a former 0.69-acre surface impoundment that was closed as a RCRA-regulated hazardous waste management unit in accordance with applicable closure requirements. As part of the closure activities, sludge from the impoundment plus one (1) foot of soil liner material was removed for offsite disposal. The surface impoundment dike materials were then placed within the impoundment to help backfill the impoundment. A RCRA landfill (geosynthetic) cap was placed over the former impoundment, and the area was graded and seeded to minimize run-on, infiltration, and erosion. Closure of the surface impoundment was completed and certified by the VADEQ in June 1985. The unit is currently under post-closure care, which includes inspections, maintenance of the cover and fence, and semi-annual groundwater monitoring. These activities are being performed pursuant to an existing post-closure permit issued by VADEQ.

During the RFI, the seven (7) AOCs described above along with other areas at the Site were investigated. Wood treating-related chemicals – mainly polynuclear aromatic hydrocarbons ("PAHs") and acid extractable phenolic compounds ("phenols") – were found to be present in (i) surface and subsurface soils at several AOCs, (ii) groundwater in the surficial water-bearing zone, (iii) sediments in the Water Supply Pond (AOC 6) and (iv) soils and sediments in a stormwater drainage ditch and associated wetland areas located along the eastern side of the Site. (The stormwater drainage ditch is referred to as the Eastern Drainage Ditch ("EDD").) In portions of the treatment plant operational area (AOC 2A), dense, free product was also encountered in shallow groundwater. The source area for the dissolved phase groundwater plume was determined to be the former treatment area where subsurface soil impacts are greatest and the free product was encountered in two monitoring wells (MW-14S and MW-30S). The RFI also reported the presence of other chemicals of potential concern ("COPCs") such as metals and 2,4,5-TD (commonly known as Silvex) that were detected during RCRA interim status monitoring of AOC 1. No offsite impacts were identified that presented any risk to potential receptors which exceeded EPA's target risk for carcinogenic compounds or its target hazard quotient for non-carcinogenic compounds.

3.3 Interim Measures

Several source control actions and interim measures ("IMs") have been implemented at the Site since facility decommissioning took place in 1985. Each IM is discussed separately below.

3.3.1 1984 Source Removal

During facility decommissioning, two soil source control measures were implemented. These measures included:

- Closure of the surface impoundment (AOC 1) in 1984 pursuant to applicable RCRA closure requirements by excavating sludge and soil liner material for offsite disposal, and backfilling and capping the impoundment.

- Excavation of approximately 400 cubic yards ("CY") of soil impacted by creosote unloading operations (AOC 2A). This soil was excavated at the time of closure of the surface impoundment (AOC 1) in 1984. Impacted soil was excavated from an approximate sixty (60) by fifty (50)-ft area to a depth of three (3) to four (4) ft below ground surface ("bgs") and disposed of offsite. This area was capped with clean backfill and re-vegetated with grass.

3.3.2 Perimeter Security Fence

In May 2007, a six (6)-foot high chain link perimeter security fence was constructed to prevent unauthorized access to the Site. Approximately 4,500 linear feet of security fence was installed at the Site to supplement the existing 2,850 ft of security fence installed by BFI along the western property line. Four (4) locking access gates were installed at the Site – one (1) to the north at Charles City Road, and three (3) along the southern perimeter of the Site for access to and from the railroad right-of-way.

3.3.3 Sediment Trap in Eastern Drainage Ditch

In May 2007, an in-line hydrodynamic separator (sediment trap) was installed at the southern end of the EDD to remove and capture sediment from storm water. The sediment trap was placed in a downstream location in the EDD to eliminate the potential for sediment transport to occur further downstream in the EDD or off-site.

4. SITE CHARACTERIZATION

4.1 Surface Water Hydrology

The most prominent drainage feature on the Site is the manmade, intermittently flowing EDD that extends north to south along the eastern border of the Site for a distance of approximately 2,450 ft as shown in **Figure 2**. Near the southeast corner of the Site, this intermittently flowing drainage ditch empties into the Eastport Stormwater Basin ("ESB"), which is a manmade storm-water detention basin associated with the Eastport Industrial Park. The ESB is drained by five (5) culvert pipes located approximately 600 ft east of the Site along the north side of the CSXT railroad right-of-way. These pipes convey runoff to Cornelius Creek, which originates at the outfall culvert pipes for the ESB.

Originally, a series of six (6) drainage ditches were utilized to convey stormwater runoff across the Site. However, after the closure of the wood treatment plant, these drainage ditches were no longer maintained and manmade opportunistic wetlands developed. The United States Army Corps of Engineers ("USACE") determined in September 2002 that the only jurisdictional wetlands at the Site were three small areas within the EDD.

4.2 Site Geology

The Site is located in the Atlantic Coastal Plain physiographic province and is several miles east of the Fall Line, which marks the boundary between the Atlantic Coastal Plain and Piedmont physiographic provinces. Approximately 250 to 275 ft of unconsolidated overburden material underlies the Site as summarized in the table below.

Site Geology and Stratigraphy

Geologic Formation	Age	Depth (ft bgs)	Primary Site Lithology/ Description	Site Hydrogeologic Zone	USCS Classification
Bacons Castle	Upper Pliocene	0-20	Clay/Silt/Sand Unit	"S"	CH/CL SM/SC*
		20-45	Sand and Gravel Unit	"A"	SP/SW/GM
Calvert	Miocene	45-95	Plastic clay and sandy clay	"B"	CH
Nanjemoy	Lower Tertiary	95-135	Silty clay and clay with variable sand	--	CL
Aquia	Lower Tertiary	135-155	Clayey and silty sand	--	SC/SM
Potomac	Cretaceous	155-265	Coarse sand and gravel	--	SP/GM/GP

Notes: USCS = Unified soil classification system, ft = feet, bgs = below ground surface, *for sand layer present in treatment area.

4.3 Groundwater Hydrology

As part of the RFI, three (3) hydrogeologic zones have been defined at the Site based on the lithologic and hydrogeologic characteristics of the geologic units. The Yorktown-Eastover water-bearing zone is the uppermost (e.g., surficial) water-bearing zone below the Site that coincides with the Bacons Castle Formation. The surficial water-bearing zone has been divided into two (2) groundwater flow zones – a shallow zone ("S" zone) that corresponds with the clay/silt/sand unit and a deeper zone ("A" zone) that corresponds with the sand and gravel unit. The shallow Yorktown-Eastover water-bearing zone at the Site is underlain by the Calvert Confining Unit composed of clay to sandy clay and has been defined as the "B" zone at the Site. The surficial water-bearing zone beneath the Site does not have characteristics that make it amenable to use for potable water supplies. For example, the groundwater yield in the "S" zone is extremely limited (less than one (1) gallon per minute) and groundwater from both the "S" zone and the "A" zone can exhibit low pH (e.g., a pH of less than six (6)) and contain naturally occurring levels of metals (such as iron and manganese) that render the groundwater undesirable for potable water use without treatment.

4.3.1 Shallow Zone ("S" Zone)

The "S" zone is the uppermost portion of the Yorktown-Eastover water-bearing zone and consists of clay/silt/sand deposits. Depth to groundwater in "S" zone monitoring wells typically ranges from five (5) to nine (9) ft bgs. A localized sand/clayey sand unit is present in the northern part of the Site underneath the former treatment area. Elsewhere on the Site, the "S" zone is comprised predominantly of clay. Long-term groundwater monitoring data for the "S" zone (since 1989) sand layer in the northern portion of the Site indicate that the overall horizontal groundwater flow direction across the former wood treatment area is toward the west. However, localized perched groundwater conditions at three (3) monitoring well locations (M-18S, M-22, and M-26S) have resulted in varying directions of localized flow radially away from groundwater mounds.

4.3.2 Intermediate Zone ("A" Zone)

The "A" zone is the lowermost portion of the Yorktown-Eastover water-bearing zone and consists of sand and gravel deposits. Depth to groundwater in "A" level monitoring wells typically ranges from seven (7) to thirteen (13) ft bgs. Long-term groundwater monitoring data for the "A" zone (since 1989) indicate that the overall lateral flow direction of groundwater in the "A" zone across the Site is toward the south.

The results from aquifer tests (e.g., slug tests) indicate that the "A" zone exists under variable hydraulic conditions at the Site depending upon the lithology of the overlying "S" zone locally and the proximity to the BFI slurry wall (described below) along the western border of the Site. In the northern part of the Site in the former wood treatment area, the "A" zone is unconfined to semi-confined depending upon the thickness of the clay unit overlying the sand and gravel unit

and the limited thickness of the "S" zone sand layer. South of the area containing this sand layer, semi-confined to confined conditions have been observed in the "A" zone because of the presence of an approximately twenty (20)-foot thick layer of low permeability clay directly overlying the sand and gravel unit.

4.3.3 "B" Zone – Bottom Confining Unit to Uppermost Water-Bearing Zone

The "B" zone is the bottom, confining unit to the Yorktown-Eastover water-bearing zone and consists of the Calvert and Nanjemoy Confining Units. Groundwater flow directions in the "B" zone have not been evaluated because the unit is an aquitard approximately eighty (80) ft thick with a permeability several orders of magnitude lower than the water-bearing zones above and below the "B" zone (i.e., the hydraulic conductivity of the "B" zone is on the order 5E-07 to 5E-09 cm/sec).

4.3.4 BFI Slurry Wall

Historically, groundwater flow directions in the shallow water-bearing zone at the Site were toward the southwest. However, groundwater flow conditions were altered in the mid-1980s by the installation of the slurry wall around the BFI landfill located to the west of the Site. The slurry wall is located approximately ten (10) to twenty (20) ft west of the property line between the BFI landfill and the Site. It was installed and keyed into the low-permeability clay of the Calvert Confining Unit (the "B" zone at the Site) and acts as an impermeable barrier for groundwater flow between the BFI landfill and the Site. Due to this hydraulic barrier, the current groundwater flow direction beneath the Site is toward the south.

5. HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT

5.1 Summary

The human health risk assessment ("HHRA") conducted for the Site evaluated risk using an Action Level ("AL") approach. The AL approach was used as a conservative screening tool to identify chemicals of concern ("COCs") and areas of potential concern to be evaluated further in the Corrective Measures Study ("CMS") Report.

The AL approach calculated "action levels" for each chemical that was detected in soils, sediments or groundwater at the Site. These chemicals are referred to as chemicals of potential concern ("COPCs"). For carcinogenic compounds, the "action levels" were based on a target risk of 1E-06. For non-carcinogenic compounds, the "action levels" were based on a target hazard quotient ("HQ") of 0.1.

"Action levels" were calculated for current and future potential receptors. Receptors that were evaluated included the following:

- Future commercial/industrial workers;
- Future construction workers;
- Trespassers;
- Future child residents (for groundwater);
- Future adult residents (for groundwater); and
- Lifetime residents (for groundwater).

For each type of current and future receptor, the "action level" that was calculated corresponds to a numerical concentration of a particular COPC that in turn equates to the relevant risk target described above for a specific environmental medium.

After evaluating each of the "action levels" for the different current and future potential receptors, a final "action level" for a particular COPC in a particular environmental medium (i.e., soil, groundwater, surface water, and sediment) was selected based on the lowest of the "action levels" calculated for the various receptors. The final "action levels" were then compared to the results from the investigation activities conducted as part of the RFI and supplemental investigation activities conducted in the course of revising and finalizing the CMS Report. COPCs that were detected at concentrations exceeding the final "action levels" were designated as chemicals of concern (COCs) and retained for further evaluation. Using the AL approach, the large array of sampling data produced through the characterization process was conservatively

screened to identify those COPCs and areas of potential concern at the Site that might warrant remediation.

An ecological risk assessment ("ERA") was also performed at the Site. The ERA concluded that concentrations of COPCs in soil and sediment do not pose an unacceptable risk to ecological receptors with the exception of exposure to soil/sediment in the EDD and associated wetland areas A, S and U that a semi-aquatic receptor (raccoon) might experience.[2] Potential downstream migration of impacted sediment in the EDD toward the ESB and Cornelius Creek was also identified as a concern. The sediment trap discussed in Section 3.3.3 of this SB was installed to mitigate this concern.

The areas that present a potentially unacceptable risk to ecological receptors also contain COCs at concentrations that exceed the human health remedial goals. Therefore, mitigating human health risks in the EDD and associated wetland areas A, S and U will also address potential ecological risks associated with these areas since the preferred remedy is excavation.

5.2 Determination of Remedial Goals

As part of the HHRA, the approach used to calculate ALs was also generally followed to calculate numerical remedial goals ("RGs") for soil (including sediment) and groundwater. For example, based on the analysis of "action levels" described above, particular receptors were evaluated for potential exposure to COCs found in specific environmental media. These receptors included commercial/industrial workers, construction workers, and adolescent trespassers for soils, adolescent trespassers for sediments, and commercial/industrial workers, lifetime residents, adult residents and child resident receptors for groundwater. The lowest RG among the various RGs that were calculated for such receptors was selected as the final RG for a particular COC in a specific environmental medium. The target risks used to calculate the RGs were different than the target risks used to calculate ALs. Specifically, when calculating RGs, various target cancer risks for COCs identified by the AL assessment were evaluated to identify a target cancer risk which would result in a total target risk within EPA's discretionary risk range of 1E-06 to 1E-04 for the combined soil and groundwater pathways that were evaluated. Based on these evaluations, a target cancer risk of 5E-06 was selected for each of the COCs. The selected RGs also were evaluated to ensure that the calculated Hazard Index ("HI") was at or below the EPA target HI of 1E+00 for the combined soil and groundwater pathways for each of these receptors and pathways. As a result of the differences in target risk for RGs versus ALs, the remedial goal concentration levels for carcinogenic PAHs in soil increased by a factor of five (5) above the screening action levels calculated for such COCs.

The calculated cumulative risk for RGs for the combined soil and groundwater pathways at the Site is 9E-05, which is within the EPA discretionary risk range of 1E-06 to 1E-04. Calculated HIs for RGs for the combined soil and groundwater pathways at the Site are at or below the EPA

[2] See Figure 2-5 in the Final CMS Report for a depiction of the wetland areas.

target HI of 1E+00 for each target organ. COCs for the Site and the associated target RGs are shown on **Table 1** and **Table 2** attached hereto.

The areas where COCs are present at the Site in soil and groundwater at concentrations that exceed the RGs for the Site are shown on **Figure 3** (surface soil and sediment), **Figure 4** (subsurface soil) and **Figure 5** (groundwater). The areas shown on these Figures will be addressed by the corrective measures described in this SB.

The HHRA concluded that current potential risks to all receptors are within EPA acceptable ranges. Potential future use of the site for industrial or commercial purposes may result in unacceptable risks to commercial workers and construction workers from soil on the Site. Groundwater beneath the Site is not currently used for drinking; however, theoretical use of groundwater as potable water in the future would be associated with unacceptable risks both to workers and hypothetical residents.

6. SUMMARY OF PROPOSED CORRECTIVE MEASURES

Based on the findings set forth in the RFI, EPA has determined that past operations at the Facility have resulted in soil, sediment and groundwater contamination. The proposed remedy for the Facility emphasizes source removal and source control through excavation, consolidation and capping of soils and sediments with concentrations of contaminants above remedial goals in a containment area (i.e. slurry wall). The primary source area of groundwater contamination will be controlled via construction of the slurry wall and free product removal, and targeted in-situ treatment and monitored natural attenuation will be used to address areas outside of the proposed containment or slurry wall and restore groundwater to drinking water standards. In addition, EPA proposes that institutional controls be implemented as necessary to prevent current and potential future exposure to contamination.

As stated in its May 1, 1996 Advanced Notice of Proposed Rulemaking (ANPR) (61 Fed. Reg. 19446), the Agency endorses a streamlined approach to identify the preferred corrective measures and risk-based cleanup goals for remediation of facility contamination. The streamlined approach acknowledges that an evaluation of multiple alternatives is not always necessary, particularly if a desirable remedy can be developed directly from site characterization, application of available engineering technologies, and resolution of regulated unit and site-wide corrective action issues. Since the proposed remedy was identified on the basis of its ability to protect human health and the environment, and because of the likelihood that it can be implemented efficiently while facilitating the reuse of the Site, EPA did not find it necessary to provide a detailed analysis of all the remedial alternatives identified for the Site as part of this SB. The scope of the corrective measures discussion will therefore address only EPA's preferred alternative (which is identified as CMA 4 in the CMS Report). A description and analysis of the other six alternatives considered by EPA can be found in the CMS Report prepared by CSXT.

6.1 Corrective Measures Objectives

The following Corrective Measure Objectives ("CMOs") were developed based on identified conditions at the Site, identified current and future potential risks to human health and the environment, and applicable regulatory criteria and guidance:

- CMO No. 1 – Mitigate the potential future risks that have been identified for evaluated receptors from exposure to soil (commercial/industrial workers, construction workers, and adolescent trespassers) and surface water/sediment (adolescent trespassers) at the Site;

- CMO No. 2 – Mitigate the potential risk that has been identified for the evaluated semi-aquatic omnivore mammal receptor (raccoon) from exposure to surface soil and sediment present in the EDD area;

- CMO No. 3 – Eliminate the source of COCs in the EDD and the potential migration of COCs via the EDD to offsite areas;

- CMO No. 4 – Restore, to the extent practicable as more fully discussed in Section 6.3.2.2, below, groundwater beneath the Site to allow for its most beneficial use; and

- CMO No. 5 – Manage accumulated free-phase product, to the extent practicable, consistent with EPA guidance on non-aqueous phase liquid and conditions at the Site.

6.2 Scope of EPA's Proposed Remedy

As part of the CMS, seven (7) remedial alternatives for the Site were evaluated based on the above objectives. The recommended alternative presented in the CMS Report (CMA 4) includes the following components to address conditions at the Site and potential risks posed by those conditions:

- Demolition of buildings in areas where active remediation is proposed to facilitate construction of the corrective measures;

- Installation of a slurry wall to contain the source area and control groundwater migration away from the source area. The source area consists of the former treatment area (AOC 1, AOC 2A, northern part of 2B, 2C, AOC 3, northern part of AOC 4 and AOC 6);

- Excavation of targeted surface soils, subsurface soils and sediments outside the slurry wall containment area with COC concentrations above RGs. Consolidation of the excavated material inside the slurry wall containment area beneath an engineered cap to preclude future potential exposure to the excavated material by receptors.

- Restoration of excavated areas including backfilling with clean soil and establishing vegetative cover, and restoration of the EDD area;

- Recovery of free product using recovery wells installed in the treatment area (AOC 2A) and northern portion of the drip track area (AOC 2B);

- Using a combination of targeted in situ chemical oxidation and oxidative bioremediation, and natural intrinsic attenuation processes to treat groundwater outside of the slurry wall containment area. Monitored natural attention/groundwater monitoring would be conducted to evaluate the effectiveness and progress of treatment and natural attenuation processes;

- Dewatering, backfilling and capping of the former water supply pond (AOC 6);

- Implementation of institutional and engineering controls to prohibit activities that may interfere with the engineered remedy and restrict or prevent activities that may result in unacceptable risk to human health and the environment, and;

- Long-term monitoring and operation and maintenance ("O&M") including: monitoring the performance of the containment system, inspection/maintenance of cap and other site areas, free product recovery operations, monitored natural attenuation of groundwater, and monitoring and maintenance of institutional controls.

The multi-component remedy described above is consistent with EPA's policy entitled "Use of the Area of Contamination (AOC) Concept During RCRA Cleanups (March 13, 1995)" ("AOC Policy") to facilitate implementation of the remedy. The AOC Policy allows for consolidation and other *in situ* waste management techniques to be used within an area of generally dispersed contamination or "area of contamination" without triggering permitting, land disposal restrictions or minimum technology requirements. As EPA has previously recognized, the AOC Policy has significant utility in the context of remediating wood treating plants where (as here) large areas of generally dispersed contamination are present. The AOC Policy has particular relevance at this Site because the Site exhibits large contiguous areas of generally dispersed contamination that are linked through historical operational activities. The area of contamination at the Site encompasses AOCs 1, 2A, 2B, 2C 3, 4, 5A, 5B, 6 and contiguous impacted areas extending into wetland areas along the drip track and extending from the treatment area into the EDD and adjacent wetlands at the southern end of the Site. EPA anticipates that the existing permit will be modified to include a Site-wide corrective action module for implementation of the proposed remedy.

6.3 Elements of Proposed Remedy

6.3.1 Soils and Sediment

6.3.1.1 Building Demolition

Buildings and structures will be decommissioned to facilitate construction of the proposed remedy. A separate document entitled *Building Demolition Work Plan* has been submitted by CSXT to and approved by EPA. Pursuant to the *Building Demolition Work Plan*, buildings and structures will be surveyed for asbestos containing building materials (friable and non-friable), lead-based paint, and other potentially hazardous materials prior to decommissioning. This work is in progress. Hazardous material abatement plans will be developed and implemented to remove any such material before proceeding with the demolition of buildings and structures.

Once any necessary hazardous material abatement activities have been completed, the remaining portions of the buildings and structures will be decommissioned. Demolition debris will be disposed of or recycled offsite in accordance with applicable federal, state and local requirements. Building slabs and foundations within the proposed containment area will be left

in place and covered with the cap that will be constructed over the containment area. The former petroleum storage building is located outside the containment area. The slab for this building will be removed as part of demolition of the building. The soil below the slab will be removed (0 to 1 ft bgs) and consolidated within the slurry wall containment area as part of the remedy implementation. Confirmation samples will be collected from this excavation to verify that RGs have been attained and that no petroleum contaminants are present above levels of concern prior to the area being backfilled with clean soil and vegetated.

6.3.1.2 Soil Excavation and Onsite Consolidation

As part of the proposed remedy, surface soil (0 to 1 ft bgs) in certain areas outside the slurry wall containment area will be excavated. **Figure 3** shows the areas where surface soil and sediment contaminant concentrations exceed the RGs for the Site. The purpose of the surface soil excavation activities outside the slurry wall containment area is to reduce surface soil exposure to levels below the RGs. Subsurface soils within AOC 5, drainage ditch F, isolated wetland area X, isolated wetland area AA, and the EDD (soil and/or sediment), which have concentrations of COCs above the RGs will also be excavated. Subsurface soils will be excavated up to a maximum depth of four (4) ft bgs in AOC 5, up a maximum depth of two (2) ft bgs in the isolated drainage ditch/wetland areas, and up to a maximum depth 2.5 ft in the EDD. Excavated soils will be placed within the containment area and a cap will be installed to preclude potential future exposure.

Figure 6 shows the areas at the Site where soil and sediment will be excavated and the proposed location of the slurry wall containment area where excavated soils and sediment will be consolidated and capped. Additional sampling will be performed in connection with the supplemental field investigation work needed to support the design and implementation of this component of the proposed remedy. The results of this sampling work will be used to confirm the boundaries of the areas of excavation and the scope of excavation required for Site soils.

Confirmation soil samples will be collected from all excavated areas to evaluate whether the RGs have been attained. Confirmatory samples will be analyzed for PAHs and phenols by SW-846 Method 8270. The specific number, spacing and frequency of confirmation samples from excavation sidewalls and floors will be developed in greater detail as part of the implementation plans for the proposed corrective measures, and will be subject to EPA and VADEQ review and approval. The confirmatory samples will help ensure that the lateral extent of the excavations is appropriate. Once excavation of an area is completed and confirmatory samples indicate that the remedial goals and corrective measures objectives have been achieved, the area will be backfilled with clean fill to a grade consistent with the surrounding terrain, fine graded and vegetated. The EDD will be backfilled with clean material and vegetated with a grass cover. If stabilization of portions of the eastern drainage ditch is required, geotextile fabric and/or rip rap rock may be placed in those segments of the ditch requiring stabilization.

Any remediation waste destined for offsite disposal will be sampled for waste characterization and profiling purposes consistent with the requirements of 9 VAC 20-60-261.10 and 261.11 and 9 VAC 20-60-262.11 and those of the selected offsite disposal facility. Decontamination-related waste will be generated during soil excavation activities, including materials used for the decontamination pad, personal protective equipment ("PPE"), and decontamination water. The final treatment/disposal facility for any remediation waste destined for offsite disposal will be selected based on identified waste characteristics and profiles, verification of required permits and insurance, the receiving facility's regulatory compliance status, and the receiving facility's ability and capacity to handle the material.

6.3.1.3 Water Supply Pond (AOC 6) Dewatering and Capping

The Water Supply Pond (AOC 6) is located within the slurry wall containment area. The surface water in the pond will be pumped out and discharged to the Henrico County Sewer System in accordance with applicable requirements regulating such a discharge. The water from the pond will be treated as necessary to meet any applicable pretreatment requirements imposed by the local publicly-owned treatment works ("POTW"). The pond will then be backfilled with material excavated from outside the slurry wall containment area and capped.

6.3.2 Groundwater

6.3.2.1 Installation of Cap and Slurry Wall

A slurry wall will be installed around the former wood treatment area to contain the area where the most highly impacted soils and groundwater at the Site have been found, and locations where free product has been encountered. The approximate alignment of the slurry wall is shown on **Figure 7**. The slurry wall will encircle an approximate 7.4-acre area encompassing the closed former surface impoundment (AOC 1), the creosote unloading area and treatment area (AOC 2A), the northern end of the drip track (AOC 2B), and the water supply pond (AOC 6). The slurry wall will be keyed three (3) ft into the underlying clay confining layer (Miocene Clay of "B" zone), which is at the base of the uppermost water-bearing zone (the "S" and "A" zones). The slurry wall will be composed of soil-bentonite slurry and designed to be three (3) ft wide with an estimated depth of forty-five (45) ft bgs.

A low permeability soil cap will be installed over the entire area encircled by the slurry wall (including the closed former surface impoundment) to minimize infiltration into that area and to preclude potential future exposure to the soils consolidated within the containment area. It is anticipated that the cap will consist of two (2) ft of low permeability clay or equivalent (e.g., having a permeability of 1E-07 cm/sec or less when compacted) covered by a six (6)-inch layer of topsoil with vegetation (grass). The approximate 7.4-acre area to be capped will be graded with a minimum 2% slope outward from the center of the area to allow for appropriate runoff and drainage. A maximum 3:1 slope is assumed around the perimeter of the capped area.

Existing monitoring wells that are located within the slurry wall containment area and within the working area around the slurry wall will be abandoned. This abandonment will occur prior to construction of the slurry wall, consolidation of impacted soils within the slurry wall containment area, and installation of the cap over the containment area.

Long-term O&M activities associated with the cap and slurry wall will include periodic inspection and maintenance of the cap area as required, such as repairing any damage to the cap, and seeding, fertilizing, and mowing the vegetative cover. In addition, the long-term performance of the containment area will be periodically evaluated through monitoring of groundwater levels inside and outside of the containment area, and monitoring of groundwater quality outside of the containment area. Piezometers and/or monitoring wells will be installed as necessary to monitor groundwater levels and conditions inside and outside of the containment area.

6.3.2.2 Free Product Recovery

Recovery wells will be installed within the slurry wall containment area to recover free product to the extent practical at the locations shown on **Figure 7**. Recovery wells will be installed adjacent to the locations of existing monitoring wells M-14S and MW-30S, where free product has been observed in the past to accumulate over time. A third recovery well will be installed in the center of the drip track west of monitoring well M-14S.

The recovery wells will be designed to include ten (10) ft of slotted screen and collection sumps at the base of the wells for free product. Free product collecting over time will be extracted (with minimal water to the extent possible) from the bottom of each recovery well using a recovery pump or other device. The recovery wells will be constructed so that the bottoms of the wells are set at the base of the "S" zone at approximately eighteen (18) to twenty (20) ft bgs, depending on the specific conditions encountered at each location. Fluids will be pumped into a holding tank and managed in accordance with applicable requirements of 9 VAC 20-60-261.10 and 261.11 and 9 VAC 20-60-262.11. Recovered fluids not containing free product may be considered to be hazardous or non-hazardous waste, depending on the specific conditions under which they are recovered and the waste characteristics of the recovered fluids. Waste characteristics will be assessed through testing and profiles will be completed for the fluids recovered to appropriately identify and characterize the recovered fluids for management and disposal purposes.

O&M activities will include periodic inspection and maintenance activities of the recovery well systems, free product gauging, and coordination of offsite transportation and disposal of recovered fluids. Free product recovery using the single well systems described above will continue until such time as additional recovery is no longer practical or economical, taking into account product recovery rates and volumes, product rebound, operating costs, and overall efficiency. This determination that recovery is no longer effective will be subject to EPA and VADEQ review and approval. This determination will be made with the recognition that the free

product will be controlled by the slurry wall, thus eliminating any further migration of free product or dissolution of free product into groundwater outside the slurry wall.

6.3.2.3 Targeted In Situ Treatment of Groundwater - Chemical Oxidation with Oxidative Biodegradation

Targeted *in situ* treatment of groundwater by chemical oxidation and oxidative biodegradation will be conducted in certain areas outside of the slurry wall to reduce concentrations of COCs and enhance natural attenuation processes. This technology typically involves the subsurface injection of an oxidant reagent solution to oxidize organic compounds in situ. The oxidation reactions are rapid and destroy organic compounds while producing benign end products. This work will likely include a single application to an area or areas totaling approximately 30,000 square ft using a direct injection technique with a direct-push rig. A formulation of oxidant solution (i.e., activated persulfate, hydrogen peroxide, permanganate, etc.) and water will be pressure injected into targeted treatment areas. This formulation is expected to provide for a strong chemical oxidation treatment of PAHs and BTEX/COCs lasting several weeks to several months and a sustained release of oxygen for up to one (1) year to enhance aerobic bioremediation processes. **Figure 7** shows the areas targeted for *in situ* chemical oxidation ("ISCO") treatment at the Facility. Specific substrates and formulations to be used as part of the ISCO process and application density and rates will be determined in specific design plans required for implementation of the selected corrective measures, and subject to EPA and VADEQ review and approval. Performance monitoring of this *in situ* remedy component will also be determined in specific design plans required for implementation of the proposed remedy, and subject to EPA and VADEQ review and approval.

6.3.2.4 Monitored Natural Attenuation of Groundwater Outside of the Slurry Wall Containment Area

The construction of the slurry wall will contain the source area for groundwater impacts and is expected to facilitate the attenuation of dissolved phase concentrations of COCs outside of the containment area over time. This expectation is based on the fact that the dissolved phase plume outside of the proposed containment area currently consists primarily of low levels of naphthalene and benzene and the fact that these chemicals are readily degradable by natural processes.

The monitored natural attenuation ("MNA") component of the proposed remedy will consist of groundwater monitoring outside of the slurry wall containment area to achieve the following objectives:

- To verify the effectiveness of source containment and control;
- To demonstrate that natural attenuation is occurring as expected;

- To detect changes in environmental conditions that could reduce the efficacy of natural attenuation processes;

- To verify that the plume is not expanding and migrating toward the southern property boundary of the Site; and

- To verify attainment of CMOs and RGs outside of the containment area.

Groundwater Monitoring Well Installation Activities

Due to the construction of the slurry wall, a new monitoring well network will be installed outside of the slurry wall containment area. The monitoring well network will include: one (1) new upgradient well nest (M-37S/A) and five (5) new downgradient monitoring well nests (M-38S/A, M-39S/A, M-40S/A, M-41S/A, and M-43S/A). One (1) additional new well nest (M-42S/A) will also be installed further downgradient of the slurry wall. Another two (2) "A" zone monitoring wells (M-44A and M-45A) will be installed to monitor the western and southern edges of the groundwater area containing COCs at concentrations above RGs. The proposed locations of the new monitoring well are shown on **Figure 7**.

Groundwater Monitoring Plan and Program

A groundwater monitoring plan will be developed that specifies the locations, frequency, and types of samples necessary to evaluate whether the remedy is performing as expected and whether it is capable of achieving RGs. This plan will be subject to EPA and VADEQ review and approval. The newly installed wells described above will supplement existing Site wells (MW-27A, MW-28A, MW-29A, MW-33A, MW-35A and MW-36A) and collectively, these twenty-two (22) wells will represent the well network used to monitor groundwater corrective action effectiveness. The monitoring well network described above will be sampled on a routine basis and analyzed for Site COCs identified on **Table 2** and selected geochemical parameters to evaluate the effectiveness of the remedy and the rate at which MNA may be occurring.

This groundwater monitoring plan will identify contingency measures that will be considered and implemented if the dissolved phase contaminant plume outside the slurry wall does not naturally attenuate within a reasonable time frame. For instance, a downgradient sentinel well (MW-45A) can be used to evaluate whether the groundwater plume at the Site is expanding. The sentinel well will also serve as a trigger for evaluating possible additional corrective measures in order to abate the potential offsite migration of the groundwater plume in the event that the plume is found to be expanding. Based upon conditions at the Site, if and when COCs are detected in the sentinel well, corrective measures alternatives will be evaluated with respect to effectiveness, implementability and cost, and a preferred alternative will be recommended by CSXT and subject to EPA and VADEQ review and approval.

Groundwater Monitoring Reports

Groundwater monitoring reports will be prepared summarizing the results of groundwater monitoring activities at the Site. Groundwater monitoring reports will include streamlined semi-annual data submissions and a more comprehensive annual report. The annual groundwater monitoring reports will be submitted to EPA and VADEQ by March 1 of each year and summarize groundwater monitoring activities conducted in the previous calendar year. The following items will be included in the annual groundwater monitoring reports, at a minimum:

a. groundwater sampling results obtained during the previous calendar year;

b. long-term time concentration plots of COCs detected at concentrations exceeding RGs;

c. when appropriate, graphic representation of groundwater plume(s) for COCs present at concentrations exceeding RGs;

d. laboratory certificates from the previous calendar year;

e. potentiometric surface maps and static groundwater level elevation data collected during each sampling event during the previous calendar year;

f. an evaluation of groundwater flow directions and gradients;

g. calculated or measured rates of migration of COCs in the groundwater;

h. when appropriate, statistically calculated background values;

i. when appropriate, statistical evaluations of the groundwater data obtained during the previous calendar year to evaluate the attainment of the RGs and the effectiveness of the remedy;

j. copies of all notifications and reports submitted to EPA and VADEQ during the previous calendar year; and

k. recommendations for any changes to the existing groundwater monitoring program.

6.4 Institutional Controls

6.4.1 Purpose

Institutional controls will be developed and implemented to support the corrective measures implemented at the Site. Given the extent and nature of impacted media left in place, more than one institutional control is necessary to prevent activities which could interfere with the integrity or protectiveness of the remedy. Accordingly, EPA's proposed remedy includes the following

institutional controls to ensure the short and long-term reliability of the remedy. Institutional controls to be utilized at the Site will:

(1) prohibit the use of the Site for residential purposes (including single family homes, multiple family dwellings, schools, day care centers, child care centers, apartment buildings, dormitories, other residential-style facilities, hospitals, and in-patient health care facilities);

(2) prohibit the use of groundwater from beneath the Site;

(3) restrict subsurface soil excavation at the Site except in conformance with an appropriate soil management plan;

(4) restrict activities that would interfere with or adversely impact the integrity of the remedy or slurry wall; and

(5) require that the cap over the containment area be periodically inspected and maintained.

6.4.2 Types of Controls

The institutional controls described above will be implemented at the Site through the following mechanisms:

- A declaration of restrictive covenant or similar instrument consistent with applicable requirements under the laws of the Commonwealth of Virginia will be recorded with the real property records for the Site such that prospective purchasers of the Site will have constructive notice of land use restrictions. The declaration of restrictive covenants will contain the land use controls described above and will be recorded with the land records in the office of the clerk of the circuit court for the jurisdiction in which the Site is located within ninety (90) days of executing the declaration. The current owner and future owners of the Site will be obligated to comply with the recorded restrictive covenant since the covenant will run with the land.

- The existing post-closure permit for the closed surface impoundment (AOC 1) will be modified to include the RCRA Corrective Action remedy decision after it is approved, and will be used as the controlling authority for implementation of the remedy through the VADEQ in consultation with EPA. The post-closure permit will also be modified, as appropriate, to include land use restrictions as described above.

- While on-Site groundwater is not currently used as a drinking water source and there are no plans for such future use, to provide additional protection, the proposed remedy includes institutional controls to prohibit the development of on-Site wells for drinking

water or other domestic uses at the Facility. A notification to prohibit well drilling under Virginia's Private Well Regulations, 12VAC 5-630-380 will be provided to the local health district (Henrico Health Department) in writing describing the nature and extent, including a map, survey description, and geographic coordinates of the Facility-related contaminated groundwater located on the Facility property and offsite. The notice will be updated every two (2) years to reflect the latest contaminated groundwater plume boundary. A copy of the notification will be provided to EPA and VADEQ.

- CSXT will be required to submit biennial review reports on the effectiveness of the institutional controls in meeting the human health and environmental protection objectives. This review may include, but not be limited to, review of CSXT's compliance with the covenant requirements, groundwater and land uses within 0.5 mile of the Facility, and zoning maps or planning documents that may affect future land use in the impacted area. Additionally, CSXT will be required to submit five (5)-year review reports on the progress of the remedial measures and of meeting the cleanup standards or RGs. The Henrico Health Department and Virginia Department of Environmental Quality, which entities are essential to the institutional controls program, will be provided with CSXT's biennial review reports and five (5)-year review reports.

EPA and VADEQ will review the progress of the remedy activities to confirm that RGs have been met. If EPA and/or VADEQ determine that CSXT is not achieving RGs, EPA and/or VADEQ may require CSXT to perform additional studies and/or to modify the existing corrective measures. If new contamination is discovered or if the proposed remedial options cannot adequately mitigate risk to human health or the environment, additional corrective measures will be developed and implemented. In the event that EPA and/or VADEQ requires CSXT to perform additional studies and/or to modify the existing corrective measures, an opportunity for public comment will be provided prior to the initiation of changes to the existing corrective measures, as necessary or appropriate.

7. EVALUATION OF PROPOSED REMEDY

This section of the SB provides a description of the criteria that 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 selection threshold criteria as general goals. In the second phase, for those remedies which meet the threshold criteria, EPA evaluates seven (7) balancing criteria to determine which proposed remedial alternative provides the best relative combination of attributes. The corrective action alternative proposed by EPA in consultation with VADEQ meets all of the evaluation criteria.

7.1 Threshold Criteria

7.1.1 Overall Protection of Human Health and the Environment

The proposed remedial alternative achieves the overall protection of human health and the environment by removing surface soils, subsurface soils and sediment in impacted areas outside of the slurry wall containment area that present potential excess risk to human and ecological receptors. The excavated soils and sediment will be consolidated in one centralized area and capped to eliminate potential exposure pathways and reduce potential risks. The excavated areas will also be backfilled with clean soil and vegetated. These steps, in combination with institutional controls that will restrict subsurface excavations, will eliminate exposure pathways to subsurface soils in areas to be excavated. Targeted removal of subsurface soils in the Landfill and Landfarm Areas (AOC 5), drainage ditch F, isolated wetland area X, and isolated wetland area A is expected to eliminate potential future human health risks associated with exposure to subsurface soils in these areas. Existing engineering controls (i.e., perimeter security fence) and institutional controls will be used to prevent uncontrolled exposure to any remaining subsurface soils with concentrations of COCs above RGs.

The slurry wall will contain the source area and most impacted groundwater at the Site and eliminate its mobility downgradient, thereby protecting human receptors who might potentially be exposed to groundwater. Targeted *in situ* treatment using chemical oxidation and monitored natural attenuation will serve as an additional polishing step to reduce dissolved phase concentrations of COCs in groundwater downgradient of the slurry wall. A monitoring program will be implemented as a further safeguard to evaluate plume stability and degradation of COCs present in groundwater outside of the slurry wall. Institutional controls will be used to prohibit future groundwater use beneath the Site.

7.1.2 Attainment of Media Cleanup Standards

Following implementation of the proposed remedy, surface soils and sediments at the Site outside of the slurry wall will comply with RGs. In the area inside of the slurry wall, RGs for soils will be attained via capping that area with clean soil and using institutional controls to eliminate potential future exposure pathways. Subsurface soils at the Site will meet RGs by

eliminating exposure pathways via capping excavated areas with clean soil and using institutional controls to restrict the potential for excavation activities affecting subsurface soils to occur except in conformance with an appropriate soil management plan.

Restoration of groundwater within the slurry wall to drinking water standards is not practical due to conditions at the Site. However, RGs for groundwater will be attained outside of the slurry wall over the long term through the targeted use of *in situ* chemical oxidation and monitored natural attenuation.

7.1.3 Source Control

The proposed remedy would control the source of releases by using a slurry wall and cap to contain and enclose the treatment area where the source of groundwater impacts is located, the level of impact is highest, and where any free product may be present. Source control will be achieved at the Site by the following steps:

- Installation of the slurry wall to isolate the source mass and eliminate the migration in groundwater of dissolved phase constituents beyond the source area;

- Consolidation and capping of soils to eliminate exposure to the most impacted soils and to eliminate leaching of COCs from those soils;

- Removal of free product from the subsurface, to the extent practical, from locations contained inside the slurry wall; and,

- Targeted *in situ* treatment of groundwater by chemical oxidation and oxidative biodegradation in certain areas outside of the slurry wall to reduce concentrations of COCs and enhance natural attenuation processes.

7.2 Balancing Criteria

7.2.1 Long-term Reliability and Effectiveness

The overall long-term reliability and effectiveness of the proposed remedy is expected to be high. Long-term reliability and effectiveness of soil and sediment excavation is considered to be high. Slurry wall containment has a high degree of reliability and effectiveness with lower maintenance requirements in comparison to other technologies used for containment. Soil consolidation and containment using a low-permeability clay cap and vegetative cover is expected to have average long-term reliability and effectiveness when compared to other effective technologies. The combination of targeted chemical oxidation and oxidative bioremediation of groundwater and natural attenuation processes for groundwater outside of the containment area is expected to have high long-term reliability and effectiveness, given source containment by the slurry wall and the expected concentrations of COCs in groundwater outside of the slurry wall. A combination of

engineering controls, institutional controls, groundwater monitoring, and O&M will be required to maintain and ensure the long-term reliability and effectiveness of the proposed remedy. Institutional controls will be necessary to limit land use at the Site to commercial and industrial purposes and to prevent uncontrolled exposure to environmental media remaining in place with concentrations of COCs above applicable RGs.

7.2.2 Reduction of Waste Toxicity, Mobility or Volume

The proposed remedy will result in the reduction of the toxicity, mobility and volume of COCs present in environmental media at the Site. The mobility of COCs at the Site will be reduced by consolidation and capping of impacted media within the slurry wall containment area. Recovery wells will be installed and used in the area inside of the slurry wall to recover accumulated free product, thereby further reducing the toxicity, mobility, and volume of COCs in soil and groundwater. Targeted chemical oxidation and oxidative bioremediation of groundwater will be used to reduce the toxicity, mobility, and volume of COCs in groundwater outside of the slurry wall containment area in addition to natural attenuation processes. Use of the slurry wall and cap around the former wood treatment area will contain and limit the mobility of COCs within identified source areas.

7.2.3 Short-Term Effectiveness

Potential short-term risks to workers at the Site, the environment, and the community posed by the proposed remedy will be controlled and minimized by implementation of good construction and work practices, use of appropriate health and safety measures, utilization of standard dust suppression techniques, implementation of erosion and sediment control measures, use of personal protection equipment, use of real-time air monitoring, and management of non-hazardous and hazardous waste in accordance with applicable federal and state requirements. The methodologies to safely perform these activities and mitigate short-term risks will be described in greater detail in the corrective measures implementation plans and associated health and safety plans.

7.2.4 Implementability

The proposed remedy is implementable. Excavation is a well-proven and readily implementable technology that is commonly used to remediate contaminated sites. The areas at the Site where excavation of soils or sediments are expected to occur are readily accessible for equipment and there is sufficient room to set up required decontamination and staging areas. The shallow excavation depths that are proposed will not require shoring or stabilization and therefore excavation procedures will be relatively simple to undertake.

Consolidating soils, constructing slurry walls, and constructing caps are well-proven and readily implementable technologies that are commonly used to remediate contaminated sites. Conditions at the Site are conducive to use of a slurry wall to contain impacted soils and

groundwater. A thick impervious layer of clay is present at a depth of approximately forty (40) feet bgs into which the slurry wall can be keyed. Sufficient work space is available onsite for construction of the slurry wall, including staging of containment berms. The topography of the Site is relatively level and conducive to completion of the slurry wall without the use of special construction procedures.

Targeted *in situ* chemical oxidation treatment and monitored natural attenuation are readily implementable technologies that are commonly used to remediate groundwater at contaminated sites in conjunction with source containment. These technologies are proven technologies for treatment of the type of dissolved phase COCs that will remain in groundwater outside of the slurry wall containment area (i.e., benzene and naphthalene) following construction of the slurry wall.

7.2.5 Cost

The total estimated cost to implement the proposed remedy for the Site is approximately $6,950,000. This cost is generally in the middle of the range of implementation costs for the suite of remedial alternatives that were evaluated.

7.2.6 Community Acceptance

Community acceptance of the proposed remedy will be determined during a public comment period.

7.2.7 State Acceptance

VADEQ has reviewed the proposed remedy for the Site concurrent with EPA and has accepted the proposed remedy prior to issuance of this SB. Furthermore, EPA has solicited state input and involvement throughout the investigation process, and the proposed remedy will be implemented pursuant to a modification of the existing permit.

8. PUBLIC COMMENT

On July 29, 2009, EPA placed an announcement in the **Richmond Times-Dispatch** to notify the public of EPA's proposed remedy for the Site and the location of the Administrative Record. Copies of the SB will be mailed to anyone who requests a copy. The Administrative Record, including this SB, is available for review during normal business hours at the following location:

U.S EPA, Region III
1650 Arch Street
Philadelphia, PA 19103
Telephone Number: (215) 814-3427
Attn: Ms. Donna McCartney

VADEQ
629 East Main Street
Richmond, VA 23219
Telephone Number: (804) 698-4393
Attn: Mr. Erich Weissbart

EPA is requesting comments from the public regarding the remedy for the Site proposed in this SB. The public comment period will last thirty (30) calendar days beginning July 29, 2009 and ending August 31, 2009. Comments on, or questions regarding, EPA's proposed remedy may be submitted to:

Ms. Donna McCartney (3LC20)
U.S. EPA, Region III
1650 Arch Street
Philadelphia, PA 19103
(215) 814-3427
FAX (215) 814-3113
Email: McCartney.Donna@epamail.epa.gov

Following the thirty (30)-day public comment period, EPA will hold a public meeting regarding 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 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 if such a meeting occurs. The FDRTC will be made available to the public. If, on the basis of public 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.

EPA anticipates that the remedy will be implemented through a Site-wide corrective action module in the Hazardous Waste Post Closure Care Permit for the CSX Transportation Incorporated facility administered by the VADEQ.