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

SDMS DocID 2121902

SUBJECT: Action Memorandum – Request for Removal Action and Exemption from the $2 Million/12-Month Statutory Limit at the Big John Salvage Superfund Site, WV

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TO: Ronald J. Borsellino, Director
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I. PURPOSE

The purpose of this Action Memorandum is to request and document approval for a proposed non-time critical removal action at the Big John Salvage Superfund Site ("Site" or "BJS Site") in Fairmont, Marion County, West Virginia. This Action "consistency" exemption request from the $2 million and 12-month limitation is made under the consistency waiver provisions of Section 104(c)(1)(C) of CERCLA, 42 U.S.C. § 9604 (c)(1)(C).

This Action Memorandum identifies the proposed responses for contaminated soil, groundwater and sediment at the BJS Site. This Action Memorandum includes the proposed response for the Monongahela River portion of the Site to reduce exposure to contaminants in a "hotspot" of industrial wastes referred to as black semi-solid deposits ("BSD") and contaminants in stained sediments closely associated with the toxic hotspot that is serving as a source of contamination to Monongahela River sediments. The BSD and visibly stained sediments contain high levels of polycyclic aromatic hydrocarbons ("PAHs").

This response action includes an area in the Monongahela River impacted by co-mingled wastes from two contiguous Superfund sites, the Big John Salvage Site and the Sharon Steel/Fairmont Coke Works Site. The Administrative Record documents that historically, aqueous wastes and uncontrolled storm water runoff at/from the two facilities contained hazardous substances, pollutants or contaminants which flowed through a common tributary to the Monongahela River. The two facilities both handled coal-tar and coal tar byproducts containing high concentrations of the PAHs present in the BSD hotspot. The BJS Site is located on Hoult Road in Fairmont, West Virginia and was placed on the National Priorities List ("NPL") on July 27, 2000. The Sharon Steel/Fairmont Coke Works Site ("FCW Site") is located on Dixie Avenue in Fairmont, West Virginia and was placed on the NPL on December 23, 1996.

The Environmental Protection Agency ("EPA") performed a site-wide Remedial Investigation for the BJS Site and included the Monongahela River in the study area. An Engineering Evaluation/Cost Analysis ("EE/CA") was conducted in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"), 40 C.F.R. § 300.415 and applicable guidance. A thirty (30)-day public comment period on the EE/CA for the non-time critical

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removal action ("NTCRA") proposed in this Action Memorandum included an advertisement placed in the Times West Virginian on October 4, 2009. On October 22, 2009, EPA and the West Virginia Department of Environmental Protection ("WVDEP") held a public meeting in Fairmont to present the draft EE/CA and solicit comment. The Administrative Record File for this NTCRA has been established pursuant to 40 C.F.R. § 300.415.

The response actions proposed in this Action Memorandum will mitigate threats to the public health, welfare, and the environment presented by the presence of an uncontrolled release of PAHs, including but not limited to naphthalene and benzo(a)pyrene, both hazardous substances listed at 40 C.F.R § 302.4 and as defined in Section 101 (14) of CERCLA, 42 U.S.C. § 9601(14). The cleanup decision is based upon analysis in the EE/CA (see Attachment 1).

The proposed response actions for the Monongahela River include dredging highly contaminated material from the river, treatment and/or off-Site disposal in an appropriately permitted facility. The response activities will require approximately 8 months to plan and 60-120 on-Site working days to complete, and will result in the removal of approximately 5,400 cubic yards of waste material. The estimated cost to implement the proposed response action for the river is $5,073,000, including 5 years of environmental monitoring.

The proposed response actions for the upland portion of the Site include consolidating contaminated sediment with contaminated soils and containing the material on-Site with a low-permeability cap and enhanced collection and treatment system for contaminated groundwater. Post-removal site controls will be implemented to preserve the integrity of the response action. The upland response activities will require approximately 18-24 months to design and complete, and will result in the isolation of contaminated soil, sediment and groundwater. The estimated present net worth cost to implement the proposed response action for the upland portion of the Site is between $12,198,000 and $13,911,000 including 30 years of operations, maintenance and environmental monitoring.

The Monongahela River has been the subject of a Remedial Investigation and EE/CA completed under the Big John Salvage Superfund Site title. However, due to the co-mingled contamination originating from both the Big John Salvage and the Sharon Steel/Fairmont Coke Works facilities, EPA will provide the opportunity for the Potentially Responsible Parties ("PRPs") from both of these Superfund Sites to cooperatively implement all of the required response actions. An obligation of funds is not necessary at this time as EPA anticipates that this action will be conducted by the PRPs.

There are no nationally significant or precedent-setting issues associated with the Site.

II. SITE CONDITIONS AND BACKGROUND

A. Site Description

1. Removal Site Evaluation

In October 2009 EPA completed, and released for public comment, the Administrative Record supporting an EE/CA addressing the Big John Salvage Superfund Site, including the Monongahela River in the study area. The Monongahela River portion of the study area is impacted by co-mingled wastes from the BJS and FCW Sites.

Environmental investigations have documented black semi-solid deposits of industrial wastes spread over approximately 1 acre of the Monongahela River bottom extending from the Sharon Steel Run confluence. The elliptical-shaped area ranges from 50-100 feet wide, extending approximately 25-50 feet upstream to approximately 350 feet downstream from the Sharon Steel Run confluence. The thickness of the BSD was reported to typically be 3-6 inches with mounds up to 12 inches thick. Analytical results from samples of BSD indicate that total PAH concentrations are in the 20,000 mg/kg range. Visibly stained sediment deposits (SSD), sediments which contain high enough mass of BSD to be visible, appear to be an erosion feature extending down gradient of the BSD. The SSD occurs in the upper 12 inches, is approximately 30 feet wide and was observed to extend 800 feet. The concentration of total PAHs in the visibly stained sediment deposits are the 1,000 mg/kg range. The intent of the NTCRA is to remove the BSD and SSD exhibiting significant toxicity from the Monongahela River and to restore the area.

Environmental investigations documented an estimated 1,800 cubic yards of buried coal tar wastes in at least 6 areas of the upland portion of the Site along with hundreds of thousands of cubic yards of soil contaminated with elevated concentrations of PAHs, including benzo(a)pyrene. Buried coal-tar wastes have seeped up to the ground surface in several areas, including the area near the existing water treatment plant. The surface and subsurface coal tar wastes are leaching hazardous constituents to groundwater, including but not limited to naphthalene.

2. Physical Location

This response action addresses the BJS Site and includes an area in the Monongahela River impacted by co-mingled wastes from two contiguous Superfund sites, the Big John Salvage Site and the Sharon Steel/Fairmont Coke Works Site. The definition of a Superfund site boundary is generally accepted to be the extent of contamination. The co-mingling of contamination extending from each of these Superfund Sites means that the respective Superfund Sites overlap within the area of concern. Accordingly, Site Conditions and Background information for each of the facilities upgradient of the area of concern within the Monongahela River will be described below.

a. Big John Salvage

The Big John Salvage Site (WVD054827944) is located in Fairmont, Marion County, West Virginia on the east bank of the Monongahela River (see Figure 1 for a general location map). The property lies along the eastern edge of WV Route 150 (Hoult Road), approximately 1,320 feet east of the Monongahela River. The extent of contamination from the Big John Salvage Site consists of both the BJS property and adjacent off-property areas sloping down to the Sharon Steel Run and extending into the Monongahela River downstream (north) of the property. The entire BJS Site is approximately 38 acres and is situated in a mixed industrial/residential area (see Figure 2). Steel Fabricators, Inc. ("Steel Fabricators") currently owns the 20-acre Big John's Property ("Big John's Property"). In terms of historic industrial use, these 20 acres constitute the most important portion of the 38-acre BJS Site (see Figure 3 for a tax parcel map).

The BJS Site also includes 18 acres of adjacent areas[1], including a low lying drainage area that is

1 The 18-acres of adjacent areas are comprised of steep slopes extending from the Big John Salvage Property down

known as the Unnamed Tributary #1 (also referred to as Sharon Steel Run). This portion of the Site is vegetated with trees and shrubs, and has steep hillsides dropping off to Sharon Steel Run and the Monongahela River. To the north and east, the Site is also bordered by generally steeply sloped, wooded terrain. Surface water runoff from the Site generally flows in a southerly direction toward Sharon Steel Run through three intermittent tributaries (East, Middle and West Tributaries). Sharon Steel Run originates south and east of the BJS Site at the Sharon Steel/Fairmont Coke Works Superfund Site and discharges to the Monongahela River.

The Monongahela River is a major river that flows northward where it discharges into the Ohio River approximately 125 miles downstream from the Site. The Site is located along a section of the Monongahela River which is known as the Opekiska water pool. This pool extends between mile marker 115.4 (Opekiska Lock) and mile marker 130 on the Monongahela River (note the confluence of Sharon Steel Run with the Monongahela River is located at approximately river mile 125.25, see Figure 4). At the confluence with Sharon Steel Run, the Monongahela River is more than 350 feet wide and 8-15 feet deep.

The Monongahela River is known to be used for multiple recreational purposes including swimming, boating and sport fishing, as well as for commerce, mainly coal and other materials barging. This river is protected as a warm-water fishery and, according to the regional fish biologist for the West Virginia Department of Natural Resources, the State stocks the Monongahela River in the area of the Site with fish. The Opekiska pool is the site of several bass-fishing tournaments throughout the year. The river is known to support a rich and diverse fish community and would be expected to provide habitat for freshwater clams and mussels, benthic invertebrates, and fishes as well as predatory terrestrial wildlife species. The significant foraging zone for predatory terrestrial wildlife would be along the shallow banks of the river. Piscivorous birds could be expected to prey on small fish throughout the river.

b. <u>Sharon Steel/Fairmont Coke Works</u>

The FCW Site (WVD000800441) is located in Fairmont, Marion County, West Virginia. The property lies along the southern edge of Suncrest Avenue approximately 1,600 feet east of the Monongahela River. The FCW Site (depicted on Figure 5 as the area within the property boundary) encompasses approximately 97 acres south-southeast of, and adjacent to, the BJS Site. Approximately 55 acres of the FCW Site were used for historical industrial operations. Approximately 7 acres located along the periphery to the north and northeast was formerly residential and commercial properties that were purchased and incorporated into the FCW Site. The remaining 35 acres include a wooded hillside that descends to the Monongahela River at the western portion of the FCW Site property. The western drainage from the FCW Site shares a common drainage system (the Unnamed Tributary) with the BJS Site. The extent of contamination from the FCW Site includes the developed portions of the property and extends into the Monongahela River downstream (north) of the property. Land surrounding the FCW Site is a mixture of industrial, commercial and residential properties.

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to the Sharon Steel Run and the Monongahela River. A portion of these 18 acres are generally included in the group of parcels comprising the FCW Site.

3. Site Characteristics

a. Big John Salvage

F.J. Lewis Manufacturing Company acquired the Big John's Property on October 24, 1925 and began refining coal tar on the Site in 1928. On December 29, 1928, F.J. Lewis changed its name to International Combustion Tar and Chemical Corporation. On December 31, 1932, International Combustion Tar and Chemical Corporation changed its name to Reilly Tar and Chemical Corporation. On May 2, 1933, Reilly Tar and Chemical Corporation changed its name to the Reilly Corporation ("Reilly"). Finally, in 2006 Reilly merged with Rutherford Chemical and changed its name to Vertellus Specialties, Inc. ("Vertellus").

Reilly processed approximately 12,000 gallons of crude coal tar per day at the BJS Site from 1928 through 1973. Most of the crude coal tar received at the Site was from the adjacent Sharon Steel/Fairmont Coke Works Site, but some crude coal tar was also received from the DuPont Belle plant in Belle, WV near Charleston. Crude tar was pumped from the railroad tank cars into storage tanks. The crude tar was then separated by distillation and condensation processes into products, which included creosote, phenol, road tar, pitch, and naphthalene. Intermediate products such as acid oil and crude acids not refined at the plant were shipped to other Reilly plants for further processing.

Wastes from the coal tar refining process included materials such as tar storage tank residues and still bottoms, lime sludge, still bottoms in the form of pitch, surplus water from the pitch pond, drainage and leakage from various plant operations, coal tar, sulfuric acid waste, water from acid oil and water separated from crude phenol distillation. The wastes generated during the years of operation were discharged through a series of impoundments at various locations throughout the Site. According to the limited historical documents available, the impoundments received industrial wastes from various sewers and drainage ditches located on the property in addition to the cooling waters, acid wastes, and tar wastes. Discharge from the impoundments reportedly flowed into the East and West Tributaries, then to Sharon Steel Run and eventually into the Monongahela River.

In January 1973, Reilly sold the property to Big John Salvage, Inc. Big John Salvage owned and operated a salvage facility on the property until approximately 1984. During its operation, Big John Salvage accepted various scrap and salvageable materials as well as waste materials at the property. Some of the material disposed at the property included glass cullet (crushed non-saleable fluorescent light bulbs), lead dust, and mercury-containing oil from the Westinghouse Electrical Corporation's ("WEC") light bulb manufacturing plant located across the street from the Big John's Property. Westinghouse Electric Corporation later merged with Viacom Inc. and the new entity changed its name to CBS Corporation.

The salvage operation also disposed of drums containing petroleum distillates, xylene, turpentine, and other hazardous and non-hazardous substances from sources other than WEC. The contents of the drums were reportedly emptied into holding tanks at the Big John's Property. The emptied drums were rinsed on-Site and then were reportedly transported off-Site.

On June 11, 1984, Big John's Salvage, Inc. filed for bankruptcy under Chapter 11 of the Bankruptcy Act. In 1990, the property was acquired by the state of West Virginia for nonpayment of taxes. In August 1992, the property was turned over to Marion County by the State. On November 14, 1997, the Deputy Commissioner of Delinquent and Nonentered Lands of Marion County, West Virginia, transferred title of the Big John's Property to Steel Fabricators, Inc., who is the current owner of the

Big John's Property. Steel Fabricators had used the Big John's Property for logging-related operations prior to the start of removal operations at the Site in 2000.

b. Fairmont Coke Works

In 1918, Domestic Coke Corporation, a predecessor of ExxonMobil purchased the FCS Site property for the construction and operation of a 60-oven by-product coke facility. Domestic Coke Corporation operated the coke plant from 1920 through 1948. Sharon Steel Corporation acquired the property and facility in 1948 and operated it until 1979, when the facility shut down. In 1991, Sharon Steel filed for bankruptcy and ownership of the property was transferred to FAC, Inc., a subsidiary of Sharon Steel Corporation. In June 1998, Green Bluff Development, Inc., a subsidiary of ExxonMobil Corporation, purchased the Site to facilitate cleanup.

During operation, the facility processed approximately 1,000 tons of coal daily to produce coke. By-products were produced from the coke-making process and included coal tar, phenol, ammonium sulfate, benzene, toluene, xylene, and coke oven gas. Facilities and process included: coke ovens, coal and coke handling facilities by-product recovery structures, coal tar tanks, other product and production intermediate tanks, gas scrubbers, and machinery and maintenance buildings. Coal tar was sold to Reilly Tar and Chemical Corporation. Coke oven gas was distributed by the local utility company.

Plant wastes were disposed of on-Site in landfills, sludge ponds, or waste piles located at the western portion of the property. Since 1920 solid wastes were deposited in two on-Site landfills: the North Landfill and the South Landfill. Starting in the early 1960s, process water from the coke plant was treated in two wastewater oxidation impoundments: Oxidation Impoundment #1 and Oxidation Impoundment #2. The impoundments were constructed along a former drainage ditch on the west end of the plant production area and discharged to Sharon Steel Run. Tar sludge from the oil recovery operations was placed in a pit referred to as the Waste Tar Pit, located in the central plant area (northeast area of the property) near the decanter tanks. Breeze (fine grained residue from coal and coke handling) was deposited in the Breeze Pile, adjacent to the North Landfill.

B. Other Actions to Date

1. Previous Actions

a. Big John Salvage

The BJS Site has been subject to regulatory interest since at least the late 1930's. The West Virginia State Water Commission ("WV Water Commission") issued a report dated October 18, 1940 which documents the Water Commission's efforts over several years to get Reilly to install treatment measures to remove tar and phenol from their effluent. The Administrative Record includes copies of official correspondence between West Virginia public health officials and Reilly documenting a steady pattern of engagement between 1940 and 1973 as regulators investigated problematic releases from the facility to the environment and subsequently attempted to direct Reilly to mitigate the releases identified.

In the early 1980's WVDNR became aware that the Big John's Salvage operation at the BJS Site was accepting hazardous materials for disposal from the nearby Westinghouse Electric Corporation ("WEC"). This led the State to conduct an inspection performed pursuant to the Resource

Conservation and Recovery Act ("RCRA") during which conditions observed led to the State requesting assistance from EPA to assess potential hazards.

In May 1983, EPA performed a preliminary assessment that included sampling of various soil, sediment, and surface water at the Site. At the time of the initial inspection, storage tanks, an oil/water separator system, a cullet pile, tar pits, and 75-100 drums were observed as concerns for the Site. Based on the results of the analyses, EPA determined that hazardous substances at the Site presented immediate threats to human health and the environment. In June 1983, EPA requested that Big John Salvage, Inc., WEC, and Reilly, as Site PRPs take actions to abate the immediate threat posed by hazardous substances at the Site. The PRPs declined to take immediate action.

EPA initiated removal actions in July 1983 which included an extent-of-contamination survey. An EPA contractor also installed sediment erosion control silt fencing and perimeter Site fence around critical areas on the Site.

In January 1984, EPA entered into a Consent Order with the owner of Big John Salvage, Inc., requiring the removal of all drums and cullet piles. The order also required Big John Salvage, Inc., to drain the oil separator and complete all work by June of 1984. EPA also collected additional samples in January 1984. Based on the January 1984 findings, the Center for Disease Control ("CDC"), with consultation from EPA, advised that the Site continued to present an imminent and substantial threat to human health and the environment in April 1984.

Although Big John Salvage, Inc. had conducted some mitigation efforts in early 1984, it filed for bankruptcy in May 1984, and EPA subsequently determined in June 1984 that insufficient work had been completed to mitigate the risk. EPA issued further demand letters to PRPs in July 1984. Although bankrupt, Big John Salvage, Inc. advised of its intent to pursue cleanup of the cullet pile; however, the company ultimately did not remove the cullet pile. Further, WEC advised EPA of its refusal to take action at the Site at that time.

Reilly subsequently expressed interest in performing mitigation efforts attributable to its past operations, and ultimately, a Consent Order, EPA Docket Number III-85-2-DC ("Reilly Order") was executed in October 1984 wherein Reilly agreed to remove all on-Site coal tar related wastes. The primary mitigation action conducted by Reilly was started on October 30, 1984, and completed on April 16, 1985, when EPA concurred with Reilly's conclusion that cleanup actions specified under the Reilly Order were completed. During this initial removal action, Reilly removed 4,100 tons of coal tar waste solids and 18,500 tons of liquid non-hazardous waste.

In October 1991, the West Virginia Department of Natural Resources ("WVDNR") conducted an inspection of the Site and found various containers with potentially hazardous substances. EPA contractors collected samples and confirmed the presence of hazardous materials. EPA conducted further reconnaissance in May 1992 identifying more than 100 containers at the Site (presumably placed at the Site sometime between 1985 and 1991). EPA implemented a removal action and 129 overpacked drums and 39 cubic yards of asbestos were properly disposed off-Site. Removal operations ended on March 31, 1993.

In March 1998, a West Virginia Department of Environmental Protection ("WVDEP") inspection performed pursuant to the Resource Conservation and Recovery Act ("RCRA") discovered that a previously empty 20,000-gallon vertical tank had been removed from the BJS Site and transported to the adjacent Sharon Steel Property. The tank was later found to contain used oil or coal tar oil.

WVDEP also observed two large excavation pits containing used oil at the Site, and requested EPA assistance to assess potential hazards in April 1998. The City of Fairmont and WVDEP expressed concern about the Site operations being conducted by Steel Fabricators, Inc. and the potential release of hazardous substances from the Site to the Monongahela River. Sampling conducted by EPA in May 1998 confirmed the presence of oil, antifreeze, and diesel fuel in the pits, as well as CERCLA hazardous substances. Initial oil removal actions commenced in May 1998, but the scope of this work was ultimately expanded to include all waste oil removal and on-Site stabilization of oil-saturated soil with cement kiln dust. Approximately 10,413 gallons of waste oil and 521 tons of non-hazardous stabilized soil from the pits were removed and disposed of off-Site. The removal action was completed in December 1998.

In 2000, EPA determined that significant hazardous substances remained at the BJS Site, which presented both short-term immediate threats and long-term risks to human health and the environment. EPA initiated a two-part strategy to take immediate action pursuant to CERCLA removal authorities to address the short-term threats and to list the Site on the NPL, making the property eligible for long-term remedial action necessary to make the property safe for reuse.

On March 31, 2000, EPA issued a Determination of Threat to Public Health or Welfare or the Environment, which found that conditions at the Site presented an imminent and substantial endangerment to the public health or welfare or the environment. The determination of threat identified two circumstances at the BJS Site which required immediate action to abate risk. First, glass cullet was present in large piles at the surface containing elevated levels of inorganic hazardous substances, including but not limited to mercury and lead. Secondly, coal tar and coal tar byproducts such as polyaromatic hydrocarbons (PAHs) containing hazardous substances, including but not limited to benzo(a)pyrene, were actively migrating from the BJS Site via steep ravines (referred to as the East Tributary and the Middle Tributary) leading to Sharon Steel Run and flowing onward toward the Monongahela River.

In April 2000, EPA notified the PRPs through a Removal Notice Letter of its intent to perform response actions at the BJS Site. EPA subsequently negotiated an Administrative Order on Consent ("AOC") with Viacom, Inc. (which had merged with WEC) and Steel Fabricators, Inc. in September 2000 to clean up the cullet and associated contamination from the cullet. Cullet removal operations by the AOC signatory PRPs began in October 2000 and ended in July 2001. EPA subsequently approved the final report for the cullet removal in August 2001. Nearly 7,300 tons of cullet was removed (approximately 4,000 tons of which were disposed of as RCRA characteristic hazardous waste for lead and mercury, D008 and D009, respectively). Nearly 16,000 gallons of water were removed from the sedimentation basins, which were also disposed of as hazardous. However, excavation of the cullet area revealed additional coal tar contaminated soils in the area formerly overlain by the cullet pile. Therefore, some cullet mixed with coal tar derivatives were left on-Site after the cullet removal action. Additionally, the mercury cleanup level during this time-critical removal was 610 mg/kg; the lead cleanup level was 1,000 mg/kg. Areas containing mercury at concentrations less than 610 mg/kg and lead at concentrations less than 1,000 mg/kg were not excavated, leaving mercury and lead in surface soils up to 609 mg/kg and 999 mg/kg, respectively. Mercury and lead are listed as hazardous substances at 40 C.F.R § 302.4 and as defined in Section 101 (14) of CERCLA, 42 U.S.C. § 9601(14).

Reilly (now known as "Vertellus"), the former owner/operator of the coal tar refinery on the Site declined the invitation to enter into an AOC to address coal tar wastes. In September 2000, EPA issued a Unilateral Administrative Order ("UAO") directing Reilly to mitigate the imminent and

substantial threat presented by coal-tar derivatives migrating down the ravines and off-Site. Under the terms of the UAO, Reilly submitted a remedial action plan ("RAP") to EPA in October 2000, and with EPA approval, Reilly began on-Site response actions in November 2000. During the period November 2000 through May 2001, Reilly conducted a variety of remedial measures, including the excavation and on-Site stockpiling of approximately 3,000 tons of coal tar contaminated soil/sediment from the East and Middle Tributaries, and the installation of a tar collection system in the East and Middle Tributaries. These systems were designed to collect tar and contaminated water migrating from the upland areas down-slope and into a manhole located at the base of the respective tributary, which is then pumped to an on-Site pre-treatment system with the effluent ultimately discharged to the City of Fairmont sewer system for final treatment. Reilly continues to operate and maintain this collection and treatment system.

On May 11, 2001, representatives from EPA, WVDEP, and Reilly met to identify outstanding removal work at the Site. Following this meeting, Reilly was notified in writing by EPA on May 16, 2001 of specific work tasks that still needed to be completed to meet the requirements of the UAO. On June 15, 2001, Reilly responded to EPA indicating they were only willing to conduct a limited amount of the work required by EPA. EPA reiterated to Reilly the requirement to fully implement the actions described in EPA's May 16, 2001 letter. Reilly responded verbally on August 30, 2001 and in writing on August 31, 2001, that they were unwilling to undertake the actions necessary to fully address the EPA items. Due to Reilly's refusal to fully implement the requirements outlined in the UAO, EPA signed an Action Memorandum on September 21, 2001, for additional funding and an exemption from the statutory limits for a removal action.

In October 2001, the EPA began additional Site stabilization and removal actions. The primary activities completed during this removal action included consolidation and disposal of contaminated soil excavated by Reilly, excavation and backfilling of additional coal tar contaminated areas and mixed coal tar and cullet areas, demolition of on-Site buildings, removal of asbestos material, and construction of an access road along Sharon Steel Run. Most significant to the scope of this action memorandum, EPA's removal work included excavation of contaminated sediments from Sharon Steel Run and the settling pond near the confluence of Sharon Steel Run with the Monongahela River. With the Site reasonably stabilized, this removal effort was completed in July 2003. During this action, approximately 194 tons of non-hazardous waste and 3,000 tons of hazardous waste were removed from the Site. In addition, approximately 44,000 cubic yards of excavated soil and sediment remained staged on-Site at the completion of this effort. The soil piles created are to be addressed as part of the response action proposed to be implemented under this Action Memorandum.

In late 2007, an EPA contractor cleaned out accumulated sediments from the settling pond near the confluence of Sharon Steel Run with the Monongahela River. Approximately 8,000 cubic yards of sediments were consolidated on the upland portion of the BJS Site.

b. Fairmont Coke Works

From May 1993 through August 2, 1996, EPA completed an emergency removal action at the FCW Site to stabilize the Site. During this removal action EPA addressed the contents of approximately 250 containers of unknown laboratory chemicals and several large above ground tanks. EPA properly disposed of suspected asbestos containing building materials, disposed of approximately 650 gallons of PCB-containing oil, and separated and disposed approximately 26,100 gallons of emulsified oil from water remaining on-Site. EPA treated and properly disposed approximately 1.5

million gallons of benzene-contaminated water from the FCW Site. Several large tanks were decontaminated and dismantled.

EPA modified a sludge impoundment to act as a temporary holding impoundment for coal and coke dust (referred to as "breeze") which had been migrating off-Site due to storm water erosion. An estimated 12,000 cubic yards of breeze was consolidated in the sludge impoundment and covered with a 60-millimeter HDPE cover.

Solidification and stabilization techniques were utilized on approximately 34,000 tons of process sludge from the former and existing oxidation ponds. The former oxidation pond was re-graded to shed water and the existing oxidation pond was rehabilitated to treat contaminated storm water run off from the FCW Site during removal operations.

To minimize potential failure of the northern slope of the north landfill, the unstable northeastern toe of the north landfill was removed and the material was consolidated on the south and west sections of the landfill. A temporary soil cover was installed over the entire north landfill.

During the removal action, erosion control measures were employed and surface water management at the FCW Site was improved with engineering controls. These controls were implemented to contain and direct storm water from contaminated portions of the FCW Site to the remaining oxidation pond for treatment via settling and pH adjustment (low pH runoff was treated with soda ash to increase the pH) prior to discharge the Unnamed Tributary. Storm water from clean areas was redirected away from contaminated areas and directly to the Unnamed Tributary.

EPA terminated its emergency removal activities on August 2, 1996.

Following completion of the EPA removal action, the acidic storm water continued to be discharged from the FCW Site. On November 30, 1999, the WVDEP directed ExxonMobil to remove the oxidation pond and implement interim treatment measures for Site storm water discharges. In 2000, ExxonMobil completed removal of the oxidation pond, replacing it with a limestone riprap channel to control the pH of the Site discharge. As part of that work, ExxonMobil also removed the sludge impoundment and staged the contents on-Site for later treatment or disposal.

2. Current Actions

a. <u>Big John Salvage</u>

Vertellus continues to operate and maintain the tar seep and contaminated groundwater collection and treatment system installed at the Middle and East Tributaries. This work component is being performed in accordance with the approved Response Action Plan submitted in accordance with the September 2000 UAO directing Reilly to mitigate the imminent and substantial threat presented by coal-tar derivatives migrating down the ravines and off-Site. The system intercepts tar seeps and contaminated groundwater (i.e., tar derivatives) by collecting the liquids migrating down-slope into a manhole located at the base of the respective tributary, which is then pumped to a pre-treatment system housed in a trailer on the Big John Salvage Site. The on-Site treatment plant effluent is discharged to the City of Fairmont sewer system for final treatment in accordance with the terms of an agreement between Vertellus and the City of Fairmont.

Approximately 44,000 cubic yards of contaminated sediments from Sharon Steel Run and the

settling pond excavated by EPA during previous removal-related responses remain staged on-Site. Vertellus maintains surface drainage ways by cleaning culverts and check dams and taking action to correct erosion features in accordance with a voluntary informal agreement with EPA. Vertellus submits a monthly progress report describing on-going work, Site observations, and conveying all environmental sampling data to EPA.

b. Fairmont Coke Works

On September 17, 1997, EPA and ExxonMobil entered into an Administrative Order on Consent for Remedial Investigation/Feasibility Study ("RI/FS Order"). On December 11, 1998 EPA and ExxonMobil suspended performance of the RI/FS AOC in favor of an Administrative Order on Consent the parties entered into as part of EPA's "Project XL," a program developed to test innovative environmental management strategies. Under the Project XL agreement, the strategy for cleanup includes implementation of Non-Time Critical Removal Actions to address the major source areas to be followed by an RI/FS and ROD to address groundwater and any other concerns which may exist due to post removal residual contamination. Phase I and Phase II EE/CAs were conducted by ExxonMobil with EPA and WVDEP oversight. Action Memoranda approving the Phase I and Phase II EE/CAs were issued by EPA on June 6, 2000 and July 23, 2003, respectively.

Implementation of the response actions outlined in the EE/CAs began in 2003 are projected for completion in 2011. Major components of the on-going NTCRA include excavation and treatment and/or disposal of wastes and contaminated soils exceeding Site-specific cleanup standards from the North Landfill, the South Landfill and the Former Process Area. In addition, materials have been excavated from the Light Oil Storage Area and the Coal Storage and Coke Handling Area. All off-site treatment and/or disposal activities are being carried out in accordance with CERCLA 121(d)(3) and 40 CFR 300.440. As of August 31, 2010:

- 486,110 tons of synthetic fuel has been generated by blending excavated wastes from Site landfills with coal and other amendments. This product is not RCRA-characteristic waste and was shipped off-Site for energy recovery
- 6,100 tons of high BTU waste materials have been shipped off-Site for energy recovery
- Approximately 163,000 tons of contaminated but non-hazardous soils were disposed of at appropriately permitted landfills
- Approximately 17,000 tons of contaminated soil determined to be RCRA-characteristic hazardous waste have been shipped to RCRA-permitted facilities for appropriate treatment and/or disposal

The on-going response actions selected in the EE/CAs are nearing completion and have reportedly cost ExxonMobil in excess of $50 million to implement. Systematic post-excavation confirmation samples conduct for each 50ft x 50ft grid provide a high degree of confidence that source removal and risk reduction goals will be achieved. Since 2000, all storm water coming in contact with contaminated ground surfaces at the FCW Site has been treated in an on-Site water treatment plant prior to its discharge to Sharon Steel Run. The treated effluent has been in compliance with its West Virginia Pollution Discharge Elimination System permit. The NTCRA source removal and on-going control of runoff from the FCW Site are significant factors in ensuring that the Monongahela River will not be re-contaminated with Site-related contaminants after the BSD hotspot removal actions proposed in the Action Memorandum are completed.

Groundwater monitoring wells are being installed to support a final RI/FS. EPA expects to re-activate the suspended RI/FS AOC with ExxonMobil in late 2010. ExxonMobil will conduct an RI/FS for the FCW Site and a Record of Decision addressing the groundwater and any other outstanding matters will follow.

C. Release or threatened release into the environment of a hazardous substance, or pollutant or contaminant

Several field sampling events and underwater surveys were conducted by EPA, WVDEP and Vertellus over a two river mile reach of the Monongahela River near its confluence with Sharon Steel Run. Surface water and sediment were sampled in April 2005 and April 2007 as part of a Remedial Investigation. Vertellus conducted underwater river surveys and sediment/waste material sampling in June 2005 and April 2006. A summary of the field sampling results is presented in the EE/CA Report prepared by Tetratech on behalf of EPA, dated September 2010 and the Administrative Record (see Figure 4 for map of impacted areas).

A wide variety of PAHs were detected in river sediments during EPA's RI sampling, and total PAH concentrations in the river sediment increase substantially along the eastern bank below the confluence with Sharon Steel Run. A black semi-solid deposit (BSD) was observed approximately downstream from the confluence. High total PAH concentrations (>1,500 mg/kg) were detected by EPA in sediments approximately 1 foot below the river bottom approximately 300 feet downstream from the confluence in an area of stained sediment just outside the BSD.

In a separate investigation conducted in June 2005 and April 2006, Vertellus delineated highly impacted river sediment areas downstream of the confluence. Vertellus mapped the extent of BSD with field sampling techniques and confirmed the findings using divers. The underwater visual inspection indicated the presence of the BSD extending at least 50-75 feet away from the east bank, and approximately 350 feet downstream from the confluence. The BSD was also observed extending about 25 feet upstream of the current confluence location. The thickness of the BSD was reported to typically be 3-6 inches with mounds up to 12 inches thick.

The divers also delineated stained sediments approximately 40 feet off the eastern shore under a surficial layer of clean sediments extending at least 800 feet downstream. Stained sediment deposits (SSD), sediments which contain high enough mass of BSD to be visible, appear to be an erosion feature extending down gradient of the BSD. The SSD appears to be approximately 30 feet wide.

Reilly collected samples of the BSD and reported total PAH concentrations for most samples in excess of 20,000 mg/kg. The BSD includes elevated concentrations of many PAHs, including but not limited to benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenzo(a,h)anthracene; each of these specific PAHs are listed as hazardous substances at 40 C.F.R § 302.4 and as defined in Section 101 (14) of CERCLA, 42 U.S.C. § 9601(14).

The concentration of PAHs drops rapidly outside this BSD/SSD area. River sediment sampling conducted to support RI ecological characterization activities indicated that the total PAH concentrations in the shallow river sediment outside the BSD/SSD hotspot area ranged from 1.89 mg/kg to 4.76 mg/kg. The surface sediment locations collected in the BSD/SSD area had higher total PAH concentrations detected at 27 mg/kg and 1,289 mg/kg. The upstream/background station had a concentration of 2.75 mg/kg total PAH in surface sediment. Concentrations of total

PAHs in subsurface sediments (2 to 5 feet below the river bottom) are in the 20-52 mg/kg range over a much larger area outside the BSD/SSD.

Surface water sampling conducted in April 2005 and April 2007 indicated that the discharge from Sharon Steel Run was not significantly affecting the Monongahela River water quality, as there was no major change in water quality observed above and below the confluence.

In addition to surface water and sediment sampling, sampling was also conducted in the Monongahela River to support ecological characterization. This included fish sampling for histopathology, macroinvertebrate (clam) sampling, and sediment sampling for toxicity testing.

The fish histopathology findings concluded that a number of changes observed in the fish (abnormal bile ducts, altered foci, and abnormal hepatocytes) suggests exposure to contaminants, most likely ones metabolized by the liver.

Clam samples were collected from two locations in the river—one from a location with relatively unimpacted sediments (total PAH concentrations < 2 mg/kg), and one from a location heavily impacted (total PAH concentrations ~ 1,300 mg/kg). The total PAH concentration in clam tissue collected from the less impacted location was 710 ug/kg, whereas the total PAH concentration in clam tissue collected from the impacted sediment location was 220 mg/kg, which clearly indicates PAH uptake into the clam tissue.

Sediment toxicity tests revealed that the sediment collected from the vicinity of the BSD caused significant mortality to Hyalella azteca after 28 days of exposure (note that this location, SD-07, also had a total PAH concentration of ~ 1,300 mg/kg). However, no other sediment locations were found to be significantly different from the reference control sediment with respect to toxicity.

The Human Health Risk Assessment for the Big John Salvage RI considered potential exposure to Monongahela River surface water and sediments by recreational users. The risk assessment used Site-specific exposure assumptions for recreational users and toxicological values for carcinogenic PAHs identified within the "total PAH"[2] concentrations reported. EPA's generally acceptable risk range for Site-related exposures is between 1 in 10,000 and 1 in 1,000,000. The risk assessment back-calculated to determine that a benzo(a)pyrene concentration of 2.0 mg/kg in sediment corresponds to a lifetime cancer risk of 1 in 10,000. Concentration levels of benzo(a)pyrene in the BSD and stained sediments in the hotspot area represents an excess cancer risk of greater than 1 in 1,000, exceeding EPA's cancer risk management guidelines.

Environmental sampling of on-Site soil by EPA identified elevated concentrations of PAHs throughout the upland portion of the Site. Nearly seventy-five percent of the locations sampled contained elevated concentrations of PAHs. PAH concentrations were greater than 1,500 mg/kg in surface soils and greater than 20,000 mg/kg in subsurface samples. In addition, semi-solid pools/patches of coal tar are present on the ground surface in several areas throughout the Site. These pools/patches of coal tar are known to contain greater than 20,000 mg/kg PAHs. The Human Health Risk Assessment for the Big John Salvage RI used Site-specific exposure

2 Risk to ecological receptors is most appropriately evaluated by considering "total PAH" concentration. Potential health risks to people are evaluated by considering toxicological profiles of individual PAHs. Benzo(a)pyrene is a good indicator compound because of its toxicity relative to other constituents makes it a "risk driver."

assumptions for future industrial workers and determined that surface soil presents a lifetime cancer risk greater 1 in 10,000 primarily due to the PAH, benzo(a)pyrene. Environmental Sampling of on-Site soil conducted by Viacom determined that concentrations of mercury up to 610 mg/kg remain in surface soils in the area of the former cullet piles near the West Tributary.

Sediment sampling conducted by EPA identified elevated PAH concentrations in the upland drainage ways, with the highest concentrations between 297 mg/kg and 510 mg/kg total PAHs in the Unnamed Tributary #2. Elevated metal concentrations in drainage way sediment included mercury (up to 9 mg/kg) and lead (up to 699 mg/kg). The Ecological Risk Assessment concluded that unacceptable risk to ecological receptors is presented primarily due to elevated concentrations of PAHs and mercury in the upland habitat areas, and PAHs, mercury and lead in the upland aquatic habitat areas.

Groundwater sampling conducted by EPA identified elevated concentrations of benzene and PAHs, predominantly naphthalene present in the overburden aquifer in the central portion of the Site in areas consistent with historical operations. The highest total PAH concentrations in groundwater were more than 3,000 µg/kg. No non-aquous phase liquids were observed in the constructed monitoring wells; however, non-aquous phase liquids continue to be collected in the contaminated groundwater and seep collection system extraction point at the bottom of the Eastern Tributary. The continuing seepage of non-aquous phase liquids to the Eastern Tributary is evidence that a local source area is present in the up-gradient upland portion of the Site. The human health risk assessment used Site-specific exposure assumptions for a future resident accessing the groundwater as a potable source and determined that groundwater presents a lifetime cancer risk greater 1 in 10,000 primarily due to the PAHs benzo(a)anthracene, benzo(b)fluoranthene, and benzo(k)fluoranthene and arsenic. Considering the same exposure assumptions, the risk assessment determined that groundwater presents an unacceptable non-carcinogenic risk primarily due to naphthalene.

Surface water sampling conducted by EPA in Sharon Steel Run and the Unnamed Tributary #2 identified elevated concentrations of benzene and several PAHs, including naphthalene, benzo(a)anthracene and benzo(b)fluoranthene. The human health risk assessment used Site-specific exposure assumptions for a current/future recreational user of the Site and determined that surface water presents a lifetime cancer risk greater than 1 in 1,000 primarily due to benzene and the PAHs benzo(a)pyrene, benzo(a)anthracene, and benzo(b)fluoranthene. The source of the organic contaminants in the surface water is likely discharge from the overburden aquifer in the area, potentially from contaminant sources located on Site as well as from the adjacent FCW Site, which historically has high benzene concentrations in groundwater.

D. National Priorities List

The 38-acre Big John Salvage Site is located on Hoult Road in Fairmont, West Virginia and was placed on the National Priorities List ("NPL") on July 27, 2000.

The 97-acre Sharon Steel/Fairmont Coke Works Site is located on Dixie Avenue in Fairmont, West Virginia and was placed on the NPL on December 23, 1996.

E. State and Local Authorities' Roles

The West Virginia Department of the Environmental Protection ("WVDEP")(and its predecessor

agencies) has responded to a long history of incidents of non-compliance with environmental regulations with respect to facility operations at both the FCW Site and Big John Salvage Site. See Section II.C.1 (Previous Actions) and the Administrative Record for additional details on past response actions.

On April 1, 2005, WVDEP issued an Administrative Order (Order 5711) requiring Reilly Industries (aka Vertellus) to take corrective action to clean up "deposits" on the bottom of the Monongahela River near the mouth of the Sharon Steel Run. Reilly Industries appealed WVDEPs decision to issue Order 5711, arguing before the WV Environmental Quality Board ("Board"), Charleston, West Virginia that the action was unwarranted considering that an EPA CERCLA action to cleanup the Big John Salvage Site would consider clean-up of the Monongahela River, and that other nearby property owners were responsible for the hotspot cleanup in the river. On December 28, 2006 the Board vacated Order 5711, finding that there was not enough evidence in the record to establish that Reilly Industries was the sole source of the BSD at the bottom of the Monongahela River.

The WVDEP has assumed the role of a support agency for the ongoing Superfund removal and remedial activities at both the BJS and the FCW Sites. WVDEP provided technical support during preparation of the RI, the EE/CA and participated in the public meeting held to present the EE/CA to stakeholders for comment. West Virginia has been informed about, and concurs with, the proposed non-time-critical removal action for the BSD hotspot described in this Action Memorandum. WVDEP informed EPA that the State of West Virginia does not have the resources to undertake the work.

III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT

40 C.F.R. §300.415(b)(2) of the NCP outlines the factors which should be considered in determining the appropriateness of a removal action. The following factors from §300.415(b)(2) are directly applicable to the conditions present on Site which the action proposed in this Action Memorandum will address. These factors are as follows:

A. 300.415(b)(2)(i) "Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants"

This factor is present at the Site due to the presence of high concentrations of hazardous substances, pollutants or contaminants in tar seeps on the ground surface and the BSD and visibly stained sediments closely associated with the hotspot extending from the point that Sharon Steel Run discharges to the Monongahela River. The BSD and SSD are contaminated with PAHs, including but not limited to benzo(a)pyrene, in an area of approximately 1 ½ acres along the Monongahela River bottom. Access to the Monongahela River is unrestricted to humans using the Site for recreational activities including fishing and swimming. A frequently utilized rails-to-trails-type public hiking and biking path extends along the river between the contiguous Big John Salvage and Sharon Steel/Fairmont Coke Works Superfund Sites and the hotspot in the river. Wildlife in the area also has unrestricted access. Sediment toxicity tests revealed that the sediment collected from the vicinity of the BSD caused significant mortality to laboratory test species (total PAH concentration of ~1,300 mg/kg).

Conditions at the Site pose an imminent threat to human health. EPA conducted a baseline risk assessment to support the EE/CA. The quantitative risk evaluation included samples collected during performance of the RI and was supplemented with additional samples collected from hotspot BSD area by PRPs. For potential carcinogenic risks, EPA's acceptable risk range is 10^{-4} to 10^{-6}. The cumulative carcinogenic risk estimate for the Recreational Reasonable Maximum Exposure scenario is greater than 1×10^{-3} and was related primarily to carcinogenic PAHs, evaluated as benzo(a)pyrene equivalents.

The semi-solid pools/patches of tar present on the ground surface in the upland portion of the Site present significant potential for exposure to trespassers and wildlife accessing the Site.

B. 300.415(b)(2)(iv) "High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface that may migrate"

This factor is present at the Site due to the existence of high concentrations of PAHs (>20,000 mg/kg) in the black semi-solid deposits and BSD-stained sediments at or near the surface of the river bottom. The BSD are cohesive along the river bottom and not likely to scour away during a single flood event as evidence by the continued presence of the BSD hotspot 30-40 years after coal tar processing has been terminated at the two Superfund Sites. However, the visibly stained sediments extending downriver of the BSD area appear to contain small particles of BSD material which have eroded from the larger mass and subsequently contaminated adjacent sediments with approximately 1,000 mg/kg total PAHs. Ecological toxicity tests conducted on sediment with greater than 1,000 mg/kg demonstrated acute toxicity to laboratory test organisms. Native aquatic organisms in the vicinity are being exposed to the contaminated sediments. The BSD/SSD is susceptible to erosion and the contaminants in the BSD area act as a source of sediment contamination further down the Monongahela River.

Contaminated soils containing elevated concentrations of PAHs, arsenic and mercury and tar seeps containing high concentrations of PAHs are exposed on the surface of the Site. The contaminated soil and tar at the surface is exposed and susceptible to erosion from water and wind and may migrate from the upland portion of the Site and act as a continuing source of sediment contamination in the upland drainage ways and the Monongahela River.

C. 300.415(b)(2)(v) "Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released"

The Monongahela River is subject to periodic extreme weather conditions as heavy spring rains and/or summer storms increase river volume and current velocity, which lead to increased scouring of the river bottom. The high concentrations of PAHs (>20,000 mg/kg) in the BSD and stained sediments at or near the surface of the river bottom are more likely to be transported and deposited further down-river during periods of high energy. The BSD are cohesive along the river bottom and not likely to scour away during a single flood event but the visibly stained sediments extending downriver of the BSD area appear to contain small particles of BSD material which have eroded from the larger mass and subsequently contaminated adjacent sediments with approximately 1,000 mg/kg total PAHs. The BSD is susceptible to erosion during extreme precipitation and the contaminants in the BSD area act as a source of sediment contamination further down the Monongahela River.

D. 300.415(b)(2)(vii) "The availability of other appropriate federal or state response mechanisms to respond to the release"

The WVDEP, the City of Fairmont, and Marion County do not possess the resources to undertake a removal response of this magnitude at this time. Although both the Big John Salvage Site and the Sharon Steel/Fairmont Coke Works Sites are on the NPL, a non-time critical removal action is the best mechanism to address the hotspot of PAHs exhibiting acute toxicity to aquatic animals in the river and the unacceptable risks presented by hazardous substances in soil, sediment and groundwater in the upland portion of the Site in a timely manner. All removal activities will be consistent with any future remedial actions.

IV. ENDANGERMENT DETERMINATION

An imminent and substantial threat to human health, welfare, and the environment exists due to the potential exposure of humans and animals to high concentration of contaminants in the BSD/SSD area sediments and soils and groundwater in the upland portion of the Site. Contaminants in the BSD/SSD area are subject to flood-related contaminant migration. EPA has determined that the Site meets the criteria for a removal action under Section 300.415 of the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP")(40 C.F.R. §300.415). A sufficient planning period existed before activities for this action had to be initiated, and accordingly, this response is being conducted as a Non-time Critical Removal Action ("NTCRA"). The goals of the NTCRA are to:

- Reduce ecological and human health risk levels stemming from exposure to BSD and highly contaminated stained sediments by removing the industrial wastes and decreasing the concentration of PAHs in river sediments
- Reduce ecological and human health risk levels presented by exposure to contaminated soil and sediment in the upland portion of the Site
- Reduce the potential risk presented by contaminated groundwater migrating from the Site

This NTCRA will remove the hotspot of PAHs from the river bottom thereby eliminating acute toxicity in the short term. EPA expects that this removal will create conditions that will enable the monitored natural recovery processes to further degrade the remaining PAHs to concentrations that are within EPA's target risk range within a reasonable time period. In addition, the industrial wastes will be removed from the river bottom, thus decreasing the likelihood that highly toxic materials would be eroded further down river. EPA anticipates issuing a Record of Decision ("ROD") after post-removal environmental monitoring records the effectiveness of the removal in risk reduction and tracks the effectiveness of on-going monitored natural recovery. The response action EPA is proposing in this Action Memorandum is consistent with the long-term remediation goals required by the NCP. Potential exposure to contaminated soil and sediments in the uplands portion of the Site will be minimized with a low-permeability cap. Migration of contaminated groundwater will be controlled.

Given the conditions in the Monongahela River, the nature of hazardous substances in the BSD hotspot area, and the potential exposure pathways described above, the actual and threatened release of PAHs and mercury from this Site, if not addressed by implementing the response action described in this Action Memorandum, may present an imminent and substantial endangerment to the public health, or welfare, or the environment.

V. EXEMPTION FROM STATUTORY LIMITS

The Big John Salvage Superfund Site meets the criteria in Section 104(c) of CERCLA, 42 U.S.C. § 9604 (c), for exemption from the Statutory Limit of $2,000,000 for Removal Actions as follows:

Section 104(c)(1)(C)	"Continued response action is otherwise appropriate and consistent with the remedial action to be taken"

A. Appropriateness

It is imperative that the NTCRA be conducted to reduce potential for human and animal exposure to contaminants in soils in the upland portion of the Site and the "hotspot" of industrial wastes referred to as BSD and contaminants in stained sediments closely associated with the toxic hotspot that is serving as a source of contamination to Monongahela River sediments. The BSD and stained sediments are contaminated with polycyclic aromatic hydrocarbons ("PAHs") and are acutely toxic to aquatic life. The upland soils and groundwater are contaminated with PAHs; the soil and drainage ways are also contaminated with residual mercury concentrations. The proposed action is appropriate to abate the threat presented by the PAHs and will prevent further migration of contaminants. It is estimated in the EE/CA that the river NTCRA can be completed in 4 months in the field but with planning time may take one year to complete. The upland response activities will require approximately 18 to 24 months to complete.

The proposed removal action is therefore appropriate and necessary.

B. Consistent With the Remedial Action

EPA anticipates issuing a Record of Decision ("ROD") after a focused FS is completed. EPA expects that this removal will mitigate the risks presented by PAH-contaminated soil in the upland portion for the Site and create conditions in the river that will enable the monitored natural recovery processes to further degrade the remaining PAHs to concentrations that are within EPA's target risk range within a reasonable time period. In addition, the industrial wastes will be removed from the river bottom, thus decreasing the likelihood that highly toxic materials would be eroded further down river. EPA anticipates issuing a ROD after post-removal environmental monitoring records the effectiveness of the removal in risk reduction and tracks the effectiveness of on-going monitored natural recovery. A focused Feasibility Study will be prepared to support the ROD. The response action EPA is proposing in this Action Memorandum is consistent with the long-term remediation goals required by the NCP.

VI. IDENTIFICATION AND ANALYSIS OF REMOVAL ACTION ALTERNATIVES

A. River Sediments

The EE/CA Report evaluates four response action alternatives for the black semi-solid deposits and heavily contaminated stained sediments in the Monongahela River. Please review the EE/CA Report in the Administrative Record for a complete analysis of the removal action alternatives evaluated and the recommended alternative for the river (See Sections 3.4, 4.4 and 5.4). A summary of the four alternatives developed and considered by EPA for river sediment are set out below:

Alternative RS1 - No Action

Alternative RS1 provided a baseline for comparing the other three alternatives. In this alternative no active remediation, treatment, or engineering controls would be implemented and no long term monitoring would be performed. There are no costs associated with this alternative. Under this alternative, potential exposure to wastes and contaminated sediments in the hotspot area would continue and hazardous substances would continue to migrate downstream within the river.

Alternative RS2 – Excavation and Off-Site Treatment and/or Disposal

Excavating the BSD and highly contaminated sediment (SSD) from the Monongahela River and disposing of it in an off-Site landfill or treating it off-Site. Alternative RS2 includes:

- Isolating the excavation area to reduce/prevent erosion and limit migration of re-suspended contaminants during removal activities
- Removing the BSD and SSD from the river
- Conveyance of impacted sediment for staging and dewatering
- Treatment and/or disposal in an appropriately permitted off-Site facility
- Managing the residual contamination by restoring excavated area with 6 inches of sand/gravel or other appropriate substrate
- Environmental monitoring program – 5 years

The EE/CA evaluated an Option A (excavate only BSD – an estimated 4,500 cubic yards) and an Option B (excavate BSD and SSD – an estimated 5,400 cubic yards) with respect to the scope of the removal action. The cost for Alternative RS2 is estimated at approximately $3.8 million for Option A or approximately $5.1 million for Option B.

Alternative RS3 – Excavation and On-Site Containment

Alternative RS3 includes the same removal activities as described in Alternative RS2, except the materials excavated from the river bottom would be consolidated on the upland area of the Big John Salvage Site beneath an impermeable cap.

In the same manner as discussed for RS2 above, the EE/CA evaluated an Option A (excavate only BSD – an estimated 4,500 cubic yards) and an Option B (excavate BSD and SSD – an estimated 5,400 cubic yards). The cost estimate for RS3 did not include the expense for constructing or maintaining the impermeable cap over the consolidated sediments because the EE/CA had accounted for those expenses in a section evaluating response alternatives for contaminated soil media on the Big John Salvage Site. The cost for Alternative RS2 is estimated at approximately $3.4 million for Option A or approximately $4.6 million for Option B.

Alternative RS4 – Monitored Natural Recovery

Alternative RS4 considers the continued use of naturally-occurring physical, biological, and/or chemical mechanisms to reduce risk to human and/or ecological receptors, and the prevention of

contact with contaminated sediments through implementation of institutional controls.

The alternative includes a biological and chemical monitoring plan to measure and evaluate the changes in sediment contaminant levels and the associated biological response for a period of 30 years.

The cost for implementation would be derived from environmental monitoring, institutional controls, and public education. The cost for Alternative RS4 is estimated at approximately $1.9 million.

B. Uplands Soil

The EE/CA Report evaluates seven response action alternatives for the buried wastes and contaminated soil with concentrations of hazardous substances greater than performance standards identified in Table 1. Please review the EE/CA Report for a complete analysis of the removal action alternatives evaluated and the recommended alternative for the soil (See Sections 3.1, 4.1 and 5.1). A summary of the alternatives developed and considered by EPA for soil are set out below:

Alternative SO1 - No Action

Alternative SO1 provided a baseline for comparing the other six soil alternatives. In this alternative no active remediation, treatment, or engineering controls would be implemented and no long term monitoring would be performed. There are no costs associated with this alternative. Under this alternative, potential exposure to wastes and contaminated soils in the upland portion of the Site would continue.

Alternative SO2 - No Further Action

Similar to No Action alternative, there would be no further soil removal actions beyond those already completed at the Site under this alternative. However, it would include long-term maintenance of the existing on-site features, including sediment erosion control silt fencing and a site perimeter fence that an EPA contractor installed.

Operating and maintenance (O&M) costs for this alternative would consist of routine monitoring of the Site, and maintenance of the fence and sediment erosion control silt fencing on a semi-annual basis for a period of 30 years. The Present Worth Cost of Alternative SO2 is estimated at approximately $745,000.

Alternative SO3 - Excavation and On-Site Thermal Treatment

Excavating the contaminated soil on the Site and treating it on-Site using thermal desorption technology. Upon completion of treatment, the excavated area would be backfilled with treated soil, covered with a layer of clean top soil to encourage vegetation growth, and then seeded with a perennial grass mixture suitable for the Site. Alternative SO3 includes:

- Excavating and staging approximately 312,000 cubic yards of soil/sediment containing hazardous substances in excess of removal performance standards listed in Table 1

- Screening soils to remove rocks and debris before placing into the desorption system
- Treating excavated soil in a thermal desorption unit to separate organic chemicals and mercury from soil
- Treatment and disposal of desorbed, recondensed contaminants from the thermal desorption process
- Staging treated soils for confirmation sampling and subsequent backfilling
- Establishing a vegetative cover

Stack testing and Proof of Performance (POP) testing would be required to determine the maximum throughput rate for the treatment units. Considering the volume of soil to be treated, multiple units would be required to achieve a treatment rate of at least 50 tons per hour. At this rate of treatment, it would take approximately 3 years to complete. The Present Worth Cost of Alternative SO3 is estimated at $94,633,000.

Alternative SO4 - Excavation and Off-Site Disposal/Treatment

Excavate the contaminated soil, and either dispose of it in an off-site landfill (as either non-hazardous or hazardous, depending on the ultimate waste classification) or treat it off-site (most likely thermally). Carry out all off-site treatment and/or disposal activities in accordance with CERCLA 121(d)(3) and 40 CFR 300.440. The major components of Alternative SO4 include:

- Excavating approximately 312,000 cubic yards of soil/sediment containing hazardous substances in excess of removal performance standards listed in Table 1. Performing waste characterization on excavated materials
- Transporting high btu wastes determined not to be RCRA-characteristic to a blended-fuel electric generation facility for energy recovery
- Transporting low btu contaminated soil determined not to be RCRA-characteristic to an appropriately permitted landfill
- Transporting RCRA-characteristic wastes to an appropriately permitted treatment facility
- Minimally backfill and grade excavated area and re-vegetate

It was estimated 44,000 cubic yards of soil with a total PAH level of 300 mg/kg or higher would be sent for off-Site treatment and 268,000 cubic yards of the remaining soil would be sent to an off-Site landfill. It would take approximately 4 years to plan and complete. The Present Worth Cost of Alternative SO4 is estimated at $49,985,000.

Alternative SO5 - Capping/Containment

Construct an engineered cap over the impacted area of the Site to prevent exposure to soil/sediment containing hazardous substances in excess of removal performance standards listed in Table 1. The engineered cap would be designed to meet the objectives of minimizing infiltration of precipitation, providing a barrier capable of preventing exposure of people and animals to concentrations of hazardous substances exceeding the Site-specific performance standards (including prevention of tar rising to surface through the constructed barrier), and preventing erosion. The final cap design must meet the performance objectives outlined in West Virginia's RCRA Subtitle-D regulations. The actual extent and specific configuration (i.e., profile) of the cap included as part of Alternative SO5 would be selected during the design.

The area to be capped would include approximately 15 acres of relatively flat areas and approximately 3 acres of steep sloped areas on the north side of Sharon Steel Run (see Figure 6). This area encompasses all of the impacted surface soils as well as subsurface soils. Consolidation of contaminated soils from perimeter areas could reduce the size of the cap. The actual configuration of the footprint and profile of the cap will be established during design.

Obvious masses of tar derived materials encountered at the surface or before and during earthwork would be segregated for appropriate off-Site disposal. Institutional controls would be implemented to ensure that future use of the property is not inconsistent with the containment strategy. It would take 18-24 months to implement. The estimated present worth cost of three suitable cap profiles for Alternative SO5 ranged from $7.1 to $8.3 million.

Alternative SO6 - In-Situ Chemical Oxidation (ISCO)

Treat soil/sediment containing hazardous substances in excess of removal performance standards listed in Table 1 with an in-situ chemical oxidation process. Major components of SO6 include:

- Installing injection points throughout area of contamination
- Mixing oxidation reagent in preparation of injection events
- Periodically injecting reagent into contaminated subsurface to chemically oxidize hazardous substances to less harmful compounds
- Periodic confirmation sampling

This alternative requires bench-scale testing to select an appropriate reagent and pilot-scale testing to affirm adequate delivery of reagent. It is likely that mechanical mixing would be required to achieve adequate reaction and destruction of contaminants. If mechanical mixing is utilized the area would require solidification to support future use of the Site. It would take approximately 2 – 3 years to implement SO6. Assuming that injection method is effective, the estimated present worth cost of Alternative SO6 is $14,766,000.

Alternative SO7 - In-Situ Treatment - Stabilization/Solidification

Treat soil/sediment containing hazardous substances in excess of removal performance standards listed in Table 1 with an in-situ solidification/stabilization process. Major components of SO7 include:

- Mixing solidification/stabilization reagent into contaminated soils with large auger-mounted injection device (or excavate and mix contaminated soil in pug mill)

This alternative requires bench-scale testing to select an appropriate mixture of Portland cement and bentonite and pilot-scale testing to affirm adequate delivery of reagent. Reducing the permeability (or hydraulic conductivity) of treated soil would result in the groundwater and surface water flowing around the treated mass instead of through it. Performance specifications for the treated soil would be required, including a maximum hydraulic conductivity (e.g., 1×10^{-5} cm/sec) and unconfined compressive strength (e.g., 10 to 50 psi). In addition, leachability testing with treated soil would be required to measure effectiveness of the immobilization. It would take approximately 18 months to implement SO7. The estimated present worth cost of Alternative SO7 is $23,720,000.

C. Upland Sediments

The EE/CA Report evaluates four response action alternatives for restoring contaminated sediments in upland drainage channels at the Site. Please review the EE/CA Report (Attachment 1) for a complete analysis of the removal action alternatives evaluated for sediments in drainage ways at the Site (See Sections 3.3, 4.3 and 5.3). A summary of the alternatives developed and considered by EPA for sediments in drainage ways are set out below:

Alternative OSS1 - No Action

The No Action alternative (OSS1) provided a baseline for comparing the other upland sediment alternatives. In this alternative no active remediation, treatment, or engineering controls would be implemented and no long term monitoring would be performed. There are no costs associated with this alternative.

Alternative OSS2 - Excavation and Off-Site Disposal

Excavate the on-site sediment exceeding performance standards identified in Table 1 from the impacted areas and sending it off-site for disposal. Excavated drainage way areas would be restored in a manner appropriate to its respective function. The total volume of impacted sediments in Sharon Steel Run/Unnamed Tributary #1, Unnamed Tributary #2, and the West Tributary is estimated to be approximately 3,280 cubic yards. Alternative OSS2 would take approximately 1 month to complete and would cost an estimated $805,000.

Alternative OSS3 - Excavation and On-Site Confinement

Excavate and consolidate on-Site sediment exceeding performance standards identified in Table 1 with contaminated soil on the Site for on-Site containment. The sediment would be excavated from the various drainage way segments and spread to fill in low areas on the Site prior to the site being capped. Excavated drainage way areas would be restored in a manner appropriate to its respective function. The total volume of impacted sediments in Sharon Steel Run/Unnamed Tributary #1, Unnamed Tributary #2, and the West Tributary is estimated to be approximately 3,280 cubic yards. Consolidation of the sediments would take one month; full implementation of Alternative OSS3, including planning and on-Site confinement would take approximately 12-18 months to complete and would cost an estimated $523,000.

Alternative OSS4 - Monitored Natural Recovery

Allow monitored natural attenuation (MNA) of hazardous substances in drainage way sediments to achieve removal performance standards listed in Table 1. The activity performed consists of institutional controls to limit exposure and monitoring of sediment quality recovery while natural processes reduce the concentrations of chemicals of concern. Monitoring sediment quality would provide an on-going evaluation of the nature and extent of natural attenuation processes occurring at the Site. The monitoring component would begin immediately but the time to achieve performance standards would be very long. The estimated present worth cost of Alternative OSS4 is $1,179,000.

D. Groundwater

The EE/CA Report evaluates six response action alternatives for restoring contaminated groundwater or containing the contaminated groundwater within a waste management area at the Site. Please review the EE/CA Report (Attachment 1) for a complete analysis of the removal action alternatives evaluated and the recommended alternative for the river (See Sections 3.2, 4.2 and 5.2). A summary of the alternatives developed and considered by EPA for groundwater are set out below:

Alternative GW1 - No Action

Alternative GW1 provided a baseline for comparing the other groundwater alternatives. In this alternative no active remediation, treatment, or engineering controls would be implemented and no long term monitoring would be performed. There are no costs associated with this alternative. Under this alternative, there would be no additional removal actions beyond those already completed at the Site, and the existing on-site groundwater collection system operation (which consists of the collection of groundwater from two sumps, on-site treatment including activated carbon, and subsequent discharge to the City of Fairmont sewer system) would be discontinued.

Alternative GW2 - No Further Action

The existing groundwater collection and treatment system would continue to be operated as it has been operated since March 2001, with no improvements or expansion beyond that currently in operation. There would also be no further removal actions beyond those already completed at the Site. The major components of Alternative GW2 include:

- Maintain two groundwater collection trenches in the Middle and East Tributaries
- Pump collected NAPL fraction and water to on-Site treatment plant
- Treat water to meet City of Fairmont's pre-treatment requirements
- Discharge to the City of Fairmont sewer system

No additional time is required to implement GW2 and the estimated present worth cost is $745,000.

Alternative GW3 - Monitored Natural Attenuation

Allow monitored natural attenuation (MNA) to achieve removal performance standards listed in Table 1. MNA refers to the reliance on natural processes (i.e., biodegradation, dilution and dispersion, and sorption) to achieve site-specific contamination removal objectives. This alternative would involve very detailed monitoring of groundwater quality to provide an on-going evaluation of the nature and extent of natural attenuation processes occurring at the Site. The estimated present worth cost of Alternative GW3 is $3,204,000.

Alternative GW4 - Expansion of the Existing Groundwater Containment System

This alternative includes expansion of the existing groundwater containment and treatment

features described in Alternative GW2 to enhance performance of the current containment systems to prevent site-related contaminants in groundwater from migrating off-site or into receiving surface waters. The locations of these features are shown in Figure 7. The Alternative was evaluated with two options. Option A would upgrade the existing on-Site treatment plant and continue to discharge to the City of Fairmont sewer for a final treatment step. Option B would upgrade the existing plant so that the treated water could be discharged to the unnamed tributary rather than the sewer. The major components of Alternative GW4 include:

- Re-configuring the tar and seep collection system by extending and re-aligning French drains to better capture tar and contaminated groundwater
- Pump collected NAPL fraction and water to on-Site treatment plant
- Upgrade or replace of existing groundwater treatment system to accommodate higher flow rate

Option A

- Treat water to meet City of Fairmont's pre-treatment requirements
- Discharge to the City of Fairmont sewer system

Option B

- Treat water to meet NPDES treatment requirements
- On-Site discharge to Sharon Steel Run

Alternative GW4 Option A could be implemented in approximately 6 months and cost an estimated $5,073,000. Alternative GW4 Option B could be implemented in approximately one year and cost an estimated $10,542,000.

Alternative GW5 - In-situ Chemical Oxidation

Treat groundwater containing hazardous substances in excess of removal performance standards listed in Table 1 with an in-situ chemical oxidation process. Major components of GW5 include:

- Installing injectors or treatment trenches throughout area of groundwater contamination
- Mixing oxidation reagent in preparation of injection events
- Periodically injecting reagent into contaminated saturated zone to chemically oxidize hazardous substances to less harmful compounds
- Periodic confirmation sampling

This alternative requires bench-scale testing to select an appropriate reagent. It would take approximately 2 - 3 years to implement GW5. The estimated cost of Alternative GW5 is $17,257,000.

Alternative GW6 - In-situ Bioremediation

Treat contaminated groundwater utilizing in-situ bioremediation to achieve removal performance standards listed in Table 1. Bioremediation is a process that attempts to accelerate the natural biodegradation process by providing/supplementing nutrients, electron acceptors, and/or

competent degrading microorganisms that may otherwise be limiting the rapid conversion of organic contaminants to innocuous end products. The major components of Alternative GW6 include:

- Installing groundwater extraction points
- Installing infiltration galleries/treatment trenches throughout area of groundwater contamination
- Mixing appropriate amendments in preparation of treatment events
- Periodically re-injecting enriched water into contaminated saturated zone to optimize biodegradation of contaminants of concern
- Periodic confirmation sampling

This alternative requires bench-scale testing to determine which essential nutrients are deficient. Pilot-scale testing would be required to design an appropriate delivery system. Bioremediation would be implemented for approximately 5 years and would be re-evaluated for continuation. The estimated cost of Alternative GW6 is $5,899,000.

VII. PROPOSED ACTION AND ESTIMATED COSTS

A. Removal Action Selection Process

EPA completed the EE/CA in accordance with the NCP, 40 C.F.R. §300.415, and applicable guidance. The EE/CA considered removal action alternatives to mitigate direct exposure of human and ecological receptors to industrial waste deposits (BSD) and contaminated sediments in the Monongahela River and to soil, sediment and groundwater in the upland portion of the Site. In addition, the alternatives considered mitigating the release or potential release of hazardous substances from the BSD area further down river as well as the costs associated with those removal actions. The potential response actions described in Section VI were primarily analyzed in terms of effectiveness, implementability and cost. In accordance with the "Guidance on Conducting Non-Time-Critical Removal Actions under CERCLA" (OSWER, August 1993), the following additional criteria were also used in this removal response action selection process: overall protection of human health and the environment; compliance with ARARs; long-term effectiveness and permanence; reduction of toxicity, mobility or volume through treatment; short-term effectiveness; state acceptance; and, community acceptance.

Based on the information contained in the EE/CA report and the Administrative Record, the removal action described in Section VII.B.1 is proposed for the Monongahela River downgradient of the Big John Salvage and Sharon Steel/Fairmont Coke Works Sites. This removal action is designed to mitigate direct contact risk to human and potential ecological receptors associated with highly contaminated wastes and river sediments and mitigate the potential risk from the release of hazardous substances, pollutants or contaminants from those wastes and sediments further down river. EPA expects that implementation of removal action described in Section VII.B.1 will achieve total PAH concentrations in the 100-500 mg/kg range and create conditions suitable for monitored natural recovery to satisfactorily reduce the residual PAHs to concentrations within EPA's target risk range within a reasonable time period. Materials removed from the river will be sampled and treated and/or disposed of in an appropriately RCRA-permitted facility.

Based on the information contained in the EE/CA report and the Administrative Record, the removal action described in Sections VII.B.2 through 4 are proposed for the contaminated media located at the upland areas of the Big John Salvage Site. This removal action is designed to mitigate direct contact risk to human and potential ecological receptors associated with buried wastes, contaminated soils, and sediment in the drainage ways. The removal action will also prevent contaminated groundwater from migrating beyond the waste management area. EPA expects that implementation of removal action described in Sections VII.B.2 through 4 will prevent exposure to concentrations of hazardous substances in excess of performance standards and achieve EPA's target risk range.

EPA carefully considered state and community acceptance of the proposed response actions prior to reaching a final decision regarding the final clean up plan. After full consideration of comments submitted during the 30-public comment period, EPA changed its recommendation for contaminated river sediments from RS2 (Excavation and On-Site Confinement) to Alternative RS3 (Excavation and Off-Site Treatment/Disposal). The community consensus was that an off-site disposal option for the wastes removed from the River was preferred. The comparative analyses completed in Section 3.4 of the EE/CA determined that the two options graded out very closely for most criteria. The two options were re-considered in light of the significant technically sound community objections. EPA determined that the more conventional option of long-term management in an appropriately constructed, permitted and monitored facility is the better option. Alternative RS2 (Excavation and Off-Site Disposal/Treatment) is EPA's recommended alternative for the BSD/SSD on the River bottom.

B. Proposed Action Description

1. River Sediment Alternative RS2: *Excavation and Off-Site Treatment and/or Disposal – Option B (BSD and SSD)*

a) Perform pre-design sampling and surveying (3-dimentional) in the black semi-solid deposits (BSD) and visibly stained sediment deposits (SSD) area of the Monongahela River near the confluence with Sharon Steel Run (see Figure 4 for map of area). Develop a dredging prism which will refine the boundaries of the BSD/SSD and define the excavation area ("River Excavation Area").

b) Isolate the River Excavation Area with turbidity curtains or other appropriate methods to reduce/prevent erosion and limit migration of re-suspended contaminants during removal activities. Measure upstream and downstream turbidity levels in the river during dredging/excavation to ensure that engineering controls are effective in minimizing the migration of residual contamination re-suspended by removal operations.

c) Remove all BSD and visibly stained sediment deposits from the River Excavation Area using dredging/excavation techniques appropriate to the Site conditions. Employ methods to minimize re-suspension and residual materials.

d) Dewater and stabilize excavated wastes and sediments (i.e., BSD and SSD) with additives (i.e., polymers, kiln dust, etc.) as required to meet off-Site treatment or disposal facility acceptance criteria.

e) Discharge water collected during the dewatering process to the Monongahela River in

accordance with National Pollution Discharge Elimination System ("NPDES") and State discharge limits.

f) Sample excavated BSD/SSD for RCRA characteristics to determine appropriate treatment and/or disposal requirements. Preliminary waste characterization profiling and landfill approval will be completed to the extent practicable prior to excavation.

g) Transport dewatered BSD/SSD by truck or other means to an appropriately permitted facility for treatment and/or disposal.

h) Dispose excavated BSD/SSD at an off-Site treatment and/or disposal facility operating in accordance with CERCLA 121(d)(3) and 40 CFR 300.440.

i) Conduct a post-excavation evaluation to verify the removal of BSD and assess the nature and extent residual contamination.

j) If the post-dredging assessment indicates that BSD remains, remove that BSD and dispose in accordance with (h), above.

k) Restore excavation area and isolate any remaining thin layer of residual visually stained sediment deposits from the benthic and aquatic ecosystems by placing a layer of sand or other earthen materials above such stained areas. Material selection shall be appropriate for the nature of contamination, the physical and hydraulic characteristics of the waterway (including scour) and permitting requirements. Post-removal elevations within the excavation and restoration area shall not be greater than pre-removal elevations (i.e., no net fill to river bottom).

l) Conduct an environmental monitoring program to document post-removal baseline conditions and continue for 5 years to document the effectiveness of natural restoration in reducing toxicity to aquatic organisms and producing a downward trend of PAH concentrations in sediments and relevant biota.

m) Implement post-removal site controls to preserve the integrity of the response action.

2. Soil Alternatives SO5: *Capping/Containment of Contaminated Soil*

a) Install a RCRA Subtitle D-type cap (Cap") over the area of the Site where surface and/or subsurface soil concentrations exceed cleanup standards identified in Table 1 (Removal Performance Standards) and the slope of the land is less than 10 percent. Contaminated soil may be consolidated prior to installation of the Cap to minimize the area of the Cap. Consolidate contaminated soil which has eroded onto adjacent properties with on-Site contaminated soil prior to installation of the Cap.

b) Construct a RCRA Subtitle D-type cap or implement an alternative equivalent containment technique in areas with a slope greater than 10 percent.

c) Install and maintain an engineered surface water runoff and erosion control system in accordance with West Virginia storm water control regulations.

d) Segregate obvious masses of tar derived materials encountered at the surface before and during earth work to the extent practical. Segregated material shall be sampled and transported and disposed or treated at an off-Site facility in accordance with CERCLA 121(d)(3) and 40 CFR 300.440.

e) Conduct confirmation sampling to demonstrate that soils contaminated with hazardous substances greater that the performance standards identified in Table 1 have been contained beneath the Cap.

f) Implement post-removal site controls to preserve the integrity of the response action.

3. Upland Sediment Alternative OSS3: *Excavation and On-Site Confinement of Sediment*

a) Excavate surficial sediments in upland drainage ways exceeding performance standards for sediment identified in Table 1. Consolidate such excavated sediments with on-Site soil prior to installation of the Cap described in 2.a, above. The upland drainage ways include Sharon Steel Run, Unnamed Tributary #2, West Tributary, Middle Tributary and East Tributary.

b) Conduct confirmation sampling to demonstrate that surficial sediments contaminated with hazardous substances greater than the performance standards identified in Table 1 have been removed from the drainage ways.

c) If the confirmation sampling indicates that contaminated sediment remains, remove that contaminated sediment and consolidate in accordance with (a), above.

d) Restore excavated drainage ways to their respective functions. Restoration of Sharon Steel Run shall include placement of clean sediment and/or root wads into select areas where established sediment deposits thicker than six inches were removed.

4. Groundwater Alternative GW4A: *Expansion of the Existing Groundwater Containment System with Discharge to POTW*

a) Upgrade and maintain existing French drains installed beneath the Middle and East Tributary, including collection area around respective sumps, to prevent migration of water with concentrations of hazardous substances greater than concentrations listed in Table 1 ("Contaminated Water") to or beneath Sharon Steel Run and to provide for efficient evacuation of Contaminated Water and non-aqueous phase liquids ("NAPL").

b) Augment the existing groundwater collection system with additional collection trenches to capture Contaminated Water closer to the upland source area and to prevent migration of Contaminated Water from the Waste Management Area to or beneath Sharon Steel Run via the West Tributary or any other point.

c) Operate the expanded groundwater collection system to contain Contaminated Water within the Waste Management Area so that groundwater-performance standards identified in Table 1 are achieved and maintained in the Area of Attainment (Figure 8 - map of the Waste Management Area and the Area of Attainment).

d) Implement a groundwater and surface water monitoring program to demonstrate that Contaminated Water is contained within the Waste Management Area. Install additional groundwater monitoring wells as necessary to demonstrate such containment. Adequacy of the re-configured groundwater collection system will be measured by achieving performance standards identified in Table 1 for surface water and groundwater in the Area of Attainment.

e) Conduct periodic evaluation of the performance and effectiveness of the containment system. Modify the groundwater collection system as necessary to achieve the performance standards in the Area of Attainment beyond the Waste Management Area.

f) Convey Contaminated Water and NAPL from collection trenches and sumps to an on-Site wastewater treatment facility.

g) Replace or modify the existing water treatment plant as appropriate to accommodate the increased flow rate [estimated at 10 gallons per minute ("gpm")] and to provide automated controls and monitoring.

h) Operate, maintain and monitor on-Site water treatment plant to demonstrate treated water continues to achieve the City of Fairmont's influent pretreatment requirements.

i) Discharge treated water to the City of Fairmont sewer system.

j) Implement post-removal site controls to preserve the integrity of the response action.

C. Contribution to Remedial Performance

The Big John Salvage Site is an NPL Site. The proposed removal action is consistent with accepted removal practices and is expected to abate the threats that meet NCP removal criteria. Further, the proposed removal action is consistent with the long term remedial actions at this Site.

D. Compliance with Applicable or Relevant and Appropriate Requirements ("ARARs")

Pursuant to 40 CFR 300.415(j), the proposed removal action set forth in this memorandum will comply with all federal and state applicable or relevant and appropriate environmental and health requirements, to the extent practicable considering the exigencies of the situation. A list of federal and state ARARs identified for the proposed removal action included as Table 2-1 in Attachment 1.

E. Project Schedule

EPA expects planning work for the removal of BSD/SSD from the river will be completed over the winter of 2010/2011. Field work for the river is expected to require 2-4 months and will be scheduled during a period of anticipated lower flows in the Monongahela River. Work will be coordinated with the West Virginia Department of Environmental Protection, U.S. Fish & Wildlife Service and the U.S. Army Corps of Engineers. EPA expects planning and construction

of the RCRA Subtitle D type cap and the enhanced groundwater containment system will require 18-24 months to complete if implemented concurrently. Post-removal site controls will follow.

F. Public Participation

Pursuant to the NCP, 40 C.F.R. § 300.415, a public comment period on the EE/CA and Administrative Record concluded on November 2, 2009. A thirty (30)-day public comment period on the EE/CA, for the non-time critical action proposed in this Action Memorandum included an advertisement placed in the Times West Virginian on October 4, 2009. The Administrative Record for this non-time critical removal action has been established pursuant to 40 C.F.R. § 300.415.

EPA received written comments from representatives of Vertellus, CBS Corporation and ExxonMobil. Each of these corporations has been notified by EPA of potential liability at the Big John Salvage and/or Sharon Steel/Fairmont Coke Works Superfund Sites. Points raised in the written or verbal comments during the public comment period are summarized and EPA's response to these comments can be found in the Responsiveness Summary (see Attachment 2).

G. Estimated Costs

The total cost estimate is $21,953,000. This cost estimate was prepared in accordance with OSWER Directive 9360.0-42, "Amendment to the Action Memorandum Guidance and Removal Cost Management System to Address Calculation of Removal Action Project Ceilings."

Extramural Costs:

Regional Removal Allowance Costs:

Total Cleanup Contractor Costs	$17,794,000
(This costs includes estimates for contractors, including a 25% contingency and 15% for design, project and construction management, and operation and monitoring.)	

Other Extramural Costs not Funded from the Regional Allowance:

Total START (oversight)	$500,000
Subtotal	$18,294,000

Extramural Costs Contingency:

(20% of Subtotal, Extramural Costs; round to nearest thousand)	$ 3,659,000
TOTAL, REMOVAL ACTION PROJECT CEILING	$21,953,000

VIII. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

If no action is taken or the action is delayed, the release or threat of potential release of hazardous substances from black semi-solid deposits and visibly contaminated sediment deposits in the vicinity of the hotspot will continue. The release or threat of release of hazardous substances from the upland area contaminated soil, sediment and groundwater will also continue. The potential threat to human health and the environment from an uncontrolled release of hazardous substances from the soil, groundwater, submerged wastes and contaminated sediments will remain.

IX. OUTSTANDING POLICY ISSUES

There are no outstanding policy issues pertaining to the removal action proposed herein for the Big John Salvage Site.

X. ENFORCEMENT

The Potentially Responsible Party Search Section has conducted an investigation to determine who the viable PRPs are. See attached confidential enforcement addendum (Attachment 4) for further information and enforcement strategy.

EPA's estimated costs for this removal action are calculated as follows:

Direct Costs[3] + Indirect Costs = Estimated EPA Costs for a Removal Action, where:

Direct Costs = Direct Extramural + Direct Intramural
Indirect Costs = Region-specific Indirect Cost Rate x (Direct Costs)

Direct Extramural = $21,953,000
Direct Intramural = 100,000

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[3]Direct Costs include direct extramural costs and direct intramural costs. Indirect Costs are calculated based on an estimated indirect cost rate expressed as a percentage of site-specific direct costs, consistent with the full cost accounting methodology effective October 2, 2000. These estimates do not include pre-judgment interest, do not take into account other enforcement costs, including Department of Justice costs, and may be adjusted during the course of a removal action. The estimates are for illustrative purposes only and their use is not intended to create any rights for responsible parties. Neither the lack of a total cost estimate nor deviation of actual total costs from this estimate will affect the United States' right to cost recovery.

Region-specific Rate = 57.23%

Therefore:

($21,953,000 + $100,000) + (57.23% * $22,053,000) = $34,674,000

The total EPA costs for this removal action based on full-cost accounting practices that will be eligible for cost recovery are estimated to be $34,674,000.

XI. RECOMMENDATIONS

This Action Memorandum represents the recommended Removal Action for the Monongahela River and upland area at the Big John Salvage Site, located in Fairmont, Marion County, West Virginia, developed in accordance with CERCLA, as amended and not inconsistent with the NCP. This decision is based on the Administrative Record for the Site.

Pursuant to Section 113(k) of CERCLA and EPA Delegation No. 14-22, I hereby establish the documents listed in the attached Index (Attachment 3) as the Administrative Record supporting the issuance of this Action Memorandum.

Conditions at the Big John Salvage Site meet the NCP Section 300.415(b) criteria and the CERCLA Section 104(c) consistency exemption from the $2 million and 12-month limitation for a non-time critical removal action and I recommend your approval of the proposed non-time critical removal action described above.

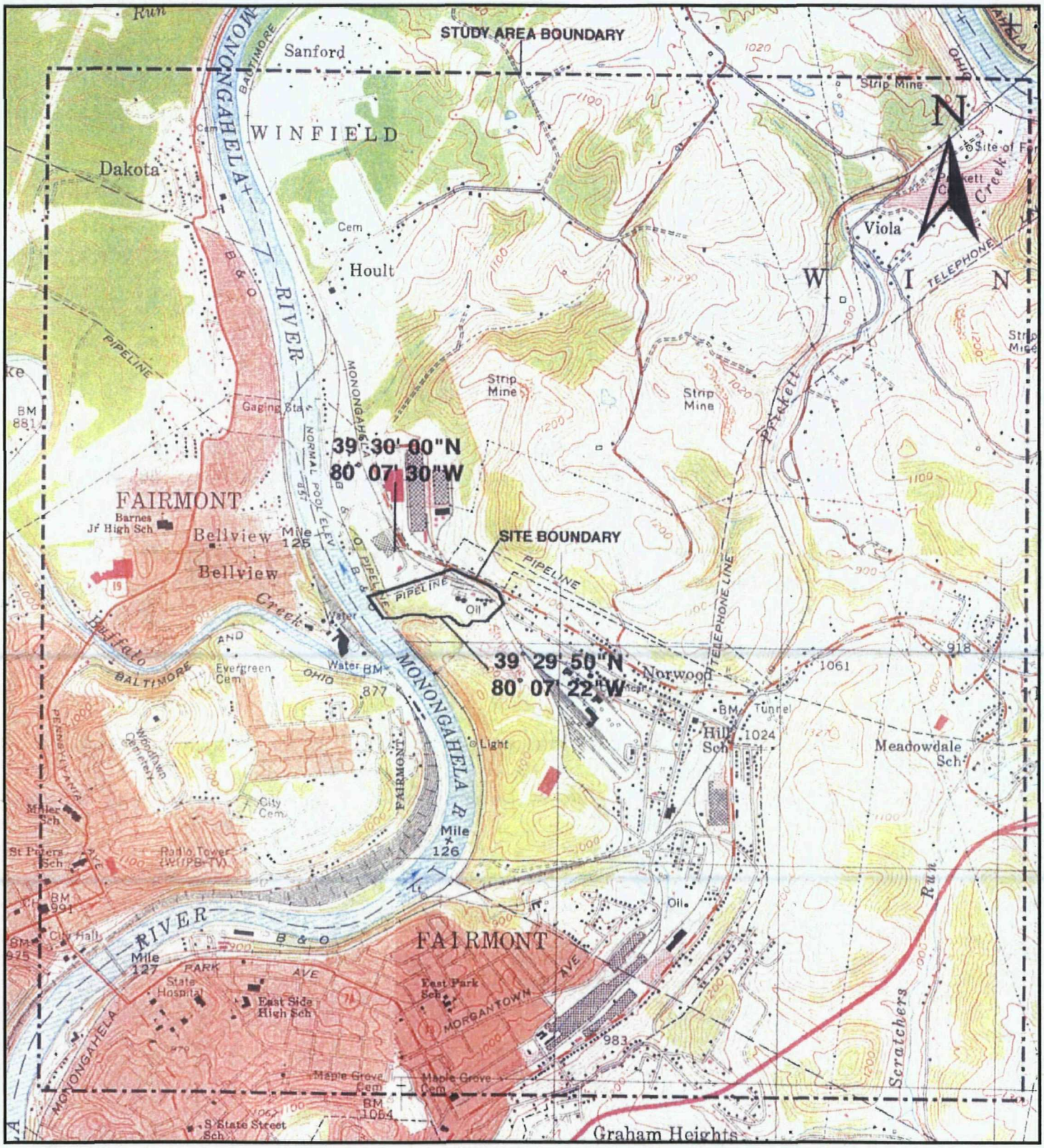
Action by the Approving Official:

I have reviewed the above-stated facts and based upon those facts and the information compiled in the documents described above, I hereby determine that the release or threatened release of hazardous substances presents or may present an imminent and substantial endangerment to the public health or welfare or to the environment. I concur with the recommended Removal Action as outlined in this Action Memorandum.

APPROVED: _____ **DATE:** 9/30/10

Ronald J. Borsellino, Director
Hazardous Site Cleanup Division
EPA Region 3

Attachment 1: Engineering Evaluation/Cost Analysis
Attachment 2: Responsiveness Summary
Attachment 3: Index to the Administrative Record
Attachment 4: Confidential Enforcement Addendum



NOT TO SCALE

Figure 1
General Location Map
Big John Salvage - Hoult Road Site
Fairmont, West Virginia

AR500085

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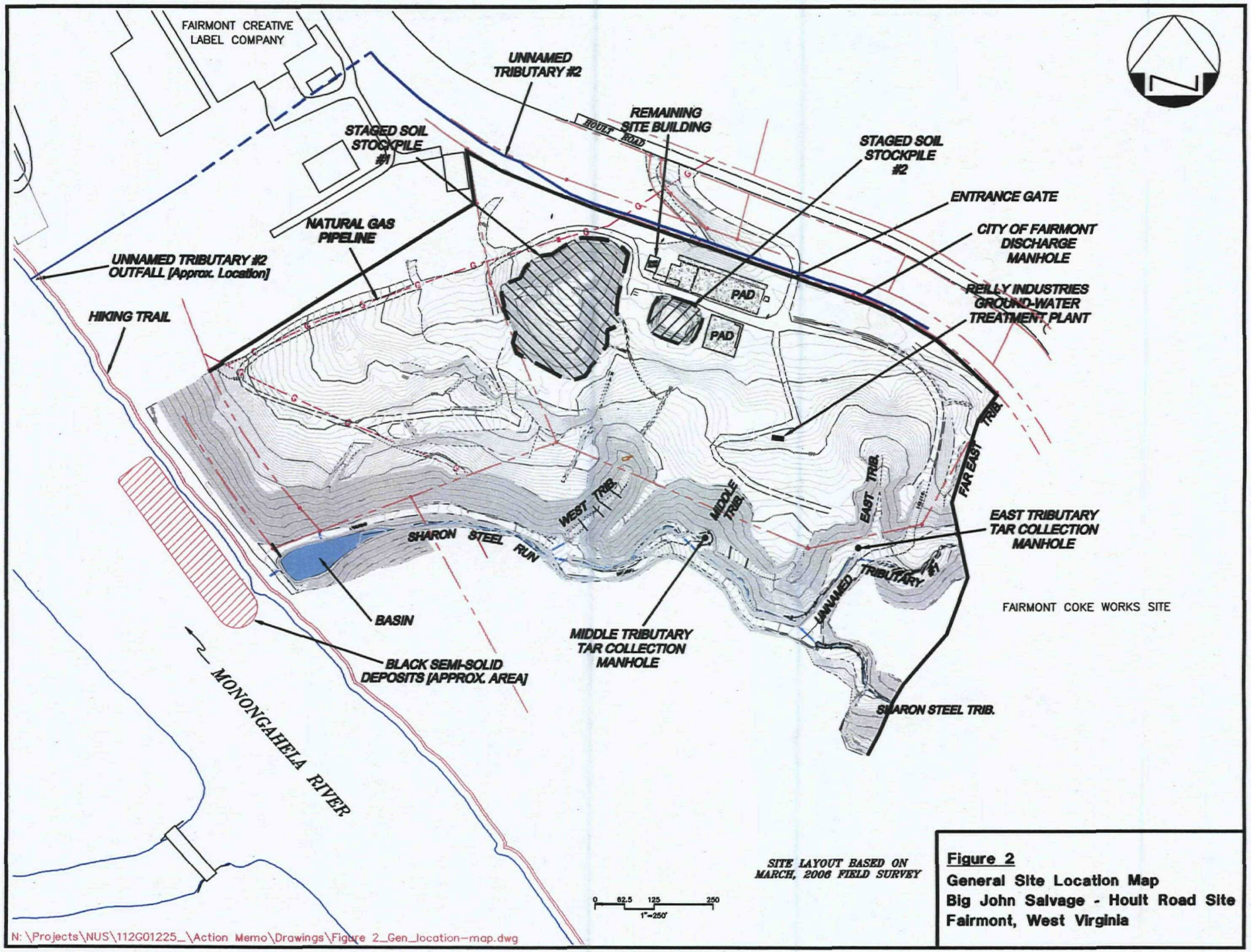


Figure 2
General Site Location Map
Big John Salvage - Hoult Road Site
Fairmont, West Virginia

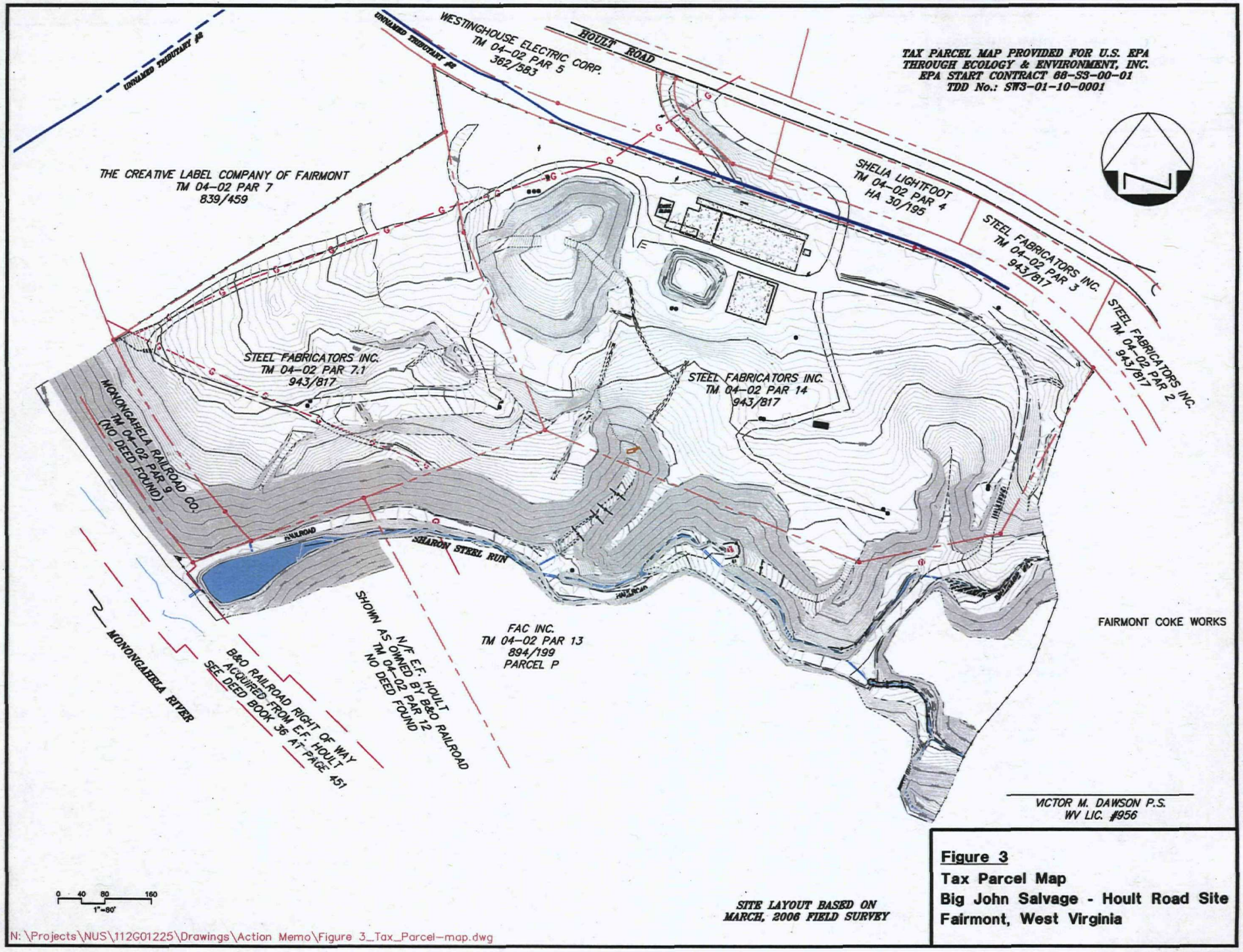


Figure 3
Tax Parcel Map
Big John Salvage - Hoult Road Site
Fairmont, West Virginia

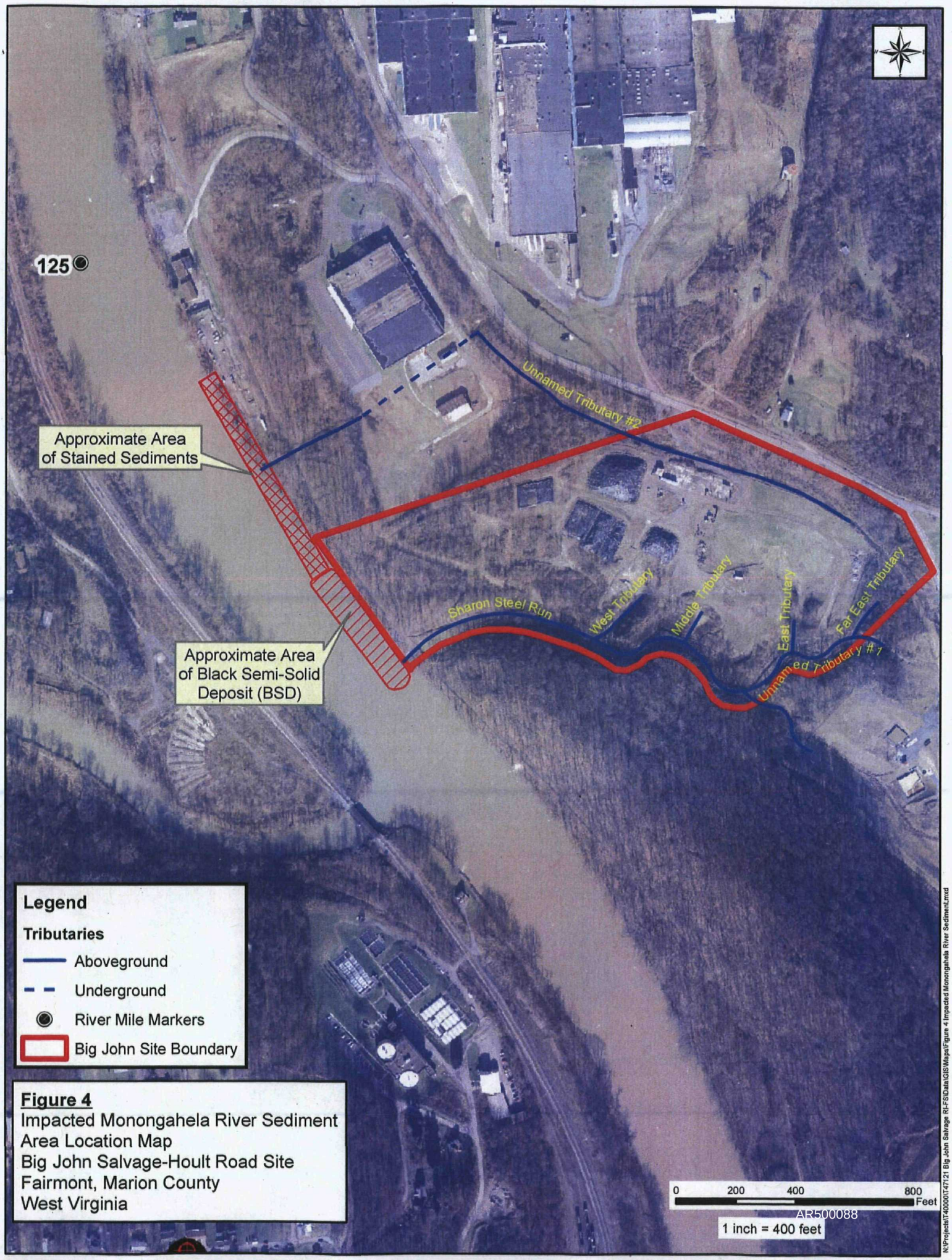
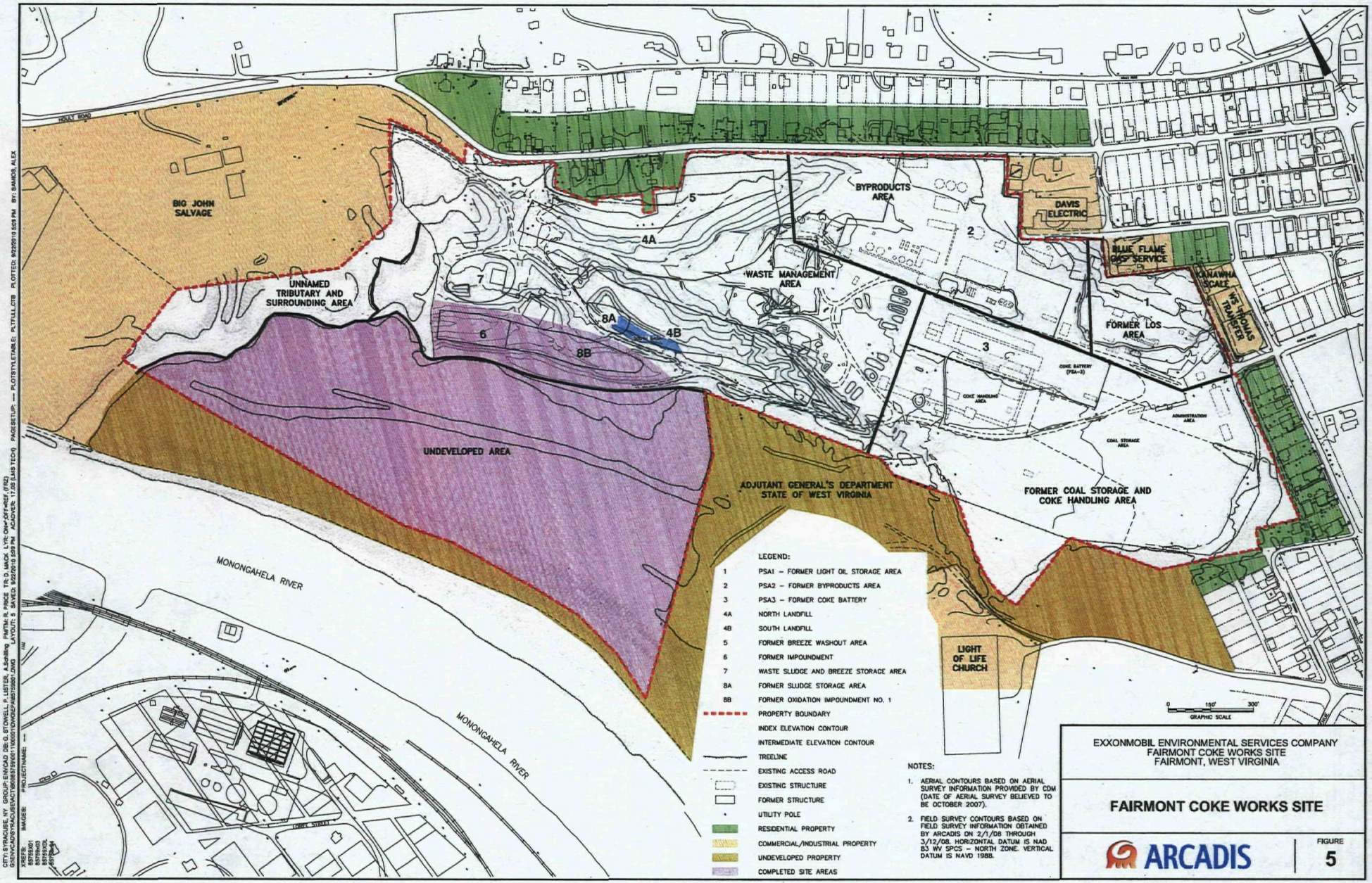


Figure 4
Impacted Monongahela River Sediment Area Location Map
Big John Salvage-Hoult Road Site
Fairmont, Marion County
West Virginia



EXXONMOBIL ENVIRONMENTAL SERVICES COMPANY
FAIRMONT COKE WORKS SITE
FAIRMONT, WEST VIRGINIA

FAIRMONT COKE WORKS SITE

ARCADIS

FIGURE 5

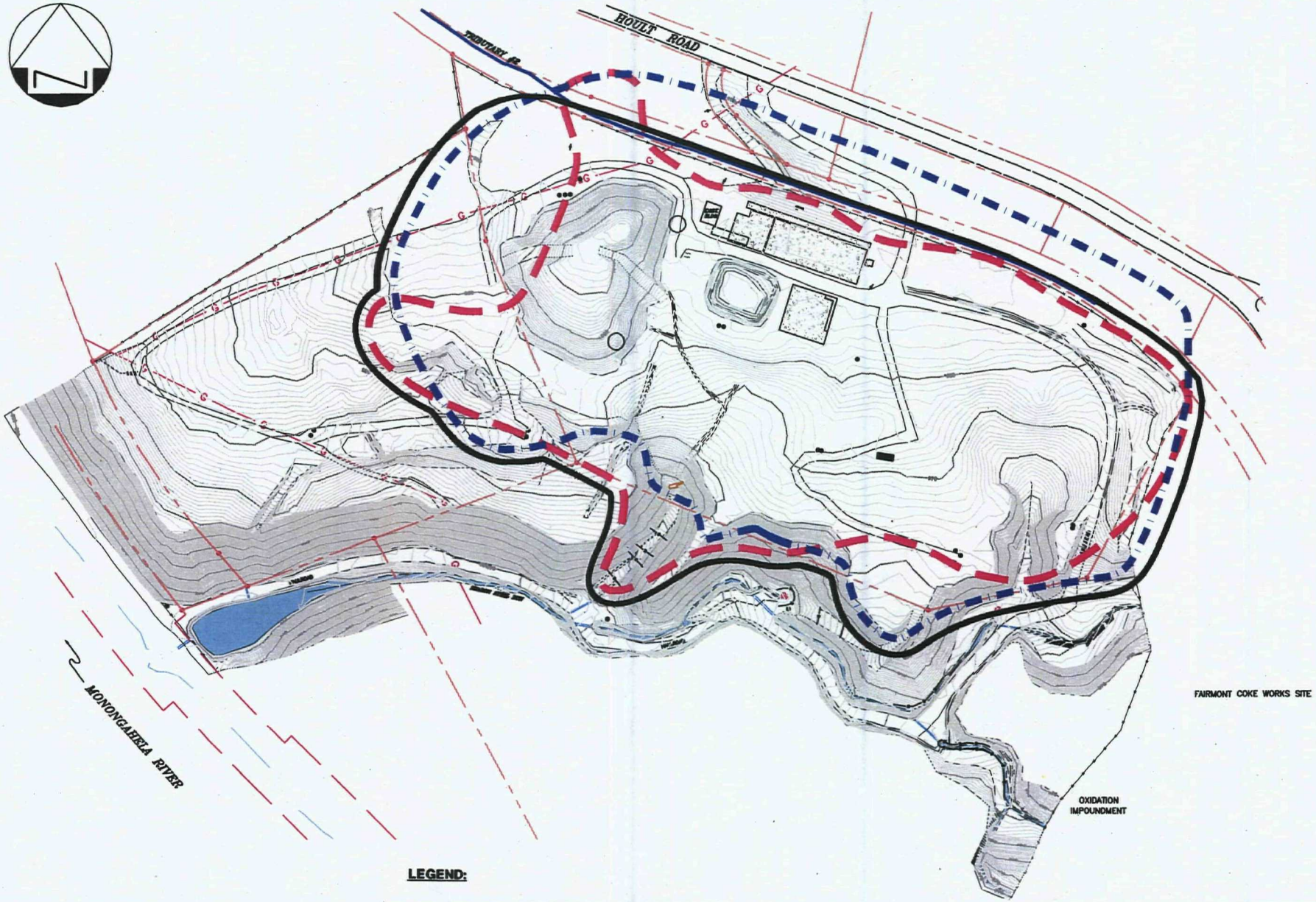


Figure 6
Impacted Surface/Sub-Surface Soil Area & Extent of Cap Location Map
Big John Salvage - Hoult Road Site
Fairmont, West Virginia

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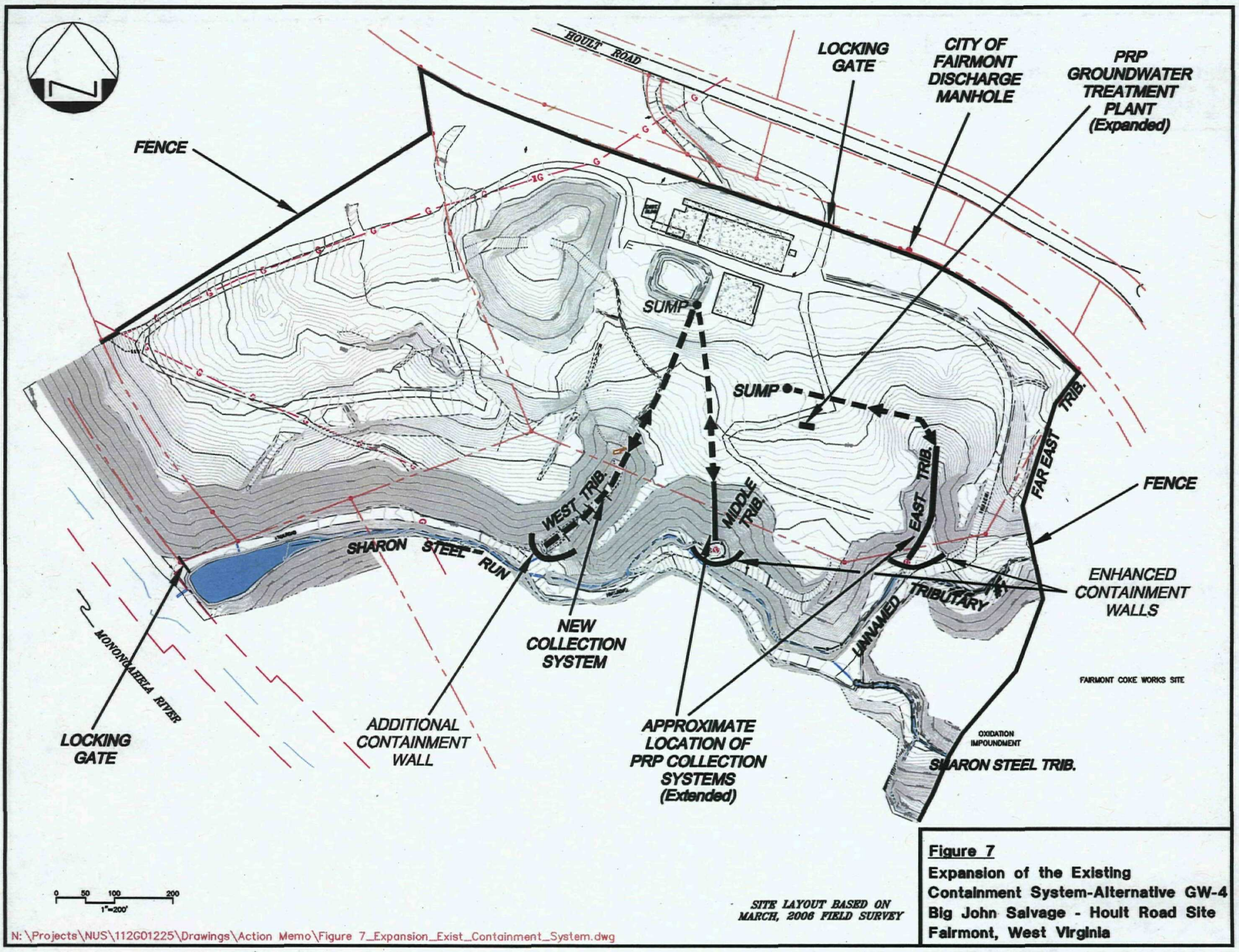
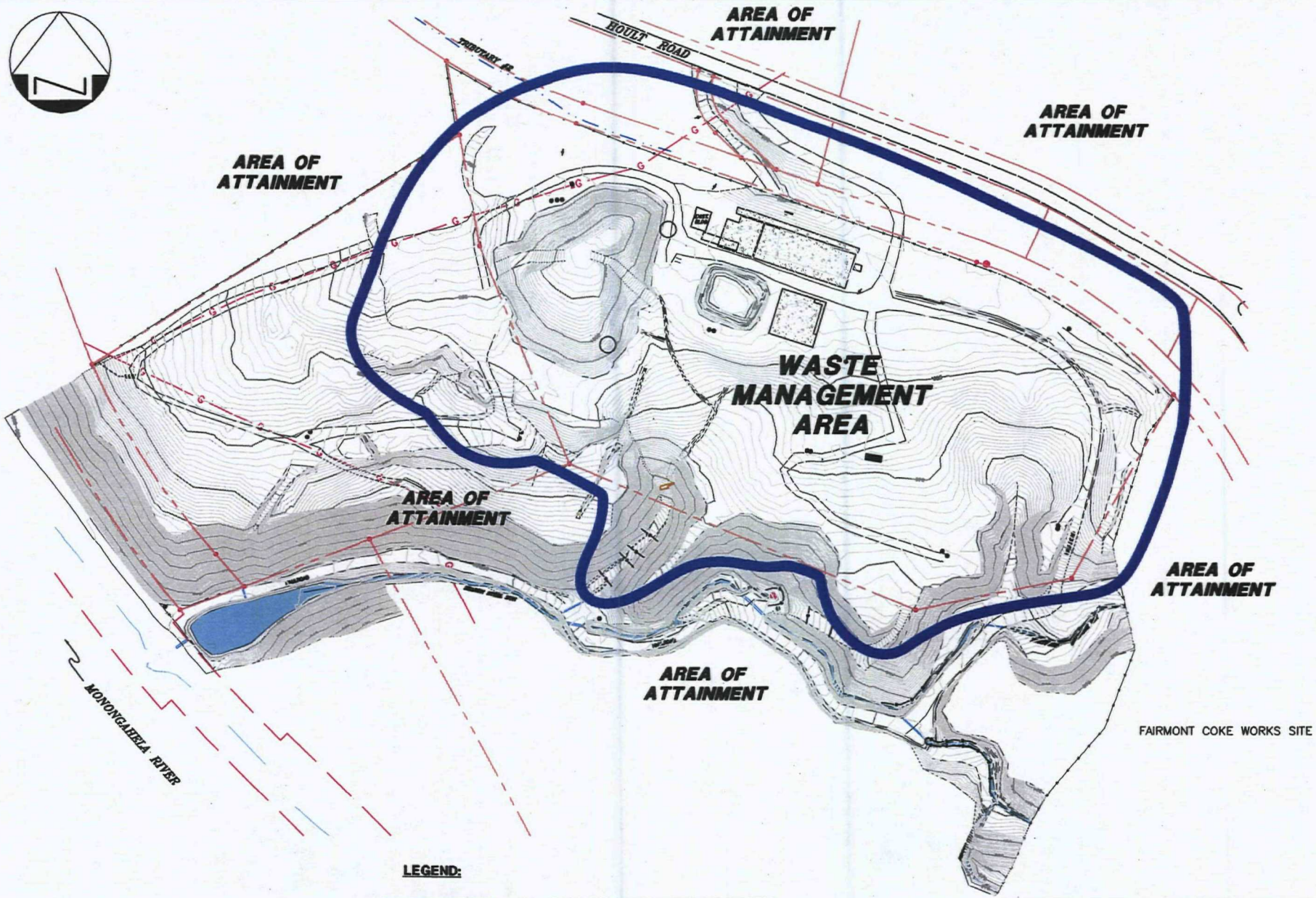


Figure 7
Expansion of the Existing Containment System-Alternative GW-4
Big John Salvage - Hoult Road Site
Fairmont, West Virginia



LEGEND:

WASTE MANAGEMENT AREA BOUNDARY

0 50 100 200
1"=200'

Figure 8
Waste Management Areas
Big John Salvage - Hoult Road Site
Fairmont, West Virginia

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TABLE 1
REMOVAL PERFORMANCE STANDARDS
BIG JOHN SALVAGE/HOULT ROAD SITE

CHEMICAL OF CONCERN	REMOVAL PERFORMANCE STANDARDS	BASIS FOR REMOVAL PERFORMANCE STANDARD SELECTION
SOIL (mg/kg)		
Arsenic	20	Protection of Industrial Uses
Total benzo(a)pyrene (BAP) equivalents	4.6	Protection of Industrial Uses
Total PAHs	26	Protection of Ecological Receptors
Naphthalene	10	Proteciton of Industrial Uses/Soil to Groundwater
Copper	35	Protection of Ecological Receptors
Mercury	1	Protection of Ecological Receptors
Zinc	95	Protection of Ecological Receptors
Benzene	0.03	Soil to Groundwater
1,2-Dibromo-3-chloropropane	0.02	Soil to Groundwater
2-Methylnaphthalene	1	Soil to Groundwater
SEDIMENT - ON-SITE (mg/kg)		
Total BAP equivalents	0.4	Protection of Recreational Uses
Total PAHs	26	Protection of Ecological Receptors
Lead	130	Protection of Ecological Receptors
Mercury	1	Protection of Ecological Receptors
Cadmium	1	Protection of Ecological Receptors
SURFACE WATER - ON-SITE (ug/L)		
Benzo(a)anthracene	0.2/GOAL - 0.02 (1)	Protection of Recreational Uses
Benzo(a)pyrene	0.03/GOAL - 0.02 (1)	Protection of Recreational Uses
Benzo(b)fluoranthene	0.5/GOAL - 0.02 (1)	Protection of Recreational Uses
Dibenzo(a,h)anthracene	0.02	Protection of Recreational Uses
Indeno(1,2,3-cd)pyrene	0.06/GOAL - 0.02 (1)	Protection of Recreational Uses
Fluoranthene	370	Protection of Ecological Receptors
Naphthalene	11	Protection of Ecological Receptors
Pyrene	0.06	Protection of Ecological Receptors
Benzene	51	Protection of Ecological Receptors
Aluminum	750	Protection of Ecological Receptors
Barium	40	Protection of Ecological Receptors
Cyanide	5	Protection of Ecological Receptors
Cadmium	0.8 - 1.1	Protection of Ecological Receptors
Iron	1500	Protection of Ecological Receptors
Lead	4.5 - 8.4	Protection of Ecological Receptors
Mercury	2.4	Protection of Ecological Receptors
Manganese	1000	Protection of Ecological Receptors

TABLE 1
REMOVAL PERFORMANCE STANDARDS
BIG JOHN SALVAGE/HOULT ROAD SITE

CHEMICAL OF CONCERN	REMOVAL PERFORMANCE STANDARDS	BASIS FOR REMOVAL PERFORMANCE STANDARD SELECTION
GROUNDWATER (ug/L)*		
1,2-Dibromo-3-chloropropane	0.2 (3)	Protection of Future Residential Uses
2-Methylnaphthalene	27	Protection of Future Residential Uses
Benzo(a)anthracene	0.2/GOAL - 0.005 (2)	Protection of Future Residential Uses
Benzo(b)fluoranthene	0.3/GOAL - 0.003 (2)	Protection of Future Residential Uses
Benzo(k)fluoranthene	0.5/GOAL - 0.03 (2)	Protection of Future Residential Uses
Benzo(a)pyrene (and total BAP equivalents)	0.2 (3)	Protection of Future Residential Uses
Naphthalene	62	Protection of Future Residential Uses
Benzene	5	Protection of Future Residential Uses
Arsenic	10 (3)	Protection of Future Residential Uses
Iron	2300	Protection of Future Residential Uses
Manganese	270	Protection of Future Residential Uses
Thallium	2 (3)	Protection of Future Residential Uses
Cyanide	200	Protection of Future Residential Uses
Vanadium	12	Protection of Future Residential Uses
MONONGAHELA RIVER SEDIMENT (mg/kg)		
Black Semi-Solid Deposit (BSD)	COMPLETE REMOVAL	Risk reduction - Human Health/Environment
Visually Stained Sediments	REMOVAL(4)	Risk reduction - Human Health/Environment

(1) First value presented is typical detection limit available from routine analytical methods. Second value is ultimate goal based on meeting West Virginia AWQC standards for protection of ecological receptors.
(2) First value presented is typical detection limit available from routine analytical methods. Second value is ultimate goal based on meeting human health risk goals (cancer risk = 1E-05, or HI = 1.0)

(3) Value presented is the maximum contaminant level (MCL).

(4) Complete removal or isolate post-excavation residual with earthen material

* The groundwater performance standards apply to the "area of attainment."

RESPONSIVENESS SUMMARY
FOR THE PROPOSED ENGINEERING EVALUATION/COST ANALYSIS
FOR THE BIG JOHN SALVAGE SUPERFUND SITE

FAIRMONT, MARION COUNTY, WEST VIRGINIA

Public Comment Period
October 4, 2009 to November 2, 2009

Overview

On October 4, 2009 EPA released the draft Engineering Evaluation/Cost Analysis ("EE/CA") for the Big John Salvage Superfund Site ("Site"), and announced the opening of the 30-day public comment period. On October 22, 2009 EPA and WVDEP held a public meeting in Fairmont to present the draft EE/CA to the local community and to seek comment. At this meeting, representatives from EPA and the WVDEP discussed the Site history, environmental investigations, EE/CA-proposed response actions and answered general questions about Site conditions.

The draft EE/CA detailed EPA's preferred alternatives to clean up the residual contamination at the Site, giving consideration to the following evaluation criteria:

Effectiveness

- Overall protection of human health and the environment
- Compliance with Applicable or Relevant and Appropriate Regulations
- Long-term effectiveness and permanence
- Reduction of mobility, toxicity, or volume of contaminants through treatment
- Short-term effectiveness

Implementability

- Technical Feasibility
- Administrative Feasibility
- Availability of Services and Materials

Cost

- Cost-effectiveness

EPA carefully considered state and community comments on the clean-up alternatives before reaching the final decision regarding the removal response plan. There were some adjustments to the final clean-up plan based on comments received during the public comment period. EPA's final EE/CA details EPA's final clean-up decision.

EPA's recommended removal action is summarized below. Based on current information, the response action selected provides the best balance among the alternatives considered with respect to the evaluation criteria EPA used to evaluate each alternative. EPA's recommended removal action addresses soil, groundwater, on-Site sediments and contaminated Monongahela River sediments.

The recommended removal action includes the following components:

- Upgrading the Existing Groundwater Containment and Treatment System to better prevent migration of contaminated groundwater to the Area of Attainment
- Constructing a multi-layered cap to contain buried wastes and contaminated soil

- Excavating and consolidating contaminated on-Site sediments beneath the multi-layer cap
- Excavating black semi-solid deposits ("BSD") and stained sediments ("SSD") from Monongahela River for off-Site disposal
- Long-term environmental monitoring of groundwater, on-Site surface water and the Monongahela River surface water, sediment and biota, as appropriate.
- Institutional Controls will be implemented to prevent: the extraction of groundwater from the aquifer beneath the Site for use as a potable water source; any interference with the groundwater extractions wells, treatment system, and related/equipment; and any removal or interference with the impermeable cap without written permission of WVDEP, and EPA as appropriate. Institutional controls will provide notice that soils beneath cap are contaminated and ensure that any redevelopment work is conducted with properly trained workers and that excavated soils are managed appropriately.

This Responsiveness Summary provides a summary of issues raised during the public comment period, including comments made during the October 22, 2009 public meeting. EPA carefully evaluated the comments submitted. Citizens submitting comments included representatives from companies put on notice of potential liability for cleanup activities, area residents and local government.

Human Health and Ecological Risk Assessments

1. Comment: Were there amendments or "errata sheets" modifying the July 2009 Human Health Risk Assessment that were not included in the Administrative Record released for public comment? To the extent any risk assessments have changed or propose to change any results or parameters (exposure, pathways, duration of exposure assumptions, etc.), the EE/CA should be reevaluated in concert with those changes.

EPA Response: No amendments or errata sheets were issued modifying the July 2009 final Human Health Risk Assessment. The Administrative Record released for public comment on October 2, 2009 is complete.

2. Comment: The ecological risk assessment determined that the protective goal for total PAHs in soil is 29 mg/kg but Table 2-2 states that the cleanup goal for total PAHs in soil is 26 mg/kg. The cleanup goal for on-Site sediment is 26 mg/kg. Did the EE/CA transpose these two numbers?

EPA Response: This was not a typographical error. It is correct that the ecological risk assessment process determined that 29 mg/kg total PAHs in soil would be protective of ecological receptors based on low molecular weight PAHs. See Appendix B for discussion on the development of preliminary cleanup goals. The on-Site sediment cleanup goal was established at 26 mg/kg total PAH. The limit for total PAH in surface soil was reduced from 29 mg/kg to 26 mg/kg in recognition that the soils erode to the streams and become stream sediments.

Error in Cost Estimates for Soil Alternatives

3. Comment: EPA's cost estimates for a few of the Soil Alternatives made an error in calculating the volume of earthen material (i.e., soil) necessary to cover the Site. The error was made in the line item(s) converting cubic feet to cubic yards of soil required. The computational error resulted in an over-estimate of the cost of performing those respective Alternatives.

EPA Response: EPA confirms that a computational error converting units from cubic feet to cubic yards occurred. The erroneous computation divided by 9 rather than the correct 27, as there are 27 cubic feet in 1 cubic yard. This error caused the cost estimate to over-estimate the amount of fill or topsoil needed to cover the Site by 3 fold. The cost estimates for Alternatives that do not include importing earthen material to the Site were not impacted. The 30-year Present Net Worth cost estimates for the following Soil Alternatives were impacted by the computational error:

Alternative SO3 (Excavation and Onsite Thermal Treatment) revised from $95,444,000 to $94,633,000

Alternative SO4 (Excavation and Off-Site Disposal) revised from $50,797,000 to $49,985,000

Alternative SO5 – (Capping/Containment, Option A – Subtitle D Cap) revised from $10,405,000 to $7,142,000

Alternative SO5 – (Capping/Containment, Option B – Expanded Subtitle D Cap) revised from $13,689,000 to $8,238,000

Alternative SO5 -- (Capping/Containment, Option C – Subtitle D Cap with Asphalt) – no revision necessary – estimate remains $8,332,000

EPA's recommended removal action for the Soil media remains Alternative SO5 – Capping/Containment). The specific cap configuration will be determined during the design process. EPA evaluated a range of low-permeable cap profiles capable of meeting removal action objectives to better assess the potential cost of implementing Alternative SO5. With respect to cost-effectiveness, the corrected cost estimates make Alternative SO5 compare even more favorably against the other potential Soil Alternatives.

The total estimated cost (30-year Present Net Worth) for all of the combined EE/CA selected removal actions is as follows:

Groundwater - Alternative GW4	**$5,073,000**
Soil - Alternative SO5	**$7,142,000 to $8,332,000**
On-Site Sediments - Alternative OSS3	**$523,000**
River Sediments - Alternatives RS2 (Option B) and RS4	**$5,056,000**
Total	**$17,271,000 to $18,984,000**

General Comments on EE/CA

4. Comment: The EE/CA consistently recommended high cost alternatives over all other removal action alternatives. Vertellus also asserts that the EE/CA does not consider the "threshold" considerations of effectiveness and environmental protection, and further, that the EE/CA recommends alternatives that do not consider cost effectiveness.

EPA Response: The EE/CA was organized in a manner to clearly focus the evaluation on the threshold considerations of "overall protection of public health and the environment" and "compliance with applicable or relevant and appropriate requirements (ARARs)." The EE/CA considered the likelihood that each alternative would achieve overall protection goals and meet ARARs in a Yes or No format. Only Alternatives receiving affirmative responses to both threshold questions were carried forward in the EE/CA. The assessment then considered the Effectiveness, Implementability and Cost of each alternative before comparing and balancing the cost-effectiveness of each alternative, or combination of alternatives, against each other. The EE/CA concluded by recommending the lowest cost alternative which would best meet the removal action objectives after considering each against the appropriate criteria established in the NCP and EPA guidance.

The EE/CA did not recommend the highest cost alternatives considered. For example, six action alternatives were considered for contaminated Site soils with estimated costs ranging from $745,000 (No Further Action) to $94,000,000 (excavation and off-site thermal treatment). The EE/CA recommended Capping/Containment with an estimated cost ranging from $7,100,000 to $8,300,000 depending on the cap configuration selected in the design. Four of the six cleanup alternatives considered for Site soils were more expensive than the recommended alternative. Only one alternative considered to address the residual hazardous substances remaining in on-Site soils was less expensive than the recommended alternative. However, the No Further Action alternative would not meet protectiveness goals and would remove the property from the possibility of being safely reused in the future. The recommended alternative (Capping/Containment) was the most cost-effective alternative considered.

5. Comment: Written and verbal comments received from CBS Corporation, Vertellus and several citizens living in the Fairmont community during the public comment period were in favor of removing the hotspot of BSD/SSD from the river; however, the comments were overwhelmingly against EPA's recommendation to consolidate the river bottom wastes beneath the cap on the Site. The primary concerns with respect to Alternative RS3 raised by the community included:

- Transporting the BSD/SSD wastes to an appropriately constructed and permitted disposal facility is a better long-term containment strategy. Modern landfills are constructed with impermeable liners as well as impermeable covers. Modern landfills have pre-established monitoring programs to detect and correct any leaks that may occur.

- Consolidation of the wastes from the river beneath the cap on the Big John Salvage Site would actually increase the mass of contamination on the Site. The increased mass of contamination could make it more difficult to contain with the proposed impermeable cap groundwater/seep collection system.

- The containment cap could not be constructed until after the river sediments were excavated, potentially delaying the completion of the cleanup and subsequent re-development.

- BSD and SSD may be structurally "soft" and make it more difficult to redevelop the property.

The community consensus was that an off-site disposal option for the wastes removed from the River was preferred.

EPA Response: The draft EE/CA released for public comment did recommend Alternative RS3 Option B, the on-Site consolidation of tar wastes lying on the Monongahela River bottom, because that alternative was judged to provide the best balance when considered against the standard decision criteria, including cost-effectiveness. The EE/CA determined that the cap and groundwater capture system proposed for containment in the waste management area could effectively prevent exposure to consolidated wastes from the river bottom without increasing the lateral extent of the impermeable cap. However, EPA's response action decision-making process includes community outreach to discuss the engineering studies and to solicit public comments on the draft EE/CA including recommended response actions.

After full consideration of the concerns raised during the public comment period, EPA has changed its recommendation from Alternative RS3 (Excavation and On-Site Confinement) to Alternative RS2 (Excavation and Off-Site Disposal/Treatment). The comparative analyses completed in Section 3.4 of the EE/CA determined that the two options graded out very closely for most criteria. Alternative RS2 was judged to be better when considering Long-Term Effectiveness and Permanence and Implementability, RS3 was determined to be slightly more cost-effective. The two options were re-considered in light of the significant technically sound community objections. EPA determined that the more conventional option of long-term management in an appropriately constructed, permitted and monitored facility is the better option. Alternative RS2 (Excavation and Off-Site Disposal/Treatment) is EPA's selected alternative for the BSD/SSD on the River bottom.

Removal Action Objectives

6. Vertellus reviewed the list of Removal Action Objectives (RAOs) that EPA identified in the EE/CA and proposed that some of those RAOs be modified. Vertellus also submitted an "alternative cleanup plan" to the alternatives presented and evaluated in the EE/CA. Vertellus did not perform an evaluation considering Effectiveness, Implementability or Cost of its "alternative cleanup plan." Vertellus did not provide an analysis comparing its "alternative cleanup plan" against the other alternatives considering the standard criteria (i.e., Overall Effectiveness, Compliance with ARARs, etc.). The Vertellus' alternative cleanup plan presumes that its proposed modifications to the RAOs have been agreed to as the alternative cleanup plan does not meet the objectives developed in the EE/CA process. The proposed changes to the RAOs, and EPA's respective response is listed below.

Comment: See below

Soil RAO #2 as stated in the EPA EE/CA released for public comment:

Minimize the infiltration of precipitation into the [contaminated] soil to reduce the potential for leaching of soil contaminants into groundwater.

Vertellus' Proposed Modification:

Provide for the infiltration of precipitation into the [contaminated] soil to allow the continued natural restoration of soil and groundwater.

Soil RAO #3 as stated in the EPA EE/CA released for public comment:
Prevent the continued leaching or migration of tar deposits to the surface.

Vertellus' Proposed Modification:
Recover and remove tar derived materials at the surface.

The RI indicates that the overburden groundwater aquifer is consuming oxygen. This indicates that natural biodegradation of organic chemicals is occurring. Without a continued source of oxygen the biodegradation processes will cease. Changing the RAO to provide for infiltration of precipitation, which provides oxygen to the subsurface, will enable the naturally occurring biodegradation processes that are already taking place in the subsurface to continue. Minimizing infiltration will starve the subsurface of oxygen and suffocate the natural degradation process.

Vertellus' past experience with remediating these types of sites has shown that tar migration is best mitigated via a diligent seep management plan, which removes source material over time. This approach provides for the removal (and stabilization if warranted) of tar-derived materials in a manner consistent with the intent of Superfund by reducing tar quantity and toxicity.

EPA Response: The proposal to allow rain water to continue to pass through the contaminated soil and buried wastes to leach chemicals to the groundwater where they can be degraded presumes that 1) the rain water can wash all the contaminants to the groundwater [this cleanup technology is referred to as "soil washing"] and 2) all the contaminants will be degraded by natural attenuation processes. EPA evaluated the potential effectiveness of soil washing and determined that water or other solvents could not effectively flush the wastes from the vadose zone. The EE/CA recognized that aerobic and anaerobic degradation is occurring to some degree at the Site. However, the rate of degradation is very slow relative to the type and concentration of contamination present (e.g., buried coal tar and high PAH concentrations in the subsurface).

Allowing tar, containing very high concentrations of toxic hazardous substances, to passively seep to the surface where people or animals could become exposed is not appropriate if the property is to be safely reused. EPA does agree that any tar that does become exposed during implementation of response actions or at post-construction seeps should be scooped up and disposed in an appropriate manner.

The impermeable cap should be constructed to prevent seeps on the flat area of the cap to the extent possible. Post-construction seeps along the toe of the down hill slope may be inevitable. Should points of tar expression occur they will be identified and specific engineering controls will be designed to control migration and prevent exposure. At a minimum the seep will be isolated and cleaned periodically.

Vertellus Proposes an Alternative Cleanup Plan

7. Vertellus submitted an "alternative cleanup plan" in its comment package. Vertellus asserted that it believes the alternative cleanup plan would be protective of human health and the environment, comply with applicable or relevant and appropriate requirements and restore the Site to a productive use. The details of the Vertellus alternative cleanup plan are set forth in the Administrative Record.

EPA Notes: The Vertellus alternative cleanup plan makes the assumption that the Black-Semi-Solid deposits/Stained Sediment deposits (BSD/SSD) located in the Monongahela River will not be consolidated on the upland portion of the Site. The Vertellus alternative does not otherwise address the river.

The three principal elements of Vertellus' alternative, addressing (1) soil, (2) groundwater, and (3) surface water/sediment are as follows:

a. Soil Element. Vertellus urges that a protective cap consisting of various surface treatments, including concrete pads, asphalt, gravel, and grass be installed over the entire Site. This approach would allow for natural attenuation of contaminants in the soil and for the future development of the Site. To establish the efficacy of the future development of the Site, Vertellus proposes that a 40,000 square foot steel shell building be constructed on the Site and be made available to local government. Vertellus suggests that a vapor mitigation system similar to those employed for radon be included beneath any future building foundation. The Vertellus solution also provides for $50,000 a year to support the salary of an individual over the next 30 years so that they may maintain the Site and keep it from falling into disrepair. This also creates one local job, and establishes a path to employ local contractors to assist in maintaining the grounds.

From the perspective of protection of public health and the environment, the Vertellus-proposed surface cover precludes the potential for exposure of any receptor to constituents in surface or subsurface soil as long as the cover is maintained. In addition, such cover will significantly attenuate any further potential for migration of constituents from soil to groundwater; in the unlikely event such migration is even occurring.

Vertellus agrees that an environmental covenant to ensure that expected future subsurface construction activities such as, installation of utility lines or building foundations, that would disturb the cover, would require an appropriate health and safety plan for workers is considered reasonable. Incorporating these above mentioned considerations will protect public health and the environment with respect to soil at the Site.

EPA Response: Vertellus' proposal is built upon a modified set of removal objectives. In other words, Vertellus' proposal does not purport to be capable of achieving the same objectives that EPA determined were necessary to be protective of human health and the environment at the Site. EPA has reviewed the removal action objectives and determined that those identified in the EE/CA are necessary and appropriate.

Vertellus proposes to cap the Site with an undefined "quilt" of "various surface treatments, including concrete pads, asphalt, gravel, and grass" to be installed over the entire Site. There was no discussion provided as to how a particular cover would be selected for a specific parcel.

As stated in the EE/CA, the final cap profile/configuration will be determined during the design phase, considering the future land use. However, gravel and grass are not impermeable materials, and concrete tends to quickly become porous due to weather and cracking. A permeable cover constructed over contaminated material would allow precipitation to infiltrate through contaminated soils, leach contaminants to the groundwater and potentially migrate beyond the boundary of the Waste Management Area. EPA's recommended response action specifies an impermeable cover over areas exceeding the soil performance standards. The soil performance standards are listed in Table 2-2 of the EE/CA. The most significant soil performance standards in determining the foot print of the cap will likely be arsenic (20 mg/kg), Benzo(a)pyrene [BaP] equivalents (4.6 mg/kg), total PAHs (26 mg/kg), naphthalene (10 mg/kg) and mercury (1.0 mg/kg).

EPA does not have the authority to call for the construction of particular buildings in its proposed risk mitigation strategy. If a Superfund property owner decides that the future use of an environmentally compromised parcel will include construction of a building, EPA will cooperate with the property owner to make sure that the design and construction of the building provides a safe work environment for future tenants.

Vertellus' proposal to construct a steel shell building on the property was not available when the EE/CA was performed but EPA believes that such a building can be safely designed and constructed. The roof of the building would likely be an acceptable alternative low-permeability cover. A vapor mitigation system similar to those employed for radon would need to be evaluated during design but would likely be satisfactory.

b. Groundwater Element. Vertellus urges the continuation of the existing system for the capture of contaminated groundwater from seeps. This allows pre-treatment of contaminated groundwater prior to discharging it to the City of Fairmont sanitary sewer. The proposed EE/CA fails to indicate any concern that the current collection system is not functioning properly. Vertellus recognizes that there is no current use of groundwater at the site and groundwater use restrictions can prevent future exposure to the groundwater. Vertellus is further aware that EPA policy requires restoration of the groundwater to a drinkable condition. Vertellus has concluded that ultimately natural attenuation will achieve that goal. In the meantime, Vertellus urges a continuation of the groundwater treatment at the Site to augment the restoration process.

EPA Response: The Remedial Investigation documents that tar and contaminated groundwater continues to flow down the slope beneath the East Tributary and the Middle Tributary and that the existing seep collection systems in the East Tributary and Middle

Tributary are doing a reasonably good job intercepting the tarry oils and contaminated groundwater before it can enter the Sharon Steel Run (also known as the Unnamed Tributary #1). The selected groundwater alternative will continue to employ the existing collection system with some upgrades. Surface water sampling in Sharon Steel Run indicates that some contamination is bypassing the bentonite dam at the bottom of the East Tributary. Elevated benzene concentrations have been documented in the Sharon Steel Run at its confluence with the East Tributary. The dam should be upgraded to more completely isolate groundwater pooling around the sump collection point from the Sharon Steel Run.

Previous removal actions completed at the headwaters of the West Tributary did eliminate some source material but additional tar waste deposits are know to exist in the upper reaches of the West Tributary. EPA constructed a temporary access road over known waste material in the West Tributary to gain expeditious access to Sharon Steel Run with construction vehicles during time-critical removal activities.

Similar to the groundwater flow pattern observed upgradient of the Middle and East Tributaries, contaminated groundwater flowing from the north to the south in the vicinity of the West Tributary likely follows a flow path leading down slope to the base of the West Tributary. The hydraulic containment system will be extended to the West Tributary so that groundwater and surface water performance standards can be met within the Area of Attainment downgradient of the Waste Management Area.

An option which may be considered during the design could be excavation of the buried tar-derived waste material from the West Tributary and consolidation of that material beneath the cap on the upland portion of the Site. The excavated area would be backfilled with clean material. This action would reduce the foot print of the constructed cap. Additional monitoring wells could be installed in the vicinity of the West Tributary. In the event that the groundwater performance standards are met at the top of the slope without a separate groundwater collection system the removal action objectives will have been met. The specific action in this area may be refined during the design process.

c. Sediment/Surface Water Element. Vertellus urges the implementation of the sediment removal elements set forth in the proposed EE/CA but cited its concern that restoration of the stream habitat would be difficult since the streams are artificially channelized and the influence of acid mine drainage will not be abated. Vertellus noted that removal of the stream sediments will further remove constituents from the Site.

EPA Response: Removal of the remaining contaminated sediment with concentrations of hazardous substances above concentrations known to be protective of the environment will assist the natural recovery of the stream habitat. EPA is unaware of acid mine drainage being documented at the Site.

8. Comment: Vertellus recommends that contaminated sediment from the Monongahela River not be consolidated beneath the proposed RCRA Subtitle D cap on the Big John Salvage property. Vertellus is concerned that those disturbed sediments would further degrade water quality at the Site and their presence would not be compatible with its recommendation that a more permeable soil cover system be installed. It should be noted that the concentration of total PAHs in the river BSD is greater than 20,000 mg/kg and except for one subsurface upland soil location, the concentrations of total PAHs is significantly less in upland soil than in the river BSD. Therefore, it appears that the total mass load of contaminants represented by the placement of river BSD on the Site is likely to exceed the total mass load of contaminants represented by the on-Site surface and subsurface soil contamination. In addition, Vertellus stated that consolidating sediment from the river would result in increased, long-term groundwater treatment costs to be incurred, due to the increased mass of PAHs ultimately leaching to groundwater and requiring treatment. Further, even Subtitle D caps have an expected rate of leakage through the "impermeable" liner material.

EPA Response: As a general policy during the conduct of the Remedial Investigation, EPA did not send environmental samples containing obvious tar wastes to the laboratory to confirm elevated levels of PAHs were present. EPA avoids sending soil matrix samples with very high concentrations of contamination to the laboratory because the laboratory staff must dilute the sample several times to protect sensitive analytical equipment. Spending funds to quantify extremely high concentrations of PAHs in actual coal tar wastes or obviously impacted material can be considered wasteful if it is not completed to meet specific data quality objectives. Note that if EPA had analyzed the tar wastes and entered those data in the quantitative human health risk assessment the calculated risk would have been considerably higher. It follows that Vertellus' calculation of the existing mass load of PAHs on the upland portion of the Site would also be adjusted upward.

Based on observations in the field and the best professional judgment of staff scientists, there are pockets of tarry wastes in various locations across the upland portion of the Site containing concentrations of PAHs in the 20,000 mg/kg PAH range.

For example, Appendix 3C in the April 2009 RI includes a summary of trenching activities completed to evaluate the potential for "recycling" buried tar wastes at the Big John Salvage Site by processing it into an alternative fuel product (i.e., synthetic coal). Black seams of buried waste materials were analyzed for BTU content and other useful waste characterization parameters. Approximately 1,800 cubic yards of black waste material was identified in 6 areas with BTU values ranging from 2,900 to 13,800 BTUs/lb. The elevated BTU values in the black tar wastes are generated by combustible PAHs within the waste material. Based on professional judgment, if these high BTU waste materials had been sent to the laboratory for analysis the results for PAH concentration would be similar to the BSD sediments in the Monongahela River.

Notwithstanding the foregoing, EPA has fully considered the objection submitted by Vertellus and other stakeholders and decided that the better option is to send the BSD removed from the Monongahela River to an appropriately permitted off-Site facility.

9. Comment: There are potential synergies between the capping response action and the groundwater response action. A RCRA Subtitle D cap would greatly reduce leaching of contaminants into groundwater. If installed, such a cap may obviate the need to expand the current groundwater collection and treatment systems. If a RCRA Subtitle D cap is installed, a phased approach to the groundwater collection and treatment system should be based on Site conditions that exist after ongoing leaching and recharge of contaminated areas has been mitigated by the cap. Designing and installing the expanded groundwater collection and treatment system prior to observing the anticipated benefits of capping may waste funds.

EPA Response: EPA agrees that installation of an impermeable cap would reduce leaching of contaminants from the vadose zone to groundwater and reduce the flux of contaminated groundwater migrating from the Waste Management Area. It is logical that the groundwater collection system would be installed before the impermeable cap is installed because the conceptual design includes horizontal drains and sumps in locations beneath the footprint of the cap. Nevertheless, the schedule and construction order of the project will be developed by the contractors retained to design and implement the cleanup. It is possible that the design effort will include installation of additional groundwater monitoring wells strategically placed to assist the designer in refining the collection system alignment. The removal action objective is to prevent contaminated groundwater from migrating outside the Waste Management Area and achieving safe levels in the Area of Attainment. EPA would consider the rationale of constructing the cap first if the constructor affirms that such a strategy would not prevent subsequent installation of the collection system or an equally effective alternate collection strategy were presented.

10. Comment: The EE/CA indicates that some natural attenuation is occurring, including both anaerobic and aerobic degradation. EPA should identify the nature and significance of these processes in the design of the Site containment system.

EPA Response: The EE/CA did evaluate monitored natural attenuation (MNA) as a response action for contaminated groundwater at the Site. Natural attenuation is the recognition that some degree of biodegradation, dilution, dispersion and adsorption are in operation at all hazardous waste sites. As noted in Section 3.2.3, the EE/CA considered the Site-specific circumstances, including mass and type of hazardous substances present and determined that "MNA as the sole remedy at the Site would not be effective in meeting most of the removal action objectives for groundwater..."

The current surface of the Site is permeable and MNA is not effectively treating groundwater contamination. With sites similar to the Big John Salvage Site, natural attenuation works best when the source of groundwater contamination has been removed and natural processes can be utilized to further diminish the residual contaminants to safe

levels. Considering the types and masses of hazardous substances present, the rate of degradation can not be appreciably increased by construction of a permeable cover compared to an impermeable cover. The natural attenuation processes occur passively and will continue to occur after the surface cap is constructed and groundwater capture efficiency is enhanced. The EE/CA analysis determined that containing the contaminants with an impermeable cap and downgradient capture of contaminated groundwater/seeps was the combination of response actions providing the best balance when considered against the decision criteria.

11. Comment: Vertellus commented that the proposed response action would leave the Site with a type of cap that effectively precludes the use of the Site for any meaningful purpose due to the increased difficulty and cost associated with building over a pre-existing plastic cap. Vertellus stated that a cap that does not use a synthetic liner would make future development opportunities easier and less expensive.

EPA Response: The recommended removal action for the soil media (Alternative SO5 – Capping/Containment) is an engineered cap that meets the objectives of minimizing infiltration of precipitation, providing a barrier capable of preventing exposure of people and animals to concentrations of hazardous substances exceeding the Site-specific performance standards (including prevention of tar rising to surface through the constructed barrier), and preventing erosion. The final cap design must meet the performance objectives outlined in West Virginia's RCRA Subtitle-D regulations. However, the EE/CA clearly states that the actual extent and specific configuration (i.e., profile) of the cap included as part of Alternative SO5 would be selected during the design.

The three specific cap profiles evaluated were presented to assess the feasibility of the alternative and develop cost estimates. The estimated cost of the three profiles evaluated in Alternative SO5 ranged from $7.1 to $8.3 million. The design process allows for a modified cap configuration provided the response action objectives are met. The performance standards of the RCRA Subtitle-D cap include a layer that acts as an impermeable barrier to reduce infiltration. A 40-millimeter geomembrane is one of the most cost-effective hydraulic barriers available and has been utilized on many properties which are subsequently redeveloped. A modified cap profile would be acceptable provided it meets the performance standards.

12. Comment: Vertellus stated the EE/CA response action fails to reduce or eliminate the potential for the Site to fall into a poor maintenance.

Response: The appropriate operation, maintenance and monitoring requirements for the recommended removal action will be developed during the design phase. The requirements will be detailed in an Operations & Maintenance (O&M) plan. Implementation of the O&M plan will be an important component of the response action.

13. Comment: Vertellus stated that EPA overestimates the total area of contamination and therefore overestimates that the required cap would need to cover 18 acres.

The EE/CA report, Section 3.1, page 3.13, states the cap would be installed over "the entire impacted area of the Site." For purposes of determining the extent of the cap, "the entire impacted area of the Site" is defined as:

- Combined area of surface and subsurface soil contamination (approximately 15 acres).
- Steep side slope areas located on the north side of Sharon Steel Run, which is the location for some of the historical tar seeps (approximately 3 acres)

Vertellus believes that this determination of 18 acres of contaminated soil grossly overestimates the actual impacted area of the Site, and by default, the total area of the proposed cap.

Furthermore, construction of a Subtitle D cap for the purpose of preventing leaching of surface and subsurface soil contaminants is not warranted given that Vertellus is proposing to construct cover material that will mitigate significantly this potential effect over the entire Site and a groundwater and treatment system is in place and operating.

Finally, Vertellus notes that the actual proposed boundaries for the cap are not shown in the EE/CA and must be interpolated from Figures 2-1 and 2-2 of the EE/CA, and that the steep side slope areas located on the north side of Sharon Steel Run, where the cap is proposed, are not shown on any of the figures.

EPA Response: The Remedial Investigation concluded that concentrations of PAHs greater than Site-specific performance standards (see Table 2-2 for soil performance standards) exist in the subsurface throughout the Site, not confined in hotspots. All soil and waste material containing chemicals of concern above clean-up standards would need to be isolated from people and animals. Note that during the removal of one of the stock piles on-Site, drums were found buried which had been unknown previously. In addition, trenching conducted during Site investigations documented other significant pockets of buried tar-like wastes. The typical treatment for "hotspot" contamination is the removal of contaminated soils, replacing with clean fill. With subsurface contamination widespread, and sporadic subsurface waste disposal likely present, the simply remove hotspot approach is not viable because unacceptable risk to human health and the environment would remain. A RCRA Subtitle D cap will minimize infiltration and reduce migration to groundwater – other designs may also meet the objective.

The final cap and its boundary will be determined during the design phase, considering the future land use on-Site. The EE/CA clearly states the fact that the extent of the cap can be further reduced by select excavation and consolidation of materials. However, a confirmation sampling program would need to be established and implemented to demonstrate that all appropriate wastes and contaminated soil have been adequately removed. The EE/CA also states that alternative capping strategies may be appropriate for steep sloped areas. EPA believes that the 18-acre cap estimate is conservative. The EPA cost-estimate may be a little high (but within the acceptable + 50%/-30% tolerance expected by EPA guidance) in the event that the cap footprint can be appropriately reduced.

14. Comment: There is nothing in the EE/CA indicating that the concept of surface soil "hotspot" response action was evaluated as a means of cleaning up discrete locations. Using a hotspot approach and identifying only the locations that have the potential to pose an adverse effect, rather than the entire area would result in a significant decrease in the overall area of surface soil contamination.

EPA Response: EPA did develop and consider hotspot mitigation techniques in the EE/CA as Alternative SO4 (Excavation and Off-Site Disposal/Treatment). The EE/CA nature and extent of contamination discussion states that highly contaminated stringers, seams and pockets of waste materials are present on Site but that most of the volume of contaminated material on-Site is actually soil containing hazardous substances above performance standards. Alternative SO4 would excavate and separate the waste materials with the highest concentration of hazardous substances (i.e., hotspots) from the lesser contaminated material. The material with the highest concentrations (estimated to be 15% of the total mass excavated) would be sent off-Site for thermal treatment and the lesser contaminated material would be characterized and sent to an appropriate off-Site landfill, likely a RCRA Subtitle D landfill.

15. Comment: The surface soil defined as the soil horizon from 0 to 5 feet below ground surface is inappropriate. Surface soil is typically defined as the soil horizon from 0 to 2 feet below ground surface and soil deeper than 2 feet below ground surface is defined as subsurface soil. This is a significant difference with major implications at this Site. The human health and ecological exposure is driven by exposure to surface soil and not exposure to subsurface soil (except for short term construction and worker exposure that can easily be addressed by environmental covenants and post-response action care provisions at this Site). By following this CERCLA definition, the aerial extent of surface soil representing a potential human health or ecological risk could be decreased significantly; thereby decreasing the total area of the cap by a substantial amount.

EPA Response: The consideration of the top 5 feet of overburden soil as "surface" soil was appropriate in the context of the Big John Salvage Site and does not have significant implications to prospective work. The primary purpose of the baseline risk assessment is to determine whether exposure to contaminants and contaminated media at the Site may present an excessive health risk to people or environmental receptors utilizing the Site if no cleanup were undertaken or land use restrictions implemented. The baseline risk assessment considers potential exposure under several current and future land use scenarios. If the calculated risk is greater than the threshold cancer risk of 1 x 10E-4 (1 in 10,000) or threshold non-cancer hazard index of 1.0, mitigation of the potential exposure route is warranted. In addition, the potential for contaminants to leach from soil to groundwater was evaluated. The remedial investigation documented that the presence and concentration of hazardous substances was elevated from the top to the bottom of the overburden, not isolated in the upper 2 feet.

16. Comment: Vertellus stated that the general premise of the EE/CA to limit future exposure to chemicals of concern ("COCs") is reasonable. However, the scope of the recommended response action is excessive in comparison to the potential health risks and significantly limits the ability to redevelop the Site. Finally, the recommended cap covers more acres at the Site than is either warranted or necessary. More specifically:

    Information provided in the RI indicates that approximately half of the areas (14 to 30) sampled for soils during the RI were subject to later soil removal actions by U.S. EPA. Historical soil sampling analytical results, collected prior to soil removal actions by U.S. EPA, were included in the risk assessment and these data may no longer reflect current conditions at the Site. As a result, the current level of risks from exposure to COCs in shallow soils in these areas is unknown. Assuming that these removal actions were successful

in reducing the amount of contamination in shallow soils, the current risks from on-Site conditions should be less than were projected in the HHRA and EE/CA. Additional sampling would assist in the delineation of the area that warrants cleanup.

EPA Response: The nature of base-line risk calculations will not change with re-sampling as high concentrations of hazardous substances were found throughout the Site. Surface soil in several areas of the upland portion of the Site have been disturbed but not removed from the Site. Environmental investigations and waste characterization tasks completed at the Site have determined that soils are contaminated throughout the overburden (surface and subsurface soil). EPA concluded that incremental excavation and off-Site disposal of contaminated material would result in limited, unsatisfactory risk-reduction unless all the contaminated material is addressed. If the top couple feet of contaminated soil were removed, the newly exposed soil would exhibit the same elevated concentrations of hazardous substances. In addition, contaminated subsurface soils remain undisturbed. Therefore, the Site conditions used for HHRA and ERA are still valid. EPA accepts that additional sampling performed during the design process may refine the footprint of the area to be capped but does not believe the change will be substantial. The areas containing concentrations greater than the appropriate performance standards listed in Table 2 of the EE/CA will require mitigation through consolidation and/or capping. Implementation of the engineering controls and land use restrictions called for in the selected cleanup strategy will be protective of industrial/commercial land use and will also be protective of wildlife.

17. Comment: The HHRA considered the future risks for a range of potential uses of the Site from residential to industrial/commercial. It is unclear which future land use scenario was the "driver" for decisions as to the level of site closure that would be warranted, although in Table 2-2 of the EE/CA it appears that a commercial/industrial future use was considered. The Site has a long history of industrial activity, and it is apparent that the levels of contamination remaining in on-Site soils, and groundwater would not be consistent with a future use of the property for housing or related residential purposes. It is unreasonable, therefore, to assume a future residential use of the property, particularly since the focus of the recommended response action strategy is in-place closure, not green-field clean-up. In contrast, the projected risks for a future commercial/industrial land use are much lower and generally consistent with U.S. EPA's risk management goals under CERCLA. The most significant health risks presented to future on-Site workers would result from ingestion and dermal exposure to hazardous substances in soil and to a lesser extent from soil gas entering, overlying, occupied buildings. These pathways can be effectively controlled by risk management planning, deed restrictions, fencing and engineering controls. Such controls may include using soil, gravel, or pavement over areas of contaminated soils to prevent direct contact, and vapor mitigation systems similar to those employed for radon beneath any future building foundation.

EPA Response: When evaluating the baseline risks EPA considered all potential risk scenarios that may be presented to potential future users of the Site, including residential use of the property. Response actions are only triggered based on unacceptable risk determinations. Institutional controls are considered a response action and therefore can only be required by EPA if the limitation is included to address an unacceptable risk identified in the risk assessment. In consultation with State and local officials, EPA has established clean up standards that are protective of commercial and/or industrial land use and are also protective of wildlife. Having prepared a complete risk assessment (including residential land use scenario), EPA has an objective scientific basis for stating that the property will not be safe for residential purposes even after the response action has been

completed. The performance standards established in the EE/CA are low enough to protect commercial and/or industrial users but they are not low enough to be protective of residential use. Accordingly, implementing institutional controls to prohibit residential land use is an important component of the recommended removal action. EPA's recommended removal action does primarily rely upon engineering controls and land use restrictions. The specific cap profile will be determined during the design process. However, the constructed cap must meet performance goals including minimizing infiltration of precipitation. The potential for soil vapor migration to any newly constructed building on the Site will need to be evaluated during its design. EPA agrees that vapor mitigation systems are routinely designed into construction specifications for buildings.

18. Comment: The rationale for the recommended impermeable (RCRA Subtitle D) cover in the EE/CA is the prevention of infiltration of rainfall into the soil to prevent migration of hazardous substances to groundwater. The Site has a long history of use for processing tar and as a salvage yard, during which times there were no controls to prevent rainfall infiltration. Vertellus stated that most mobile constituents of any materials released into soils would have already migrated due to forces of rainfall over time. Vertellus believes that it is unlikely that the placement of an impermeable cap over the contaminated on-Site soils would result in any improvement in groundwater quality in the future. To contrary, Vertellus believes that an impermeable cap over the Site would be detrimental for a number of reasons: 1) It reduces the natural flushing of Site-related chemicals from the soil to the groundwater; 2) the water table will be gradually lowered thus undermining the effectiveness of the interception of the groundwater recovery system; and, 3) it inhibits the natural exchange of oxygen and carbon dioxide as the indigenous microbes in the subsurface consume and remediate the chemicals of concern. None of these outcomes are desirable.

EPA Response: The Remedial Investigation documented that hazardous substances have migrated to the groundwater and are present at concentrations exceeding appropriate standards. The EPA selected response action includes an impermeable cap to reduce the continued leaching of hazardous substances from the vadose zone to the groundwater and an enhanced groundwater collection system to create a hydraulic divide between the Waste Management Area and the Area of Attainment. The technologies selected by EPA are engineering controls used in combination to isolate and contain the hazardous substances present.

The comment over emphasizes the relevance/effectiveness of naturally "flushing" chemicals of concern from the soils and groundwater. There are many complex reasons that prevent rainwater from successfully flushing all the hazardous substances from the subsurface contaminated soils and coal-tar derived wastes within a reasonable time period. For example, many of the hazardous constituents are insoluble, or have limited solubility in water. The presence of high concentrations of relatively insoluble (non-polar) PAHs can impede leaching of soluble constituents. Additionally, hazardous constituents become adsorbed onto site soils, retarding their migration to and/or within the groundwater. Accordingly, the risk mitigation strategy selected by EPA relies on containing the material within the smallest reasonable area.

A lower water table will support the efforts to contain the hazardous constituents in place. The ideal circumstance would have the water table drop to a level that would eliminate any buried hazardous material from sitting within the saturated zone. The impermeable cover

will reduce the volume of water moving vertically through contaminated soil and waste, thereby reducing the mass of hazardous substances leaching to the groundwater.

Groundwater with elevated dissolved oxygen will continue to flow horizontally from higher elevations north of the Site, beneath the cap, and on toward the Sharon Steel Run. Unfortunately, the rate of biodegradation of many of the types of hazardous substances on the Site is very slow. Even so, note that aerobic microbes require very little ambient oxygen to continue metabolic functions. The upgraded groundwater collection system will capture the contaminated groundwater more efficiently. This will prevent contaminated groundwater from discharging to the Sharon Steel Run or migrating beyond the WMA.

19. Comment: Vertellus states its belief that periodic tar seeps occurring at the surface have primarily been in the East Tributary. Tar residue at other locations on the Site appears to Vertellus to be primarily from either direct placement or a historical tar deposit. In July 2009 Vertellus' contractor catalogued where tar has been observed at the surface and where the material has been removed. Vertellus' stated that its contractor has not observed any "significant new active seeps of liquid or semi-solid surface tar deposits" since that time. Vertellus added that since June 2000 none of its contractors have observed noteworthy new surface expressions of tar deposits or new groundwater seeps.

    Vertellus stated that its contractors have successfully managed similar tarry wastes at several other hazardous waste sites it has accepted responsibility for in Indiana, Ohio and Utah. The types of covers constructed have included soil and gravel covers or a combination of a RCRA Subtitle D cap and a soil cap along with a tar management plan requiring routine observation and collection of tar seeps when they are observed. Vertellus stated that the various caps along with respective tar seep monitoring and management plans are functioning as designed. Tar seeps are immediately addressed in accordance with a written plan.

    If a tar derived material penetrates Vertellus' proposed cap of soil, gravel drives and parking areas along with asphalt and concrete someone would then respond. The likelihood of new seeps to the surface has diminished and the natural processes will continue to reduce the quantity, the toxicity, and the potential mobility of the materials at the Site.

EPA Response: EPA accepts that in certain site-specific circumstances an overall cleanup strategy which includes a permeable cap and an active tar seep management plan could be adequate. For instance, Vertellus' hazardous waste site located on property adjacent to its corporate office in Indianapolis, Indiana is uniquely suited to such a cleanup strategy. However, in Indianapolis, Indiana, the subsurface wastes were treated via an in-situ stabilization process prior to installation of the soil and gravel covers. In addition, Vertellus' owns the Indianapolis property and maintains a continuous on-site presence. This site-specific circumstance limits the potential that people or wildlife will become exposed to the tar seeping to the surface.

The better removal action strategy at the Big John Salvage Site is to utilize engineering controls to prevent subsurface wastes from seeping to the surface. Allowing tar to seep to the surface in the level areas of the property would likely be a significant obstacle to re-establishing a beneficial use. It is likely that a tar seep monitoring and management plan will be necessary and appropriate along the steep slope where placing a geomembrane may be difficult and potential exposure is more limited.

20. Comment: The response action should include placement of deed restrictions, fences, and other institutional controls as well as inspections on the property to preclude the installation of groundwater wells, trespass, and the subsequent abuse and abandonment of materials on the property.

EPA Response: EPA has incorporated reasonable land use restrictions and engineering controls that together will provide for safe reuse of the property. The primary objective is to take appropriate actions that will enable the property to be safely reused by people and environmental receptors (plants and animals). As a matter of policy, EPA does not implement institutional controls or fences and access restrictions in lieu of appropriate response action to mitigate risk.

21. Comment: Vertellus provided comment on the individual components of the recommended RCRA Subtitle D for contaminated soil:

    a. Comment on a "Foundation Fill" Layer: The cap would be constructed on a Foundation Fill Layer which as described would consist of the upper 12 to 24 inches of the on-Site soils that had been reworked, compacted, and amended to provide a suitable foundation for the overlying Hydraulic Barrier/Low Permeability Layer of the cap. Typically, only a 6-inch thick Foundation Fill Layer is necessary to provide a "cushion" for a Hydraulic Barrier/Low Permeability Layer, when it consists of an impermeable synthetic liner. Furthermore, it should be noted that such a Foundation Fill Layer is typically only constructed in conjunction with the installation of an impermeable synthetic liner.

EPA Response: Please see Section 3.1.5 (Alternative SO5: Capping/Containment) of the EE/CA for a description of assumptions considered for this alternative as it relates to the general components of a RCRA Subtitle D cap. No additional fill material is proposed to be used in the cap. The selected alternative assumes that the existing soil can be reworked to achieve the substantive purposes of foundation fill beneath a low permeable barrier.

    b. Comment on the Low-Permeability Layer: The EE/CA states that the Hydraulic Barrier/Low Permeability Layer of the cap is required to have a maximum permeability of 1.0 x 10E-5 centimeters per second (cm/sec). Each of the three capping/containment options presented in the EE/CA incorporates a 40-mil thick linear low density polyethylene (LLDPE) liner into the Hydraulic Barrier/Low Permeability Layer. A properly installed LLDPE liner is typically considered to be "impermeable" and is generally substituted for a 12-inch thick compacted clay layer designed to provide a minimum permeability of 1.0 x 10E-7 cm/sec. Therefore, the recommended response action utilizes a hydraulic barrier/low permeability layer that would have a permeability two orders of magnitude less permeable than the required permeability of 1.0 x 10E-5 cm/sec.

Response: EPA concurs that a properly installed LLDPE or high density polyethylene ("HDPE") liner would meet or exceed the minimum permeability specifications. A

geomembrane is often specified in favor of low permeability earthen layers as it is less costly and easier to install than clay or other soil layers. In addition, as stated in Section 3.1.5 of the EE/CA, "Functionally, the geomembrane would also prevent the underlying tar from migrating up through the cap to the surface." Throughout the EE/CA, it is noted that the specific configuration of the cap will be determined during the design. Accordingly, an alternative low-permeability layer that achieves the performance standards may be substituted during the design process.

22. Comment: Based on the removal action objective of limiting future contact with COCs in on-Site soils, it is unclear that the recommended option of installing a RCRA Subtitle D-compliant cap is required to achieve this objective. For example, installation of a 6-inch thick soil cover in conjunction with implementation of an institutional control managing the future redevelopment of the Site rather than installation of the proposed cap would also accomplish the removal action objective of limiting future contact with COCs in on-Site soils. While both a 6-inch thick soil cover and a Subtitle D cap would limit future direct contact with COCs in on-Site soils, installation of a Subtitle D cap would interfere with the natural biodegradation of BTEX and PAHs present in both soils and groundwater.

EPA Response: The response action must meet several other objectives in addition to preventing direct contact. For example, the response action must minimize the infiltration of precipitation into contaminated subsurface soil/wastes to reduce potential for leaching of soil contaminants into the groundwater. The response action must also prevent the continued migration of tar-derived material to the surface. Nevertheless, EPA does not believe that a 6-inch soil cover in conjunction with implementation of an institutional control "managing the future redevelopment of the Site" would meet the response action objectives for the Site. A 6-inch soil cover would not provide adequate long-term protection from any of several expected surface impacts when considering reasonable future land use scenarios (i.e, erosion, tire rutting in the harsh West Virginia climate, etc.).

EPA does believe that containing the subsurface wastes combined with reasonable land use restrictions can be an acceptable risk mitigation strategy. However, the protective cover must be sufficiently robust to safely support viable reuse of the Site. Any natural biodegradation that is occurring to the contaminants amenable to such degradation will continue to occur. In addition, the hazardous substances present on the Site which are recalcitrant to degradation, such as the carcinogenic PAHs, will be contained within the Waste Management Area.

23. Comment: The proposed extension of the groundwater collection system from along Sharon Steel Run to the upper portion of the Site appears to be unwarranted and unlikely to materially improve the amount or efficiency of groundwater interception for several reasons. First, the collection system's drains would be sloped upgradient, against the natural grade of both the land surface and the water table, both of which dip to the south. The construction of these drains would be difficult at best, requiring very deep cuts (>30 feet) on their northern-most ends. Second, the drains would be aligned along the dip of the water table following

parallel along a single flow line to the north into the upper portion of the Site. Drains should be aligned across (perpendicular to) the direction of groundwater flow, allowing for the interception of flow and groundwater recovery. Furthermore, the deepest drawdown of water along the drain would be at the northern end, with significantly less drawdown to the south where the drain would be much shallower. As such the drains would have very limited effectiveness in intercepting and collecting groundwater in areas lateral to the alignment of the drain, and will not, therefore, improve the efficiency of groundwater capture in this area of the Site.

Response: The subsurface drain conceptual design works with the natural flow of groundwater towards the upper reaches of East, Middle, and West Tributaries. The linear collection drains extend into the source areas to capture contaminated groundwater, at its highest concentration, before it flows down the respective tributaries. The introduction of new collection paths would likely alter the direction of groundwater flow (locally) as the water moves toward a new low elevation created by the withdrawal of contaminated water from the respective sumps.

As described in Section 3.2.4 of the EE/CA report, the specific details of the groundwater collection systems will be developed during a design phase to ensure the most effective operations. The drain configuration may be refined during conduct of the design as warranted. The removal action objective, preventing contaminated groundwater from migrating beyond the Waste Management Area, is the performance standard that must be met. Capturing groundwater from the source area before it can flow down slope to the collection points at the bottom of the respective Tributaries is not a performance standard but it is considered to be a best practice. Installation of the drains, even to depths of >30 feet is technically feasible.

24. Comment: Vertellus stated that data in the Remedial Investigation demonstrates that groundwater flows to the south and is captured by the drains operated at the base of the East Tributary and the Middle Tributary along Sharon Steel Run. Further, Vertellus believes that a groundwater seep collection system at the West Tributary is not supported by an identified groundwater connection with the Sharon Steel Run; nor are there documented groundwater seeps from the West Tributary since completion of soil removal activities at the head waters of the West Tributary.

EPA Response: The overall objective of the upgrade to the existing tar and groundwater seep collection system is to create a long-term hydraulic containment system capable of limiting the extent of groundwater contamination to the boundaries of the Waste Management Area with a high degree of certainty. The confinement system will be successful when groundwater and surface water monitoring in the Area of Attainment (located downgradient of the Waste Management Area) demonstrate that performance standards have been met.

The Remedial Investigation documents that tar and contaminated groundwater continues to flow down the slope beneath the East Tributary and the Middle Tributary and that the existing seep collection systems are doing a reasonably good job intercepting the contamination before it can enter the Sharon Steel Run. Surface water sampling in the Sharon Steel Run indicates that some contamination is bypassing the bentonite dam at the base of the East Tributary. This statement is based upon a spike of benzene concentrations in the Sharon Steel Run at its confluence with the East Tributary.

The bentonite dam at the base of the East Tributary was not "keyed in" to the underlying bedrock when it was constructed so a small flow of contaminated water is likely by-passing at the rock and dam interface. A modification to this construction detail may stem this flow. Additionally, the collection system placed at the headwaters of the Tributaries will reduce the mass of contamination flowing to the collection systems at the base of the hill.

Previous removal actions completed at the headwaters of the West Tributary did eliminate some source material but additional tar waste deposits are know to exist in the upper reaches of the West Tributary. EPA constructed a temporary access road over known waste material in the West Tributary to gain expeditious access to the Sharon Steel Run with construction vehicles during time-critical removal activities.

Similar to the groundwater flow pattern observed upgradient of the Middle and East Tributaries, contaminated groundwater flowing from the north to the south in the vicinity of the West Tributary is presumed to follow a flow path leading down-slope to the West Tributary. The hydraulic containment system will be extended to the West Tributary so that groundwater and surface water performance standards can be met within the Area of Attainment downgradient of the Waste Management Area.

The method taken to meet the objective in the West Tributary area may be refined during the design process. An option which may be considered during the design could be excavation of the buried tar- derived waste material from the West Tributary and consolidation of that material beneath the cap on the upland portion of the Site. The excavated area would be backfilled with clean material. This action would reduce the foot print of the constructed cap. Additional monitoring wells could be installed in the vicinity of the West Tributary. In the event that the groundwater performance standards are met at the top of the slope without a separate groundwater collection system the removal action objectives will have been met.

25. Comment: The scope of the monitoring program envisioned in the EE/CA for on-Site groundwater is excessive. Semiannual monitoring of all (46) existing wells and four new wells for 30 years goes far beyond the reasonable need for data to assess the performance of the groundwater response action. Some areas of the Site have no detectable levels of Contaminants of Concern ("COCs") in groundwater and are positioned such that migration of COCs into these areas in the future is unlikely. Other areas where COCs have been detected (*e.g.* around MW-4 and 5) have shown consistent concentrations over the monitoring record

and rapid changes in these concentrations is unlikely. The focus of monitoring groundwater in the future should be to demonstrate that the goals for the groundwater response action are being met and maintained for the COCs. As such, less frequent *(e.g.* annual) monitoring of selected wells for a mobile COC (benzene is a perfect indicator) and monitoring of the groundwater treatment system consistent with the requirements of the discharge permit should suffice.

EPA Response: The engineering and cost assumptions made in the EE/CA for the groundwater monitoring program are reasonable for cost estimation purposes but the monitoring program will be optimized during the development of the Response Action Plan. The EE/CA actually assumed that semi-annual groundwater monitoring would occur during the initial five (5) years and annual monitoring would occur for the next twenty-five (25) years. EPA agrees that the objective of the groundwater monitoring program will be to assess the effectiveness of the response action in isolating Site-related contamination within the Waste Management Area, including confirming that performance standards are met at the Area of Attainment downgradient of the Site. The specific configuration of the monitoring well network may be realigned to best meet the objectives of the monitoring program. The specific frequency, number of wells and parameters to be monitored will be established during the design. In addition, as the response action is being implemented the groundwater monitoring program will be re-evaluated for optimization opportunities periodically.

26. Comment: It should be recognized that iron and manganese detected in on-Site sediment and surface waters are naturally occurring and will continue to affect the quality of water in these streams over the long term, well after any remedial effort is completed. Given this, the goals set for on-Site sediment restoration are unrealistic. Specifically, the stated goals of restoring 1) sediment quality (and surface water quality) to levels below human health and ecological risk criteria, 2) surface water to TMDL levels for iron and related constituents, and 3) surface water drainage quality and ecological functions in Sharon Steel Run all seem impractical given the off-Site and naturally occurring impacts. Vertellus believes that any degraded water quality upstream of the Big John Salvage Site cannot be controlled by any cleanup at the BJS Site. Therefore, whatever removal of potential COCs might occur in Sharon Steel Run, it would appear that any sediment improvements would only be temporary. Surface water from the Fairmont Coke Works Site, and other upstream sources cannot be controlled, and would soon negate any sediment habitat improvements. Given this eventuality, we believe the stated goals for the non-river sediments must be significantly revised.

EPA Response: The removal action goals stated above are reasonable and do not need to be revised. EPA believes that the combined cleanup actions being performed at the Fairmont Coke Works Site and the proposed cleanup actions for the Big John Salvage Site will collectively achieve the goals established for the Sharon Steel Run to the greatest extent practicable. The proposed response actions at Big John Salvage will contain Site-related contamination within the Waste Management Area. On-going remediation at the Fairmont Coke Works Site includes the removal of hundreds of thousands of tons of buried waste

material on the property. Isolation and removal of these sources of hazardous substances which have historically leached from the two adjacent Superfund Sites to the groundwater and migrated to the Sharon Steel Run will have a beneficial impact on the sediment and surface water quality and support the restoration of ecological functions of the Sharon Steel Run. Further, the protective cap placed over the Big John Salvage Site will increase the volume of clean stormwater discharging to the Sharon Steel Run.

Iron and manganese are naturally occurring substances in the environment; however, the presence of subsurface organic contaminants (PAHs, BTEX, etc.) creates geochemical conditions which lead to an increased concentration of dissolved iron and manganese in the groundwater. Isolation and removal of the organic contaminant source areas located at the two adjacent Superfund Sites should indirectly lead to a reduced concentration of Site-related iron and manganese in the groundwater.

27. Comment: The ecological risk assessment concluded that unacceptable risks exist for terrestrial plants and invertebrates, and for birds and mammals which consume these organisms as a food source. However, no plant or earthworm tissue samples were available from the Site. Therefore, the risk estimates are based on extrapolations of soil concentrations to plant and earthworm concentrations using generic biotransfer factors. Furthermore, the conclusions of unacceptable risk are based on a comparison of these conservatively estimated doses to doses that have resulted in no- or low-observable adverse effects to animals during test studies. The literature-based estimates of acceptable doses are very conservative, especially when applied to the potential for adverse effects at the population or community level.

EPA Response: The ecological risk assessment (ERA) was conducted using conservative exposure assumptions in the screening steps. However, as presented in Section 5.0 of the ERA, many of the conservative exposure assumptions used in the initial screening steps of the ERA were refined, and risk were re-evaluated using the less conservative exposure assumptions. This approach is consistent with EPA ERA guidance documents.

28. Comment: Unacceptable risks were identified for ecological endpoints based on the potential for future exposure. It is inappropriate to attempt response actions to support ecological communities in streams in which riprap have been installed, which is the case for Sharon Steel Run. The installation of riprap eliminates the riparian zone of the stream, necessary for the success of most species in the aquatic habitat. The absence of a riparian zone in a channeled stream virtually eliminates the possibility that diverse and viable ecological communities will return to the streams.

EPA Response: It is appropriate to consider restoration of habitat in Sharon Steel Run, even with the presence of riprap. Riprap has been placed in certain areas of the stream to reduce erosion from areas excavated during previous removal actions. Wildlife habitat has already begun to improve as sediments are being deposited and volunteer vegetation colonizes some stretches of Sharon Run. Over time, other stretches will likely become more

viable leading to benthic communities returning to those areas. Alternative projects such as conversion of sedimentation basins constructed during cap construction into stormwater retention basins supporting wildlife habitat/wetlands after cap construction is completed may be a reasonable mitigation strategy. Note that targeted removal of riprap may be included in a habitat restoration plan as well.

Monongahela River

29. Comment: Vertellus submitted a written denial that its operations or activities contributed contaminants to the Monongahela River.

EPA Response: Please refer to the Administrative Record for information documenting the migration of hazardous substances from the former Reilly Tar plant to the tributaries conveying storm and waste water to the Monongahela River over several decades.

30. Comment: All potential sources of contamination upgradient of the River should be controlled before BSD/SSD is removed from the Monongahela River. This includes sources from the Big John Salvage Site and the Sharon Steel/Fairmont Coke Works Site.

EPA Response: The BSD/SSD will not be removed from the River until all substantial upgradient sources capable of re-contaminating the area are controlled. As a practical matter, all sources of insoluble coal-tar derivatives at the Fairmont Coke Works Site are currently under control. At Fairmont Coke Works, any potentially contaminated stormwater is treated in an on-Site water treatment plant and discharged to the Sharon Steel Run in compliance with its WVPDES permit. The BJS Site will need to be assessed and additional run-off controls may be necessary prior to implementing the BSD/SSD removal project.

31. Comment: CBS understands that EPA anticipates preparing a follow-up to the risk assessment and Record of Decision ("ROD") for the Site, and may be proposing additional (remedial) actions, after completion of the response (removal) actions under the EE/CA. EPA should clarify how and when the RI/FS or ROD-related risk assessment will be conducted, and whether the risk evaluation will be conducted before or after completion of the EE/CA removal actions.

EPA Response: The Remedial Investigation and associated human health and ecological risk assessments (Appendix 6A and 6B, respectively) address the Site by geographical area and media. The risk assessments and the derived numeric performance standards addressing soil, groundwater and on-Site sediment are final. EPA does not expect to prepare a follow-up risk assessment for these media. EPA expects that the final Record of Decision for the Site will affirm that unacceptable risks to human health and the environment in these media have been abated by the response action performed during the non-time critical removal action.

The human health and ecological risk assessments for the Monongahela River sediments were completed, including numeric preliminary removal goals for total PAHs in river sediment, but the EE/CA selected narrative performance standards (e.g., hotspot removal of BSD and SSD) because they were determined to represent the most appropriate removal action level. The numeric preliminary removal goals, included for reference only, were 26 mg/kg total PAHs (ecological) and 0.4 mg/kg benzo(a)pyrene equivalents [BaP equivalents][1]. EPA acknowledges that these preliminary removal goals were derived using conservative assumptions in the risk assessment process, appropriately so. A more robust Triad-style sampling program extending several years and costing several hundred thousand dollars may result in a marginal adjustment to the sediment PRGs but EPA believes that numeric PRGs would remain in the 6 mg/kg to 100 mg/kg total PAH range. EPA believes that the most appropriate plan of action is to remove the BSD/SSD hotspot for the following basic reasons.

The environmental investigation in the river found that there is a relatively small area (e.g., 1 ½ acres) on the river bottom with a deposit of toxic industrial wastes, referred to as the black semi-solid deposit and stained sediment area (BSD/SSD). The concentration of total PAHs in the BSD/SSD area is approximately 500 – 20,000 mg/kg. The sediments with greater than 500 mg/kg total PAHs demonstrated acute toxicity to aquatic invertebrates. The concentrations of PAHs drop rapidly outside this BSD/SSD area. Concentrations of total PAHs in surface or subsurface sediments are in the 20-52 mg/kg range over a much larger area outside the BSD/SSD.

The EE/CA evaluation of appropriate technologies indicated that monitored natural recovery ("MNR") would be a reasonable alternative for river sediments if the initial PAH concentrations were lower and the required reduction in PAH concentrations was within approximately one order of magnitude. If not for the presence of the extremely high concentrations of PAHs in the BSD/SSD area, MNR would have been the cleanup option representing the best balance of tradeoffs with respect to the evaluation criteria considered for Monongahela River sediments. Even if a significant Triad-style sampling program were to result in the PRG being adjusted up to approximately 100 mg/kg total PAH (as posited in another comment), MNR would not be effective in reducing existing concentrations of PAHs in the BSD area from 20,000 mg/kg to 100 mg/kg within a reasonable time frame. However, if the BSD/SSD area were removed and the resulting PAH concentration in the area were reduced to the 100 to 500 mg/kg range as predicted in the EE/CA, MNR would likely be effective in further reducing those concentrations to safe levels (for estimation purposes assume the goal would be in the 6 to 26 mg/kg range) throughout the river within a reasonable time frame. The lower the actual post-removal PAH concentration achieved,

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[1] Note that EPA calculated that 0.4 mg/kg BaP equivalents is the background concentration in river sediments and would equate to approximately 6 mg/kg total PAH considering the PAH distribution found in the Monongahela River.

the more likely that MNR will be affirmed as the final selected remedy in the Record of Decision addressing the Monongahela River.

In summary, EPA determined that it is best to remove the obvious "hotspot" of PAHs in the BSD/SSD area using non-time critical removal authorities now rather than wait until a more robust river risk assessment could be completed because EPA is convinced the basic conclusions will be the same. The proposed removal action is entirely consistent with any potential remedial action for the submerged wastes and contaminated sediments. The greatest threat to human health and the environment, represented by the toxic BSD/SSD area, would need to be addressed with remedial action and MNR would likely be utilized for the larger area of lesser contaminated sediments to degrade and otherwise attenuate the residual concentration of PAHs to safe levels over time. It is better to swiftly establish conditions suitable for MNR to achieve final safe levels by removing the obvious problem.

There is a high probability that post-removal MNR (i.e., natural attenuation) will satisfactorily reduce the residual PAHs to concentrations within EPA's acceptable risk range over reasonable period of time. Environmental and biological monitoring will be completed to document the reduction in PAH concentrations and provide data for a post-removal risk assessment. The post-removal risk assessment will provide supporting *information for a final Record of Decision covering this section of the Monongahela River.*

Cleanup projects at both the Big John Site and the adjacent Fairmont Coke Works Superfund Sites have been carried out utilizing time and non-time critical removal actions. Each of the Sites will require a final Record of Decision addressing any residual risks in the future. Since this section of river has co-mingled hazardous substances from both the Big John Salvage and Fairmont Coke Works Superfund Sites, the final decision for the Monongahela River may be documented in a CERCLA ROD for either of these two Sites. It is expected that at least two years of post-removal monitoring will be required before a final ROD could be issued.

32. Comment: The removal of sediment from the Monongahela River over a wide area is not supported by the data. The environmental data indicate that impaired ecological habitat exists only in the vicinity of samples BJ-SD-03 and BJ-SD-7, both close to the point of entry of the materials into the river. The rationale for considering removal action based on impaired ecological habitat at locations other than these is unclear.

EPA Response: EPA has selected Alternative RS2: Excavation and Off-Site Disposal/Treatment, Option B. The scope of the response action would be limited to removal of black semi-solid deposits (BSD) and those closely associated stained sediment deposits (SSD). This scope is consistent with the comment.

The EE/CA selected narrative performance standards (e.g., hotspot removal of BSD and SSD) for the river because they were determined to represent the most appropriate removal action level. The human health and ecological risk assessments for the Monongahela River sediments were completed and included in the Administrative Record but the numeric

preliminary removal goals were included for reference only in the EE/CA. The narrative below has significance because the final Record of Decision for the Monongahela River will likely include final numeric cleanup standards. The final ROD will be based on a post-removal risk assessment but the final cleanup standards will likely be similar to those derived in the early stages of the EE/CA as preliminary removal goals. There will be an opportunity to reconsider some of the Site-specific assumptions selected in the risk assessment during preparation of the final ROD for the river.

The quantitative human health assessment concluded that deeper sediments exceed the upper bound of the cancer risk management range of 1 additional cancer per 10,000 exposures for current/future visitors; surface sediment risks were within EPA's acceptable risk range. However, the baseline quantitative assessment only considered lesser contaminated sediment samples collected mostly outside the Black Semi-Solid Deposit (BSD) and stained sediment area. The BSD/SSD area is relatively small (approximately 1.5 acres). Vertellus divers documented that concentrations of PAHs exceed 20,000 mg/kg in the surface sediment and extend up to one foot deep within the BSD area. When EPA qualitatively considered the risks presented in the BSD area using these higher exposure point concentrations collected in the BSD area surface sediments, carcinogenic risks presented to the current/future visitors by carcinogenic PAHs in surface sediment exceed the acceptable risk range.

The ecological risk assessment evaluated several "lines of evidence" and concluded that benthic invertebrates, aquatic invertebrates, fish, avian insectivores, as well as mammalian and avian piscivores are likely adversely impacted by chemical stressors in the sediment. Sediment collected nearest the BSD area was found to be toxic to *Hyalella azteca*. The tarry waste material covering the river bottom in the BSD area presents an unacceptable risk to aquatic life. Therefore, the EE/CA correctly concludes that people and animals exposed to the river sediments in the area of contamination are not being protected from the presence of hazardous substances related to historic discharges or releases from the BJS and the Fairmont Coke Works Sites.

33. Comment: The EE/CA mischaracterized requirements of the West Virginia Water Pollution Control Act, Requirements Governing Water Quality Standards, WV CSR 47-2 (promulgated July 2008) as Applicable or Relevant and Appropriate Requirements (ARARs) that require removal of the BSD and SSD. These regulations are not ARARs that would drive sediment removal; such regulations are ARARs only with respect to ongoing or future point source discharges, such as a discharge of treated effluent in the course of response action implementation. The statement that these narrative standards are ARARs with respect to the BSD is incorrect and should be deleted from all ARARs discussions.

    For example on page 2-5, the EE/CA states that the "West Virginia Water Pollution Control Act, Requirements Governing Water Quality Standards, WV CSR 47-2 (promulgated July 2008) ... regulates the discharge or deposit of sewage, industrial wastes and other wastes into the waters of the state, and establishes water quality standards for the waters of the State

standing or flowing over the surface of the State." This appears to be an accurate characterization, as water quality standards are used to set limitations on point source discharges of pollutants into state waters; WV CSR 47-2-1.1 specifies that "these rules establish requirements governing the discharge or deposit of sewage, industrial waste and other wastes into the waters of the state." The EE/CA then says, however, that the anti-degradation policy in WV CSR 47-2-4 "is relevant and appropriate to the industrial wastes referred to as black semi-solid deposit (BSD) covering a portion of the bottom of the river." While water quality standards and anti-degradation policies may be relevant to ongoing discharges, they do not impose retroactive requirements to remove historically discharged material from the beds of State waters. Otherwise this regulation would require the removal of all pollutants from all West Virginia sediments, which would be wholly inconsistent with EPA's management of contaminated sediments in West Virginia and elsewhere. As confirmed in Section 7 of EPA's *CERCLA Compliance with Other Laws Manual* (August 1989), EPA does not ordinarily consider general narrative standards such as WV CSR 47-2-3 or 47-2-4 to be ARARs, and the more specific water quality standards created to achieve such narrative standards are ARARs only with respect to ongoing or future point source discharges, such as a discharge of treated effluent in the course of response action implementation. Therefore, the statement that these narrative standards are ARARs with respect to the BSD is incorrect.

Similarly, on p. 3-70, the EE/CA correctly concludes that "there are no promulgated Federal or State contaminant specific cleanup standards for contaminated sediment." The EE/CA then says, however, that the "No Action" alternative "does not comply with several relevant and appropriate regulations or policies, including the West Virginia Anti-Degradation Policy (requiring protection of existing uses of state waters); the West Virginia Water Pollution Control Act - Requirements Governing Water Quality Standards." (p. 3-70 and several subsequent pages.) This latter statement is not correct. First, the water quality and water uses at the Site are not impaired for any Site-related constituents. Second, the Water Pollution Control Act and its implementing regulations govern ongoing and future discharges to waters of the State; they do not impose a retroactive requirement for removal of materials like all historically discharged waste from State waters (including "the mass of BSD exposed on the bottom of the Monongahela River"), as discussed above. If such a retroactive requirement existed, it would constitute a promulgated State cleanup standard for contaminated sediment, which the EE/CA recognizes does not exist.

For these reasons, the EE/CA cannot justify the removal of either the BSD or "stained sediments" based on ARARs. The No Action and Monitored Natural Attenuation alternatives would comply with ARARs.

EPA Response: EPA agrees that the West Virginia Water Pollution Control Act, Requirements Governing Water Quality Standards, WV CSR 47-2 (promulgated July 2008) are "applicable" to ongoing and future discharge or deposit of sewage, industrial wastes and other wastes into the waters of the state. Therefore these regulations would not be directly applicable to the BSD Area, because the wastes were deposited in the Monongahela

River before the regulation was promulgated. However, in the context of this Site, EPA believes that the West Virginia Anti-Degradation Policy is "relevant and appropriate" with respect to the hotspot of industrial wastes (BSD) deposited in the Monongahela River at its confluence with Sharon Steel Run. Although EPA discusses the BSD area within a section of the EE/CA referred to as "Off-Site Sediment," the character of the BSD (in the range of 20,000 mg/kg PAHs) is more industrial waste than sediment. The stained sediments found along the fringe of the BSD are more characteristic of contaminated sediments. The Requirements Governing Water Quality Standards were established by the State to prevent industrial wastes from, among other things, being deposited in the waters of the State. EPA justifies removal of the BSD to mitigate the unacceptable risks to human health and the environment presented by high concentrations of hazardous substances. EPA does find that West Virginia's action to pass a regulation to prevent additional instances of these degraded conditions within its waterways is relevant and appropriate. EPA does not believe that a cleanup plan that leaves these exposed industrial wastes on the river bottom would be compliant with the relevant and appropriate anti-degradation policy.

34. ExxonMobil Statement: The HHRA for the Site evaluated exposure of a "current/future visitor or resident, adult and child" to sediments of the Monongahela River. The following assumptions were critical to the conclusions reached in the HHRA.

- Through wading, both adults and children would be in direct contact with sediment containing high concentrations of PAHs, including PAHs located more than a foot deep in the sediments and in sediments located in more than eight feet of water.
- Adults and children would be wading in those sediments 48 days per year.
- Adults and children would ingest an unusually large amount of sediment during each of those days.
- The skin surface area in contact with sediment during wading would include the head, hands, forearms, feet and legs, on every day of exposure.
- Sediment would adhere to the skin of child waders to the same extent as the upper bound estimate of skin adherence for young children playing in wet soil, and would adhere to the skin of adult waders to the same extent as soil adheres to the skin of a utility worker involved in intensive soil excavation.

a. Comment: Site conditions demonstrate that the direct contact exposure pathway to Monongahela River sediments is incomplete, *i.e.*, it would be extremely unlikely for adults and children to come into contact with high PAH concentrations in river sediments at the Site. There is no easy land-based public access to this area of the river, and the river banks are relatively steep in the area of identified contamination. Except in the immediate vicinity of the discharge point from the Unnamed

Tributary/Sharon Steel Run the BSD Area delineation work performed by Reilly Industries (now Vertellus) on which EPA relied indicated that the area of BSD and stained sediments is located over 20 feet from the bank. The river is 8-15 feet deep in this area, making it virtually impossible that recreational users, if any, would come into direct contact with the BSD or stained sediments in this area. The only locations where exposure would potentially occur would be those sediments that are located very near the shore, in shallow water.

Section 3.4 of the EE/CA states that a marina and a water activity center are planned in the vicinity of the Site that "[t]his could create a magnet recreational area in the river, which could greatly increase traffic on the river." Nothing about such plans, however, would create a basis for assuming human exposure to the relevant river sediments. It is our understanding that the water activity center that is planned will be a man-made recreational area that will be constructed in the upland area of the former FCW Site and will not include or provide access to the river or its sediments. While there were conceptual discussions some time ago about building a docking area for boats well upstream of the relevant sediment areas, there are no current plans for doing so. In addition, there is no reason to believe that construction of a docking area for boats would result in increased sediment exposures for users of those docks, particularly to sediments located over one thousand feet away from the area in which construction might occur. The mere fact that more people will be present in the vicinity of the river or in boats on the river does not mean that people will have any greater likelihood of contacting the relevant river sediments, given the steep river banks, the lack of a floodplain, the distance of the higher-concentration PAHs from the shore, and the depth of the water overlying the sediments. Therefore, the plans for a marina and a water activity center do not provide any basis for assuming a complete human exposure pathway for the contaminated sediments of interest.

EPA Response: <u>The EE/CA selected narrative performance standards</u> (e.g., hotspot removal of BSD and SSD) because they were determined to represent the most appropriate removal action level for the river. The human health and ecological risk assessments for the Monongahela River sediments were completed and included in the Administrative Record but the numeric preliminary removal goals were <u>included for reference only in the EE/CA.</u> The narrative below has significance because the final Record of Decision for the Monongahela River will likely include final numeric cleanup standards. The final ROD will be based on a post-removal risk assessment for the river but the final cleanup standards will likely be similar to those derived in the early stages of the EE/CA as preliminary removal goals. There will be an opportunity to reconsider some of the Site-specific assumptions selected in the risk assessment during preparation of the final ROD for the river.

EPA has an obligation to consider current and future exposures, the mobility of sediments, and the lack of existing institutional controls on the river. The City of Fairmont has developed a master plan to guide its intended redevelopment efforts in the area including a future that incorporates the Monongahela River as valuable resource and a focal point.

EPA acknowledges that there is an inherent conservatism in the exposure assumptions; however, the assumptions are plausible and the approach is not inconsistent with the general and specific guidance followed by EPA. Even before the area is redeveloped, the "rails-to-trails-type" path along the river is frequented by many citizens and children can be observed swimming in the River on most summer afternoons. The BSD, while semi-solid, is not in an engineered or controlled containment system. The exposure assumptions are consistent with the Site-specific activity patterns that could occur under a future recreational scenario discussed in the Remedial Investigation and EE/CA.

Furthermore, the NCP requires the lead agency (in this case, EPA) to "conduct a Site-specific baseline risk assessment to characterize the *current and potential* threats to human health and the environment ... The results of the baseline risk assessment will help establish acceptable exposure levels for use in developing remedial alternatives ..." [40 CFR 300.430 (d)(4); emphasis added]. "Alternatives shall be assessed to determine whether they can adequately protect human health and the environment, in *both the short- and long-term*, from unacceptable risks ..." [40 CFR 300.430 (e)(9)(iii)(A); emphasis added].

It is also important to note that the BLRA for human health was based on 2005 river sediment data which did not focus on the hotspot of industrial deposits within the BSD area. EPA did not send BSD material to the laboratory for inclusion in the quantitative human health risk assessment. The tar wastes located in the BSD area were obviously heavily contaminated with PAHs. A Vertellus-contracted dive team observed and collected material from the BSD area and reported that PAH concentrations are in the range of 20,000 mg/kg total PAHs. Sediment data collected by EPA in 2007 found higher contamination in the shallow river sediment, at concentrations comparable to the deep river sediments. Therefore, the need for action on the river sediments was further strengthened.

35. Comment: The HHRA report indicates that 20 samples of surface (0-1 foot) sediment were used to evaluate potential exposures to shallow sediments. A review of Table 3-8 and Figure 3-8 of EPA's Remedial Investigation (RI)[1] indicates that only 3 sediment sampling locations are close to shore in the vicinity of the Site (MON4W, MON4Z and MON2D), and one of those is considered an upstream location (MON2D). The remaining surface sediment samples appear to have been taken either from the center of the river channel, from the opposite side of the river, or substantially upstream or downstream of the Site. These data cannot be considered representative of the exposures that would occur if individuals used the Site to access the river. The only sediment samples that are relevant for evaluating recreational exposures to near-shore surface sediments associated with the Site would be the three samples that were actually collected from that area. The specific constituent concentrations for these three locations for the constituents of interest (PAHs) were all below the human health based screening values. Based on these data, exposure to sediment via direct contact should have been screened out of the human health risk assessment. If such screening had occurred, there would have been no need for the subsequent assumptions and calculations discussed below, and no need to develop a PRG based on potential direct human contact with the sediments.

The EE/CA recognized that exposure to shallow river sediments resulted in risk estimates within EPA's acceptable risk range and that "measures to reduce current concentrations of COPCs [chemicals of potential concern] in the shallow surface sediments of the Monongahela River to protect visitors or nearby residents involved in recreational activities at the Monongahela River may not be warranted." Estimated risks exceed the acceptable risk range only when PAH concentrations in deeper and generally inaccessible sediments are erroneously included in the exposure calculations.

According to the HHRA and the EE/CA, subsurface sediments (>1 foot depth) would present a potential risk only if they became exposed due to dredging or erosion. There is no reason to believe, however, that dredging will occur in the area of the contaminated sediments, or that erosion would remove a foot or more of the overlying sediments. Even if such extreme erosion were to occur, the resultant increase in water depth would make exposure to sediment, through wading or swimming, that much more unlikely. The water in most areas is already at least 8 to 15 feet deep. In addition, if sediment dredging were to occur, it is reasonable to assume that appropriate environmental controls would be put in place to ensure that the sediments being dredged would not be placed close to shore or transported downstream, where exposure along the shoreline might occur. Thus, it is not plausible that recreational users would be exposed to subsurface sediments.

EPA Response: The comment discusses analytical results for the 20 surface sediment samples collected over 2 river-miles in 2005 and used to calculate river-wide risks in the Baseline Risk Assessment (BLRA) for human health but fails to discuss the much higher contaminant levels much closer to the Site. The EE/CA response action focuses on the relatively small area smothered by black semi-solid deposits containing hazardous substances orders of magnitude higher than those entered into the BLRA. In addition, sediment data collected by EPA in 2007 found higher contamination in the shallow river sediment, at concentrations comparable to the deep river sediments. When EPA considered the PAH concentrations in BSD and closely associated stained sediments found in the BSD area, the surface sediment was determined to present an unacceptable risk to human health and the environment. In addition, elevated concentrations of PAHs in mussel tissue collected from the Monongahela River indicate that PAHs are available to filter-feeders dependent on collecting their food from the water column.

If EPA does not take action to mitigate the risks presented by elevated PAH concentrations in the BSD Area, there would be no basis for the Commenter's statement that "if sediment dredging were to occur, it is reasonable to assume that environmental controls would be put in place to ensure that the sediments being dredged would not be placed close to shore or transported downstream, where exposure along the shoreline might occur." EPA is obligated to consider the potential for current and future exposures, the potential mobility of sediments, and the lack of existing institutional controls on the river.

36. Comment: A number of the assumptions and parameters used to evaluate sediment exposures for both adults and young children are overly conservative when the physical characteristics of the Site are considered. The analysis assumes that exposures occur through wading for a total of 48 days per year, that 100% of the daily sediment ingestion rate is derived from the Site on those days, that the skin surface area in contact with sediment includes the head, hands, forearms, feet and legs on every day of exposure, and that the sediment/skin adherence factors are 3.3 mg/cm^2 for young children and 0.9 mg/cm^2 for adults, respectively. The risk assessment assumes that PAHs in those sediments have a dermal bioavailability of 13%. None of these assumptions is plausible at this Site.

The frequency with which recreational users would wade into the river in an area with poor access, steep banks, deep water, etc., is likely to be much less than 48 days per year. The U.S. Fish and Wildlife Service indicates that West Virginia residents who fish the freshwaters of the state spend an average of 22 days/year fishing. Use of this more realistic exposure frequency would reduce risks by a factor of 2. In addition, it is not likely that 100 percent of all soil/sediment ingested during a day would be derived from the Site, when only a portion of the day would be spent there. Instead, individuals will ingest a portion of their total daily soil/sediment ingestion from the non-Site areas where they spend the rest of the day. If it is assumed that 50% of the total daily ingestion rate is derived from the Site, this would further reduce risks for this pathway by a factor of 2 (total factor of 4).

Moreover, the assumed exposures to a resident or visitor include both ingestion of and dermal contact with both soil and sediment on the days that sediment exposure is assumed to occur. The HHRA assumed upper-bound total daily soil ingestion rates of 200 mg/day for young children and 100 mg/day for adults for both the soil ingestion and the sediment ingestion pathways, and it is assumed that 100 percent of each of those exposures is Site-related. As a result, the calculations of risk double-count exposure through ingestion (total rates of 400 mg/day for children and 200 mg/day for adults). Similar double-counting has been assumed for dermal exposures to soil and sediment. Thus, total potential risks to the resident visitor have been overestimated by at least a factor of 2 and more likely a factor of 4. If this double counting was corrected, the resulting estimated cancer risk would be well within the acceptable risk range.

EPA Response: EPA acknowledges that there is an inherent conservatism in the exposure assumptions utilized in the Baseline Risk Assessment; however, the Site-specific assumptions are plausible and the approach is not inconsistent with the general and specific guidance followed by EPA. The exposure assumptions are consistent with the Site-specific activity patterns that could occur under a future recreational scenario discussed in the Remedial Investigation and EE/CA. EPA has an obligation to consider current and future exposures, the mobility of sediments, and the lack of existing institutional controls on the river.

Again, the comment fails to acknowledge that the EE/CA response action focuses the cleanup on the relatively small (approximately 1.5 acres) BSD area where hazardous substances are present at concentrations orders of magnitude higher that those concentrations entered in the river-wide BLRA. The potential risk presented to human health and the environment by BSD wastes and stained sediment is much higher than

reported in the quantitative BLRA because the higher concentrations located in the BSD area were not included in the Site-wide assessment.

The use of the 48 days/year exposure scenario for recreational users and the 13% PAH bioavailability factor are considered conservative yet not unreasonable Site-specific assumptions ("reasonable maximum exposure").

Comment suggests replacing the sediment adherence factor used in the risk assessment, which was based on children playing in mud, with that from an adult reed-gathering scenario. EPA believes that Site-specific sediment/skin adherence factors selected for young children and adults are conservative yet not unreasonable. EPA does not see a reason to change the exposure assumption that was selected for Site-specific reasons to a generic default for reed gatherers. Sediment does adhere to skin and is not completely rinsed by surface water; sediment containing tar-like material may be less likely to rinse off easily.

In response to the alleged double-counting of soil and sediment exposure, the risks were presented both by medium and by receptor, allowing a full consideration of which chemicals and scenarios were driving risks. The deep sediment cancer risks alone exceeded 1E-4, even without any other exposures and utilizing the initial 2005 sampling data. Subsequent investigations document that higher concentrations of PAHs are also present at the surface in the BSD area.

The cited ingestion rate of 100 mg/day sediment is based on extrapolation of EPA guidance for incidental soil ingestion and is considered conservative yet not unreasonable.

37. Comment: Inappropriate evaluation and application of the ecological data led to overbroad conclusions about ecological risk. The flaws in the risk assessment (or in the application of their results) resulted in the EE/CA establishing an inappropriately conservative Preliminary Removal Goal of 26 mg/kg total PAHs for river sediments. Correcting the errors in the ecological risk assessment or its application would result in a substantially higher PRG. If EPA were to address the issues in its risk assessments, the Agency would be in a position to conclude that a final cleanup level in excess of 100 mg/kg for surficial river sediments would protect human health and the environment and appropriately manage risks.

    With respect to benthic invertebrates, Site-specific sediment toxicity tests indicated that only sediment sampling location SD-07 in the BSD hotspot area had reduced survival; there were no effects on survival, growth or reproduction at any of the other locations evaluated. Potential impacts were noted at a few locations outside the BSD/SSD area based on results of the benthic community analysis; however, those effects were not demonstrated to correlate with chemical concentrations. Based on this information, it would appear that ecological effects, if any, from exposure to PAHs in sediments are very localized and do not warrant a response action, except perhaps in the immediate vicinity of sampling location SD-07. The Site-specific sediment toxicity testing would support a reasonably conservative PRG range of about 44 to 116 mg/kg total PAHs in surface sediment (the biologically active zone), with the low end of this range reflecting the highest concentration at which no adverse effects were observed (*i.e.*, the "no observed adverse effect level," or "NOAEL") and the high end of this

range reflecting the lowest concentration associated with a possible effect (i.e., the "lowest observed adverse effect level," or "LOAEL"). NOAELs are typically considered for use as PRGs only when evaluating risks to endangered and threatened species. LOAELs are more typically considered for use as PRGs and would still be reasonably conservative at this Site, given the presence of Site-specific data indicating that effects are more probable at higher concentrations than 116 mg/kg total PAHs.

EPA Response: The scope of the EE/CA response action for River Sediment (and industrial wastes deposited on the river bottom) is very similar to the scope suggested in the comment. The comment suggests that the ecological performance standard for taking action in river sediments should be 116 mg/kg total PAHs, the LOAEL concentration. EPA has adopted a narrative performance standard to remove the black semi-solid deposits (BSD) and SSD. Analytical results from samples of BSD indicate that total PAH concentrations are in the 20,000 mg/kg total PAH range. The concentration of total PAHs in the stained sediment deposits (SSDs) are in the >500 mg/kg total PAH range. The BSD and SSD are limited to a relatively small area with concentration of PAHs declining swiftly outside the BSD area. The EE/CA estimates that removal of the BSD and the SSD would achieve a total PAH concentration in remaining sediments in the 100 to 500 mg/kg range. EPA believes that a post-excavation surface concentration in the lower end of this range is achievable (closer to 100 mg/kg PAH).

Removal of the BSD and SSD will eliminate the major source of PAHs in the area. The high concentrations of PAHs in the BSD area are toxic to aquatic invertebrates. In addition, the physical nature of the 1-foot-thick tarry residue retards the potential effectiveness of existing physical, biological and chemical mechanisms recognized as important components of MNR (i.e., degradation and dilution).

Reducing the PAH concentrations in the BSD area will reduce ongoing risk to the environment and create conditions more favorable to monitored natural restoration further reducing the residual concentration of PAHs to safe levels over time.

As indicated in Appendix B of the EE/CA, the PRGs in the sediment were based on risks to sediment-invertebrates, using a line of evidence approach. EPA is not aware of any errors in the ecological risk assessment that would result in substantially higher PRGs. Therefore, EPA does not agree that the PRG is inappropriate and will maintain the study findings in the Administrative Record for the EE/CA. EPA does understand that additional Site-specific sampling and investigation could refine the target concentration for PAHs in the River that would be protective of ecological receptors. EPA has decided that removing the hotspot area using the narrative criteria of BSD/SSD removal followed by environmental monitoring is the better option for this Non-Time Critical Removal. Any refinement to a final numeric target could be completed prior to issuance of a final Record of Decision for the Monongahela River.

38. Comment: Review of the Baseline Ecological Risk Assessment (BERA) indicates that very little Site-specific information was used in the development of risk estimates, with exposure

parameters based primarily on conservative assumptions. Although conservative dose modeling indicates a potential for risks to avian receptors through consumption of aquatic invertebrates, that evaluation is based on very limited Site-specific data. Tissue concentrations used in that evaluation represented samples from only one species (Asiatic clam) that were collected from a limited number of locations. In addition, there is evidence, as described in Appendix B of the EE/CA, that the avian toxicity reference value (TRV) used in the risk assessment substantially overestimates the potential risk to birds from exposure to PAHs. Therefore, as acknowledged in the uncertainty section of the BERA (Section 8.1), it is likely that risks to ecological receptors have been overestimated. In addition, the approach used to derive PRGs for the protection of ecological receptors does not reasonably reflect the risk assessment results.

EPA Response: The ecological Preliminary Removal Goal (PRG) for PAHs in sediment was developed in an appropriate manner utilizing Site-specific data and several lines of evidence. Notwithstanding the detailed explanation below, EPA accepts that additional data collection and Site-specific studies could further refine the goal.

EPA included the environmental data and scientific analysis utilized to develop the PAH PRG in the Administrative Record but the EE/CA adopted a narrative performance standard to address the toxic black semi-solid deposits (BSD) and (SSD) in this removal action. Analytical results from samples of BSD indicate that total PAH concentrations are in the 20,000 mg/kg total PAH range. The concentration of total PAHs in the stained sediment deposits (SSDs) are in the >500 mg/kg total PAH range. The BSD and SSD are limited to a relatively small area with concentration of PAHs declining swiftly outside the BSD area. The EE/CA estimates that removal of the BSD and the SSD would achieve a total PAH concentration in remaining sediments in the 100 to 500 mg/kg range.

If significant funds were spent refining the PRG over the next several years to settle on a final quantitative performance standard for PAHs in river sediments it is believed that the final concentration would be within the 6 mg/kg to 116 mg/kg PAHs range.[2] The toxic PAH hotspot represented by the BSD area is contaminated by PAHs in the 20,000 mg/kg range.

The EE/CA process determined that these extremely high initial PAH concentrations in the BSD area could not be reduced to 100 mg/kg or less within a reasonable period of time relying on Monitored Natural Restoration process alone. However, if the initial PAH concentration could be significantly reduced by taking this removal action, MNR should be able to further reduce the concentration of PAHs to an acceptable risk range within a reasonable period of time.

Comment states that "very little Site-specific information was used" in the development of the risk estimates and PRGs for Monongahela River sediments. In fact, only Site-specific

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[2] The lower bound of this estimate, 6 mg/kg total PAHs, is the calculated background concentration of PAHs in Monongahela River sediments and would represent a 2.0×10^{-5} cancer risk to recreational users due to 0.4 mg/kg benzo(a)pyrene.

data were used to develop the sediment PRG of 26 mg/kg PAHs. The lines of evidence for the sediments include sediment concentrations, laboratory toxicity testing, a benthic macroinvertebrate survey, mussel tissue concentrations, and fish tissue histopathology.

The results of the bioassay with *H. azteca* were evaluated and incorporated as one line of evidence. The bioassay demonstrated that toxicity is severe (i.e., 0% survival) at SD07 with the highest concentration of PAHs at 61.87 mg/kg. Toxicity was not observed at the next lower concentration of 25.68 mg/kg PAH at SD08. Without serial dilutions of the SD07 sample with clean sediments, the lowest toxic concentration can not be identified.

As other species of benthic macroinvertebrates (BMI) are known to be more sensitive than standard test organisms, EPA advocates the use of a triad approach for sediment toxicity assessments. For this reason, BMI surveys were also performed in the river. Hester-Dandy samplers were selected for the assessment as they rely on BMI drifting downstream to colonize suitable substrate. It provides data on the colonization potential without the potential confounding influence of the asphalt-like substrate. Thus, any negative effects relative to the reference locations are attributable to contaminant exposure rather than poor habitat. The BMI metrics were the lowest at SD07 (corresponding to the bioassay results), moderately affected at SD03, and modestly affected at SD08 compared to the upstream reference colonization. The negative effects at SD07 and SD03 are correlated to PAH contamination yielding a low effects concentration of 7.24 mg/kg PAH. The more modest effects at SD08 despite higher PAH concentrations than SD03 is likely due to its upstream position. Hester-Dandy sampling is spatially influenced by uncontaminated water continuously carrying healthy BMI from upstream, whereas contaminated water within the impaired reach does not supply as many organisms to the downstream locations. This effect was also observed on the other side of the river with the most upstream location near the POTW having higher metrics than the downstream location.

Efforts were made to collect crayfish and mussels in multiple locations in the river to assess the bioavailability of the PAHs. However, crayfish were not found and mussel populations appear to be severely limited. Screening of the sediment samples submitted for toxicity testing also demonstrated that predatory BMI were absent from locations adjacent to the Site or POTW, but present in reference samples. Toxicity tests (*in situ* or laboratory) would be needed to determine if PAH contamination is responsible for poor colonization by these species. Even with only two mussel samples, it is clear that the PAHs are bioavailable as the mussels accumulated PAHs. As mussels are filter feeders, this observation documents that PAHs are released into the water column from the sediment deposits. Thus, the asphalt-like nature of the deposit does not provide complete containment of the PAH contamination necessary to prevent exposure.

PAHs are not bioaccumulative in fish tissue as vertebrates metabolize the parent compounds. However, some of these metabolites are highly reactive and cause cellular damage. Fish tissue histopathology served as both an indirect measure of fish exposure to PAHs in the river and evidence of PAH-induced cellular damage. Results indicated that the

AR500132

fish are exposed and affected by PAHs in the river. As fish are mobile, it is not possible to associate this effect with a particular location. However, research on PAH effects in bullheads indicates that cellular damage leading to tumors is associated with sediment PAH concentrations exceeding 25 mg/kg (Pinkney, A.E. and J.C. Harshbarger. 2005. Tumor prevalence in brown bullheads (*Ameiurus nebulosus*) from the South River, Anne Arundel County, Maryland. http://www.fws.gov/chesapeakebay/pdf/CBFO-C0504.pdf).

Using the weight of evidence approach, PRGs were selected within the range of the lowest adverse effect concentration and the highest concentration with no adverse effect across the measurement endpoints. In this case, adverse effects on the benthic community were observed at 7.24 mg/kg PAH. The lowest adverse effect level above all no effect concentrations was 25.68 mg/kg, which was also the highest no effect concentration in the bioassay. Severe effects were observed at 61.87 mg/kg in both the bioassay and benthic colonization surveys. No samples were tested between 26 mg/kg and 61 mg/kg. Considering all of the evidence cumulatively, 26 mg/kg total PAHs was selected as PRG for sediments during the development of the EE/CA. When performance standards for sediments in the Monongahela River were selected for the EE/CA, the narrative performance standards were identified.

39. Comment: There are a few concerns about the adequacy of the cleanup alternative analysis presented in the EE/CA. If the concerns (discussed below) were addressed, ExxonMobil believes that EPA would ultimately select a response action that is focused on the BSD, and perhaps the highest concentrations of PAHs in the surficial sediments immediately adjacent to the BSD, where there is some evidence of impact (or potential impact) on benthic organisms based on toxicity testing. The remaining sediments either do not present a human health or ecological risk or will be addressed over time through natural attenuation. In addition, an appropriate response action would allow combinations of dredging and capping to avoid uncertainties regarding the depth of contamination and the amount of residuals generated through dredging. Whether to dispose of removed BSD (and removed SSD, if any) on-Site or off-Site should be left open, subject to further analysis during the design phase of the implementability, cost, and long-term risks associated with each option.

    The EE/CA rejected the "No Action" and "Monitored Natural Recovery" alternatives based on errors in the analyses of human health risk, ecological risk, and ARARs. The remaining alternatives relied solely on physical removal of the BSD and SSD. The EE/CA stated that no alternatives for sediment armoring or capping were considered for the Site based on assumptions regarding the potential erosion of armoring or capping due to high river flows during storm events. EPA prematurely eliminated armoring or capping technologies from consideration.

    The EE/CA also failed to evaluate the effectiveness and implementation risks of dredging relative to the other alternatives. The EE/CA noted various "challenges" to sediment removal, such as the presence of cobbles and shallow bedrock that create a very uneven dredging surface, but assumed that all challenges could be effectively overcome.

Uncertainties regarding the quantity of SSD that EPA may require to be removed make it difficult for the EE/CA to evaluate the costs and cost-effectiveness of removal options that include the SSD.

Finally, the EE/CA provides virtually no technical analysis of the implementability issues associated with either off-Site disposal or on-Site disposal and likely understates the costs of both.

These drawbacks are discussed in more detail below. If these drawbacks were all addressed, ExxonMobil believes that EPA would ultimately select a response action that is focused on the BSD, and perhaps the highest concentrations of PAHs in the surficial sediments immediately adjacent to the BSD, where there is some evidence of impact (or potential impact) on benthic organisms based on toxicity testing.

EPA Response: The scope of the EE/CA response action for River Sediment (and industrial wastes deposited on the river bottom) is very similar to the scope suggested in the Comment. The selected response action is focused on the BSD, and the highest concentrations of PAHs in the surficial sediments down-stream from the BSD, where there is some evidence of impact on benthic organisms based on toxicity testing. The EE/CA estimates that removal of the BSD and the SSD would achieve a total PAH concentration in remaining sediments in the 100 to 500 mg/kg range. Removing the hotspot would represent an immediate risk reduction. EPA believes that there is a high probability that post-removal MNR (i.e., natural attenuation) will satisfactorily reduce the residual PAHs to concentrations within EPA's acceptable risk range over reasonable period of time. The EE/CA response action calls for installation of a thin cap over the excavated area to prevent exposure to the veneer residual layer of contaminated sediment in the immediate post-excavation time period. Environmental and biological monitoring would be completed to document the risk reduction and provide supporting information for a final Record of Decision at Big John Salvage.

The recommended removal action utilizes physical removal of the BSD and SSD to establish conditions that will enable natural attenuation to effectively reduce the remaining concentrations. It is EPA's intention to move to expeditiously excise the hotspot wastes from the river. The BSD and SSD area is only approximately 1 ½ acre; comparable to many pilot-scale dredging exercises. The sediment cap option was considered in the EE/CA and screened out for the technical reasons described. Additionally, EPA has concern that utilizing a sediment cap over the BSD, in the context of a removal, has the potential to be inconsistent with a future remedial action in the river. In the event that the subsequent Big John Salvage or Sharon Steel/Fairmont Coke ROD was to determine that the BSD and SSD needed to be removed, the installed cap would increase the cost of the selected remedy.

The EE/CA did evaluate the likely effectiveness of dredging relative to the other alternatives. The effectiveness evaluation considered each alternative from 5 perspectives

and ranked them with a Yes/No or graduated rating system (i.e., poor, fair or good). The 5 criteria considered in the effectiveness evaluation were:

1) Overall Protection of Human Health and the Environment;
2) Compliance with ARARs;
3) Long-Term Effectiveness and Permanence;
4) Reduction in Contaminant Toxicity, Mobility or Volume through Treatment; and,
5) Short-term Effectiveness

The EE/CA evaluated implementation challenges for each of the alternatives and ranked them with a graduated rating system (i.e., poor, fair or good). The criteria considered in the implementation evaluation were:

1) Technical Feasibility;
2) Administrative Feasibility; and,
3) Availability of Service and Materials

EPA utilized conservative assumptions in estimating the volume of material included in the BSD/SSD area. The BSD area was reported to be 50-100 feet wide and 375-400 feet long. EPA assumed that the area was 100 feet by 400 feet long (the upper-bound dimensions included in the description). The thickness of the BSD was reported to typically be 3-6 inches with mounds up to 12 inches thick. EPA assumed that the sediment in the BSD area would be removed to 3 feet, the reported depth of the bedrock.

The intent of the sediment action is to remove the BSD and SSD to restore the area exhibiting significant toxicity. The SSD, sediments which contain high enough mass of BSD to be visible, appears to be an erosion feature extending down gradient of the BSD. The narrative criteria may be refined to reduce potential ambiguity during the design. The potential volume of SSD is reasonably well bounded. The potential depth is limited. Investigations report that the SSD occurs in the upper 12 inches and bedrock is approximately 3 feet below the sediment surface. The SSD is approximately 30 feet wide and was observed to extend 800 feet. The downstream extent SSD was not fully delineated. The EE/CA suggests that additional sampling be performed to better define the horizontal and vertical boundaries so a dredge prism can be developed during the design process. If the SSD extends an additional 100 feet the additional volume of material removed would be approximately 110 yards. The quantity of SSD has been defined with sufficient certainty to support a meaningful cost-effectiveness determination.

Implementability issues associated with disposal of the BSD/SSD was considered with respect to technical feasibility, administrative feasibility and availability of service and materials. The EE/CA cost estimate is sufficiently detailed to support a comparison of the alternatives. EPA concedes that the cost estimating process can be more detailed once the actual design begins and process option decisions are made. EPA's EE/CA cost estimates

add a 25% contingency line item to account for the possibility that the more streamlined cost estimate overlooked details which may increase the actual cost of the alternative.

EPA chose to include an on-Site and an off-Site disposal option for the BSD for several reasons. Those reasons included the desire to fully consider concerns that PRPs from the two upgradient Superfund Sites may have about the idea of consolidating comingled wastes deposited in the river onto the Big John Salvage Site. EPA also needed to solicit and consider concerns that local officials and the broader community may have about EPA's plan for long-term containment of the BSD on the Big John Salvage parcel. EPA learned that the objections to the on-Site consolidation and containment of BSD on the Big John Salvage property were significant and nearly unanimous.

40. Comment: The EE/CA screened out armoring and capping sediment technology without complete technical analysis. Sediment armoring and capping, both alone and in conjunction with dredging, may be effective and reliable for some or all affected river sediments. A more detailed and Site-specific technical analysis may show, for example, that removing the BSD and the top one foot of SSD in a defined area, following by placement of a one-foot sediment management cap in the area where SSD had been removed, is effective over the long term, implementable, and cost effective relative to other alternatives involving much more uncertainty.

    Thin sand covers do not effectively isolate high concentrations of PAHs over the long term. For purposes of isolation (rather than the temporary management of dredge residuals), an appropriate cap for sediments containing high concentrations of PAHs is a reactive cap that contains a sorbent material such as organoclay. The effectiveness of reactive caps for the in-place management of PAH-containing sediment is recognized in relevant design documents. Placement of a reactive cap following limited dredging of PAH-contaminated sediment also has been approved by EPA Region III and the West Virginia Department of Environmental Protection as the preferred corrective measure for the Koppers Industries Site on the Ohio River in Follansbee, West Virginia. The cleanup process is currently in the initial design and permitting phase and will go through the formal approval process under RCRA in early 2010. The Ohio River site is particularly relevant given the constituent of concern, the regulatory entities, and the focused use of dredging to address the area of highest environmental concern and to support placement of a reactive cap.

    Reactive caps have been used in high energy aquatic environments (*e.g.*, the Island End River and Collins Cove sites in Massachusetts) through the addition of a stone armor layer over the cap. Depending on the hydraulic setting, the stone can provide beneficial ecological habitat, as it is above the effective portion of the cap. In areas that are more depositional in nature, sands and silts will deposit over the stone layer and provide another type of habitat. In the event high flow events disturb the deposited sands and silts, the armor stone will keep the cap intact.

EPA Response: The stand-alone sediment capping alternative was screened out early in the process as an alternative to removal of the hotspot for several reasons.

The relatively small area of the BSD hotspot combined with thin thickness of the material increases the cost-effectiveness (and the likely permanence) of the removal option. A reactive sediment cap is a more appropriate technology when contiguous PAH DNAPL is present as a continuing source that will likely re-contaminate an area after the top layer has been removed. Historically, the BSD was discharged to the Monongahela River from Sharon Steel Run and settled on the surface of the river sediments. The BSD appears to be limited to the upper 12 inches with approximately 2 feet of sand between the bottom of the BSD and the underlying bedrock. The likely effectiveness of the excavation alternative is increased because the BSD layer is so thin.

Note that the scope of the selected EE/CA alternative is similar to the suggested response action. The selected response action is removing the BSD and the SSD followed by placement of a six-inch sediment management cap. The EE/CA alternative assumed that the six-inch cover would be sand for the purpose of cost estimation. The actual material utilized in the thin cap may be revised during the design process. EPA believes that monitored natural restoration will be effective on the residual PAH contamination after the highest concentrations of PAHs are removed.

41. Comment: The effectiveness and implementability discussions for dredging downplay the challenges associated with environmental dredging. The challenges associated with attempting to achieve removal action objectives for sediment through dredging are well documented in the EPA Sediment Guidance and the National Research Council (NRC) in *Sediment Dredging at Superfund Megasites- Assessing the Effectiveness*. The EE/CA mentions the possibility of re-dredging and claims that it will be effective but the EPA Sediment Guidance and the NRC report show that simply taking one or more additional dredge passes is unlikely to achieve the intended residual sediment concentration. A highly focused and realistic approach to sediment removal is the best way to avoid the need for further lengthy study of the topic at this Site.

    Hydraulic dredging will not be feasible for the BSD and there is no need to include two different dredging approaches (hydraulic and mechanical dredging) when a single approach (mechanical dredging with a barge mounted excavator) can remove the SSD sediment and BSD identified in the EE/CA. Barge mounted excavators are capable of dredging sediment located at depths up to 30 feet below the water line and are directly applicable to this project.

EPA Response: The challenges associated with environmental dredging discussed in the sediment guidance and relevant case studies have been considered. The challenges are not to be understated but the challenges are somewhat proportional to the scale of the removal. The EE/CA considered operational strategies to manage the well documented issues associated with dredging such as the potential for re-suspension and the thin layer of residuals that will settle on the bottom after contaminated sediments are removed. For

example, several options to address the thin residual layer are discussed including additional dredging passes, allowing natural deposition of bed load moving down the river to cover the residuals, or backfilling the area with a thin cover. The EE/CA assumed that the thin cover option would be utilized. EPA agrees that mechanical dredging would likely be the most effective means of removal for the limited quantities of BSD and SSD but does not believe that all reference to hydraulic dredging technology needs to be removed from the EE/CA. The EE/CA will not specify the sediment removal method – the actual sediment removal method to be employed at this Site will be determined during the design phase of the project.

The removal objective is to remove industrial wastes (BSD) and SSD containing high concentrations of PAHs from the river bottom. The EE/CA concluded that it is feasible to remove the BSD and SSD from the river bottom and reduce the concentrations of PAHs in the river sediment to the 100 to 500 mg/kg PAH range. EPA believes that post-removal concentrations can be reduced to the lower end of that range and that natural restoration processes can achieve final CERCLA risk reduction goals over a reasonable period of time if the highest concentrations of PAHs are removed by excavation. The EE/CA recommended removal action includes an environmental monitoring plan focused on documenting a post-removal baseline and subsequent effectiveness of natural restoration in producing a downward trend of PAH concentrations in sediments and relevant biota.

EPA plans to analyze and evaluate the monitoring data in preparation for a final Record of Decision covering this section of the Monongahela River. Cleanup projects at both the Big John Site and the Fairmont Coke Works Superfund Sites have been carried out utilizing time- and non-time critical removal actions. Each of the Sites will require a final Record of Decision addressing any residual risks in the future. Since this section of river has co-mingled hazardous substances from both the Big John Salvage and Fairmont Coke Works Superfund Sites, the final decision for the Monongahela River may be documented in a CERCLA ROD for either of these two Sites.

42. Comment: The EE/CA does not appear to include the appropriate costs for hydraulic dredging operations. The cost estimates for Alternatives 2 and 3 currently include a removal and shoreline transportation cost of $75 per cubic yard (CY), but provide no quantitative support for these estimates. For example, do the estimated costs include one dredge with an operator and a deck hand, what are their hourly rates and number of work hours per day, and how many days per week do they work? What other support personnel are included in the estimate to manage on-water activities, such as site superintendents or construction staff to manage pipeline operations?

EPA Response: The sediment removal costs included in the EE/CA are planning level cost estimates that were developed based upon review of the general dredging costs associated with several other planned or completed river sediment removal projects. These projects included both mechanical and hydraulic dredging techniques. The general unit rates used in the cost estimate are considered to be conservative yet reasonable to support the decision

making process for this Site. A more detailed cost estimate to include staff levels (i.e., number of operators, deck hands, supervisors, etc.), hourly rates, and production assumptions (i.e., number of work hours per day/week) will be developed during the design phase of the project.

For further general comparison purposes related to the validity of the reasonableness of the cost estimates used in the EE/CA, a comparison of the Big John river sediment removal composite cost (in terms of dollars per cubic yard) was compared to the findings of a study conducted by the New York State Energy Research & Development Authority – NYSERDA completed in late 2005.
http://www.nyserda.org/publications/Final%20Mobile%20Containment%20Report-web.pdf NYSERDA used data from the Major Contaminated Sediment Sites (MCSS) Database (http://www.smwg.org/home.htm). The MCSS database provides a review of activities at over 100 sites in the U.S. that have undertaken some form of subaqueous contaminated sediment removal and/or capping.

The cost data presented in this database is expressed as a composite cost in terms of dollars per cubic yard. Although cost data is not available for all the sites, and where data is provided it is not consistent from site to site with respect to the level of detail, the available information does provide a means to examine the general magnitude of the costs, the relative costs and range of costs encountered in prior cleanup projects. To undertake such an examination, NYSERDA selected data from 23 locations for statistical analysis. This analysis indicated that the composite cost of sediment removal actions ranged from $110 to $1670 per cubic yard, with a population average and standard deviation of $510 and $414 per cubic yard, respectively. The median value of the data set is $375 per cubic yard.

The EE/CA places the composite cost for the Monongahela sediment removal action for the preferred alternative at approximately $800 per cubic yard (based on approximately 5,500 cubic yards of sediment removal), which is well within this range. For further comparison, a review of the EPA Region V September 2007 ROD for the Allied Chemical & Ironton Coke Site - Operable Unit Three - Tar Plant, which includes a limited sediment removal action (5,100 cubic yards) in the Ohio Rivers, indicated a range of composite cost of $777 to $831 per cubic yard of sediment removed. This Ohio River sediment removal composite cost range is very similar to the Monongahela River sediment removal composite cost provided in the EE/CA.

These comparisons support the reasonableness of the planning level cost estimates used in the EE/CA for this Site.

43. Comment: The EE/CA mentions the possible use of turbidity management methods around the dredging area, such as steel sheetpiling or silt curtains. However, sheetpiling or silt curtains are unlikely to be environmentally necessary for the dredging due to the generally granular nature of the substrate to be dredged, which would settle out at the point of dredging. Sheetpiling is very costly and should be used only where necessary. While silt curtains may

be less costly than sheetpiling, they would be open on the bottom and thus would provide very limited effectiveness in controlling any suspended sediment that migrates away from the point of dredging.

EPA Response: Limiting re-suspension of contaminants during excavation activities and minimizing the area for residuals to settle out from the water column will be important design considerations. Options for containment will need to be further evaluated and selected in the final design plan.

44. Comment: The processes to dredge, dewater, transport, and dispose of SSD are so ill defined in the EE/CA that the estimated costs for sediment removal are not within an acceptable range of uncertainty. It is unclear why the sediment removal alternatives in the EE/CA for the stained sediments use an estimated removal volume of 900 CY (based on one foot of sediment removal over the SSD area), when the EE/CA states that sediment removal "would not likely exceed 3 feet in thickness in most areas." This indicates that the estimated removal volume, which does not include an allowance for over-dredging of residuals, could be low by a factor of three or more. This level of uncertainty must be constrained such that the estimated response costs are with the acceptable range of -30% to +50% to support appropriate decision making. This could be addressed through elimination of the component of SSD removal, or by constraining the scope of the required removal to a fixed area and shallow depth (followed by capping as needed).

EPA Response: See the prior response regarding the reasonableness of the planning level cost estimates used in the EE/CA. Nevertheless, the wording identified in the EE/CA is confusing and should have been written more clearly. The one foot SSD assumption used in the volume estimate was based on reported field observations of SSD thickness. The statement noting that the thickness would not likely exceed 3 feet was based on the report that the sediment thickness, stained and unstained, is approximately 3 feet thick above underlying bedrock. Therefore, 3 feet sediment depth is thought to be an upper-bound thickness in the unlikely event that stained sediments occur from the surface to the bedrock. The level of cost uncertainty will be further reduced during the design phase of the project as the scope of the sediment removal action is refined (i.e., determination of actual quantity of sediment that will be removed, determination of sediment removal and dewatering method, determination of disposal approach, etc.). However, the general planning level cost estimate provided in the EE/CA is reasonable to support decision making at this step in the project.

45. Comment: The costs for the sediment removal alternatives appear significantly underestimated. The EE/CA cost estimates lack of detail and the use of unit and lump costs prevent meaningful public comment on the items that may or may not have been included in the estimates. For example, it is not clear that the cost estimates include appropriate pre-design investigations, construction of access roads and staging areas, restoration/backfill of dredged or excavated areas, and monitoring. Costs for mobilization and demobilization, sediment removal, dewatering, design, and project and construction management appear to be

significantly underestimated and have not been appropriately scaled for this project. Cost estimates should be developed that include manpower, equipment, and materials/supplies. For the scope of removal recommended in the EE/CA, missing detailed elements could add $3 to $5 million in cost to the project.

See the prior response regarding the reasonableness of the planning level cost estimates used in the EE/CA.

Overall, the cost estimate provided in the EE/CA addresses pre-design investigations (accounted for in both the lump sum line item for additional sediment sampling and contaminant delineation ($300,000) as well as the design/project/construction management line item (15% of total cost, which at nearly $476,000 is reasonable based on a project of this size), construction of all access roads and staging areas and all on-Site facilities (accounted for in the lump sum line item for mobilization/ demobilization - $500,000), restoration/backfill of dredged areas (accounted for in the river sediment capping material line item - $140,000), and monitoring (accounted for in the attainment sampling study line item ($60,000) as well as the project/construction management line item). With regard to turbidity control, this cost is accounted for in the lump sum line item for site isolation/ dewatering ($900,000), although the specific method (such as turbidity curtains or sheet piling) has not been specified. However, although sheet pilling was described as an option to be considered in the EE/CA, it is unlikely that it would be used extensively at the Site, as the presence of an irregular rocky bottom in some areas would make it very difficult to install.

A more detailed cost estimate which includes a breakout of specific manpower, equipment, and materials/supplies will be developed as part of the design phase of the project.

46. Comment: The EE/CA did not perform a thorough evaluation of the potential transportation and disposal options for the BSD and SSD materials. The EE/CA mentions the possibility of transporting the materials for disposal via "river barges," but no further details are provided. Use of barges for transportation to a disposal facility would minimize the short-term effectiveness issues associated with the other transportation and disposal options identified in the EE/CA.

EPA Response: A more thorough evaluation of transportation and disposal operations will be conducted during the design phase of the project. It is acknowledged that there are a variety of transport and disposal options available for this project, including those involving river and rail transport and nearby and distant disposal options which may offer cost savings and other efficiencies – however, these other options cannot be fully explored until details regarding the quality of material (characteristic hazardous vs. non-hazardous) and pre-treatment requirements are identified in the design phase of the project. Consequently, transport via truck was used in the EE/CA cost estimate, as this is expected to be the most conservative approach. The current transport and disposal assumptions used in the EE/CA are reasonable to support decision making at this stage of the project.