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METAL BANK SUPERFUND SITE
PHILADELPHIA, PENNSYLVANIA

RECORD OF DECISION

PREPARED BY
THE ENVIRONMENTAL PROTECTION AGENCY

DECEMBER 1997

METAL BANK SUPERFUND SITE
RECORD OF DECISION

PART I - DECLARATION

I. SITE NAME AND LOCATION

Metal Bank Superfund Site
Philadelphia, Pennsylvania

II. STATEMENT OF BASIS AND PURPOSE

This Record of Decision ("ROD") presents the final remedial action selected for the Metal Bank Superfund Site ("Site"), located in northeastern Philadelphia, Pennsylvania. This remedial action was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 ("CERCLA"), 42 U.S.C. §§ 9601 et seq., as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"), 40 C.F.R. Part 300. This decision document explains the factual and legal basis for selecting the remedial action and is based on the Administrative Record for this Site. An index of documents for the Administrative Record is included in Appendix A of the ROD.

The Pennsylvania Department of Environmental Protection ("PADEP") has commented on the selected remedy and the State's comments have been incorporated to the extent possible. PADEP concurs with the selected remedy.

III. ASSESSMENT OF THE SITE

Pursuant to duly delegated authority, I hereby determine, pursuant to Section 106 of CERCLA, 42 U.S.C. § 9606, that actual or threatened releases of hazardous substances from this Site, as discussed in Section IV (Risk Assessment) of this ROD, if not addressed by implementing the remedial action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

IV. DESCRIPTION OF THE SELECTED REMEDY

The Environmental Protection Agency ("EPA"), in consultation with PADEP, has selected the following remedial action for the Metal Bank Superfund Site. This remedy addresses contaminated soil, sediment, surface water, and groundwater at the Site and includes the following components:

- Installation of an oil collection system consisting of a sheet pile wall around the southern and western perimeter of the property; interceptor trenches with oil-water separators and

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sump pumps, or similar collection devices, inside the wall to prevent oil from migrating to the Delaware River; discharge of collected groundwater to the Delaware River in accordance with National Pollution Discharge Elimination System requirements; and off-site disposal of collected oil in accordance with RCRA and TSCA requirements;

- Installation of temporary cofferdams prior to soil/sediment excavation to minimize transport of contamination into the Delaware River;

- Excavation of contaminated soil within the Courtyard Area within two feet of the surface where polychlorinated biphenyl ("PCB") concentrations exceed 10 ppm; excavation of contaminated subsurface soil in the Southern Portion of the Metal Bank property where PCB concentrations exceed 25 ppm; excavation of contaminated sediments within 100 feet of the Metal Bank property and within four feet of the surface of the river bed; and excavation of sediments beyond 100 feet of the Metal Bank property which have PCB concentrations exceeding 1 ppm if determined by EPA to be appropriate and feasible.

- Disposal of contaminated soil and sediments that are not hazardous in the following manner: (1) if PCB concentrations are less than 25 ppm, backfill material on the Southern Portion of the property ; (2) if PCB concentrations are between 25 and 50 ppm, dispose in a landfill permitted in accordance with the Resource Conservation and Recovery Act ("RCRA") Subtitle D or Pennsylvania Residual Waste Management Regulation requirements; or (3) if PCB concentrations are 50 ppm or greater, dispose at a Toxic Substances Control Act ("TSCA") landfill;

- Disposal of contaminated soils and sediments that are hazardous in the following manner: (1) if PCB concentrations are less than 50 ppm, dispose at a facility in compliance with RCRA Subtitle C or Pennsylvania Hazardous Waste Management Regulations; or (2) if PCB concentrations are 50 ppm or greater, dispose at a TSCA landfill;

- Removal and disposal of the underground storage tank and its contents from the Southern Portion of the property;

- Backfilling of excavated areas in the Courtyard Area with clean soil, installation of a 12-inch soil cover over the entire Courtyard Area, and establishment of an erosion-resistant vegetative cover;

- Backfilling of excavated areas in the Southern Portion of the property with excavated soils and sediments with PCB concentrations less than 25 ppm, installation of a 24-inch soil cover over the entire Southern Portion, and establishment of an erosion-resistant vegetative cover;

- Restriction of access by installing and maintaining a fence around the perimeter of the Metal Bank property;

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- Posting signs prohibiting consumption of fish caught in the Delaware River in the vicinity of the Site;

- Restrictions on the deed to the property to prevent future residential or agricultural use of the Site, use of the groundwater, and intrusive activities into the subsurface soils below the water table in the Southern Portion of the property;

- Additional investigation to determine whether dense non-aqueous phase liquids ("DNAPLs") are present at the Site and whether the storm sewer system in the vicinity of the Site is contaminated; and

- Monitoring of groundwater, the Delaware River, and the Baxter Water intake.

V. STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. The remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. This remedy does not employ treatment as a principal element.

Because this remedy will result in hazardous substances remaining on-site above health-based levels, a review will be conducted within five years after initiation of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

W. Michael McCabe
Regional Administrator
Environmental Protection Agency Region III

12/31/97
Date

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PART II - DECISION SUMMARY

I. SITE NAME, LOCATION, AND DESCRIPTION

The Metal Bank Superfund Site is a former scrap metal and transformer salvage facility located at 7301 Milnor Street in an industrial area of northeastern Philadelphia, Pennsylvania (*see* Figure 1). The Site is bordered by Cottman Avenue on the west; Milnor Street on the north; Safe Disposal Systems (an appliance recycling company) and Morris Iron & Steel Company (a metal salvage yard) on the east; and the Delaware River on the south. To the west of Cottman Avenue is St. Vincent's School, which is a day care center and a temporary shelter for abused children. A stormwater outfall owned by the City of Philadelphia at the southern end of Cottman Avenue empties into a mudflat area west of the Metal Bank property. The Quaker City Yacht Club is located west of the mudflat. Tacony Warehouse, formerly known as U.S. Army and Air Force Exchange Warehouse, is located approximately 1,000 feet south of the Site and adjacent to the Quaker City Yacht Club. A Philadelphia drinking water intake and treatment plant are located 2.2 miles upriver of the Site (*see* Figure 2).

The Metal Bank property includes two areas: the southern area which consists of approximately six acres of open area that was used for scrap metal recovery; and the northern area which consists of six vacant brick and steel buildings, a courtyard, and a parking area (*see* Figure 3). The buildings are locked and a 6-foot fence is maintained around the southern area of the property except along the river to limit access.

II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

A. Site History

Beginning in 1962, the Site was used for scrap metal storage. From approximately 1968 or 1969 until 1973, transformer salvage operations were conducted at the Site. Transformer oil was drained on a concrete pad which was connected to an underground storage tank. Spills of the oil and possibly a rupture of the underground storage tank caused soil and groundwater contamination at the Site. Between 1968 and 1972 copper wire may have been burned at this Site to remove insulation. From 1973 to 1985, storage of scrap metal continued at the Site, but no transformer salvage operations have been conducted since 1973.

L. Goldstein's Sons, Inc. ("Goldstein's") purchased the Site from H.K. Porter in October of 1962. In the mid-1960's, Goldstein's changed its name to The Metal Bank of America, Inc. On December 4, 1968, Metal Bank of America, Inc. entered into an agreement

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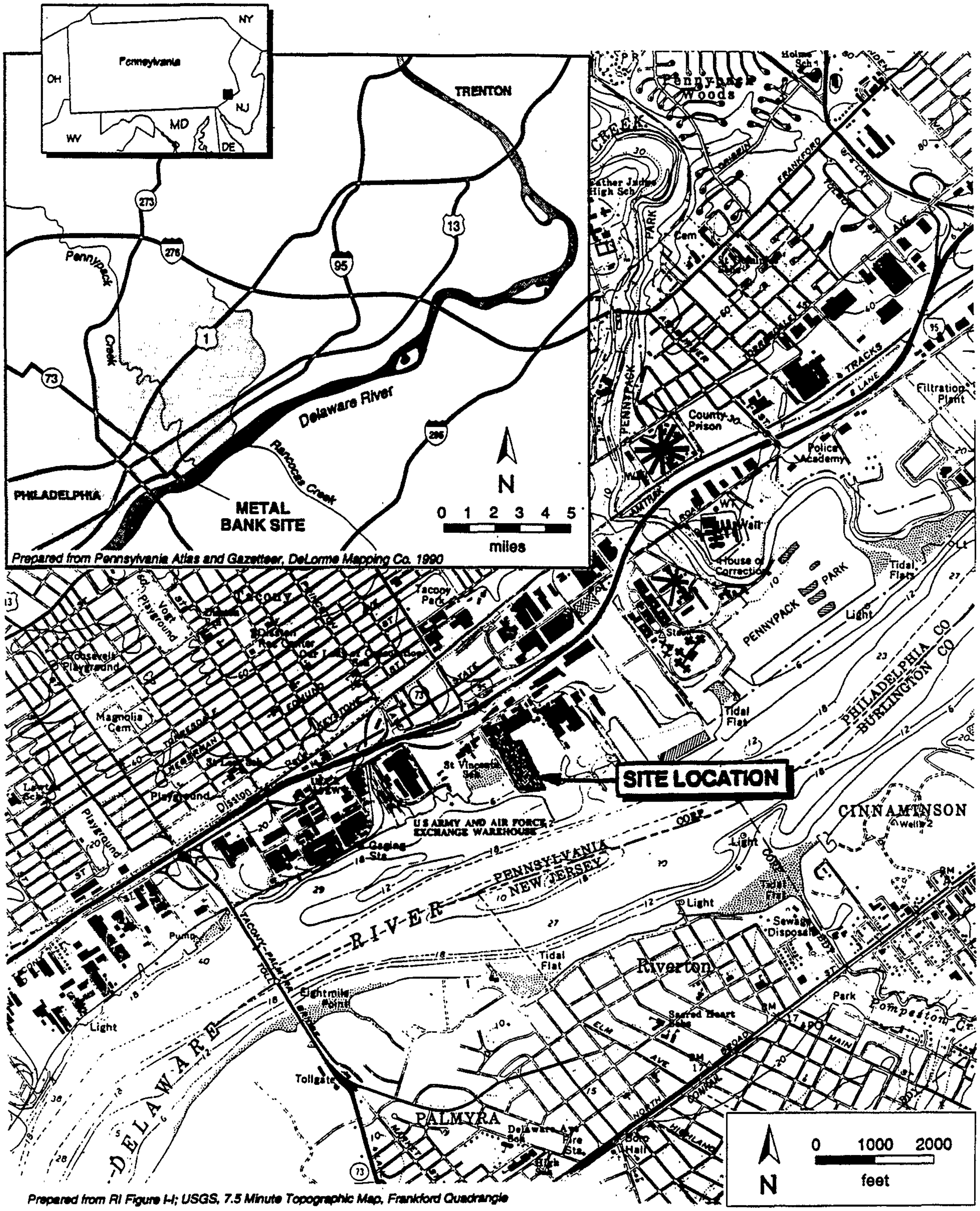

Figure 1: Site Location

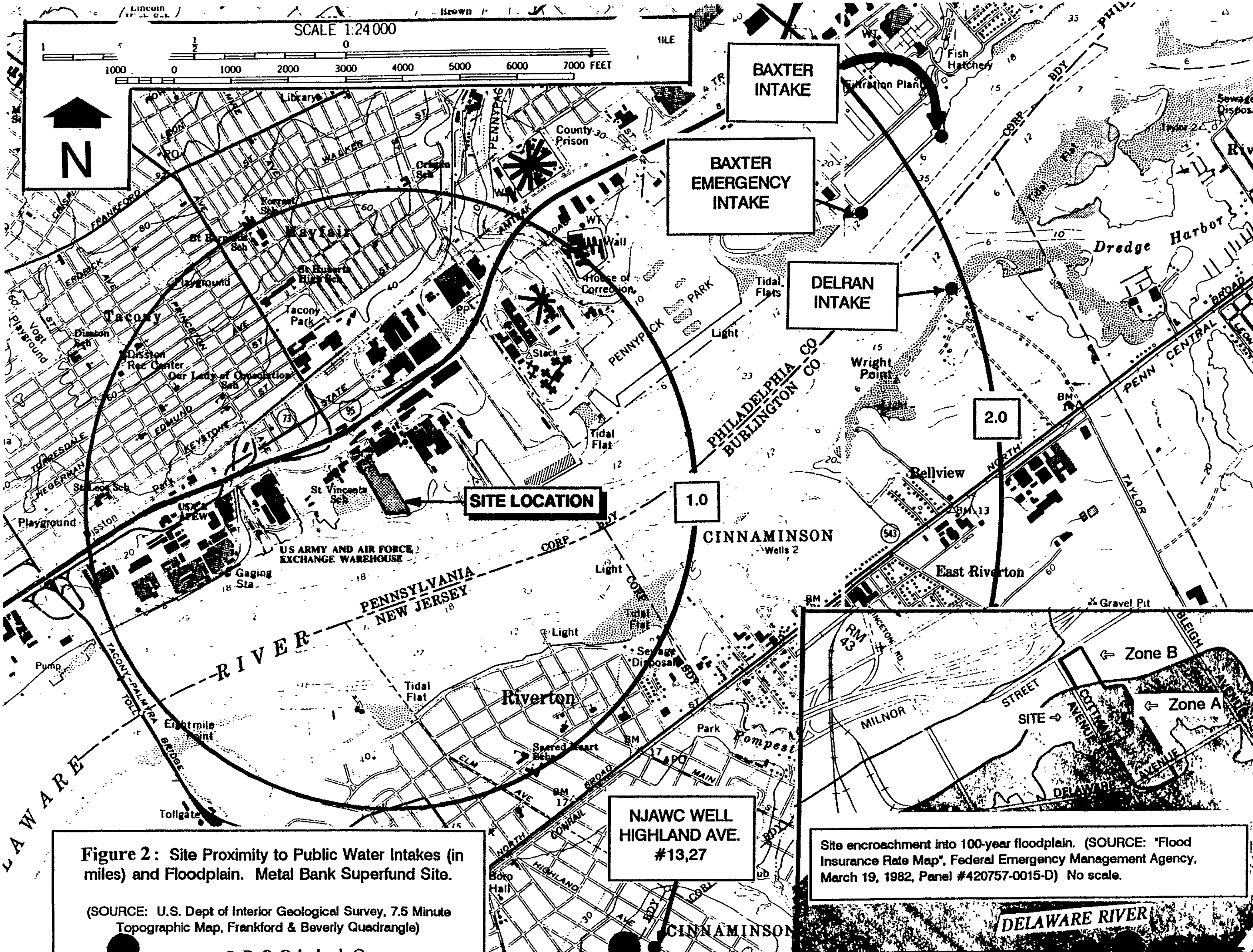

Figure 2: Site Proximity to Public Water Intakes (in miles) and Floodplain. Metal Bank Superfund Site.

(SOURCE: U.S. Dept of Interior Geological Survey, 7.5 Minute Topographic Map, Frankford & Beverly Quadrangle)

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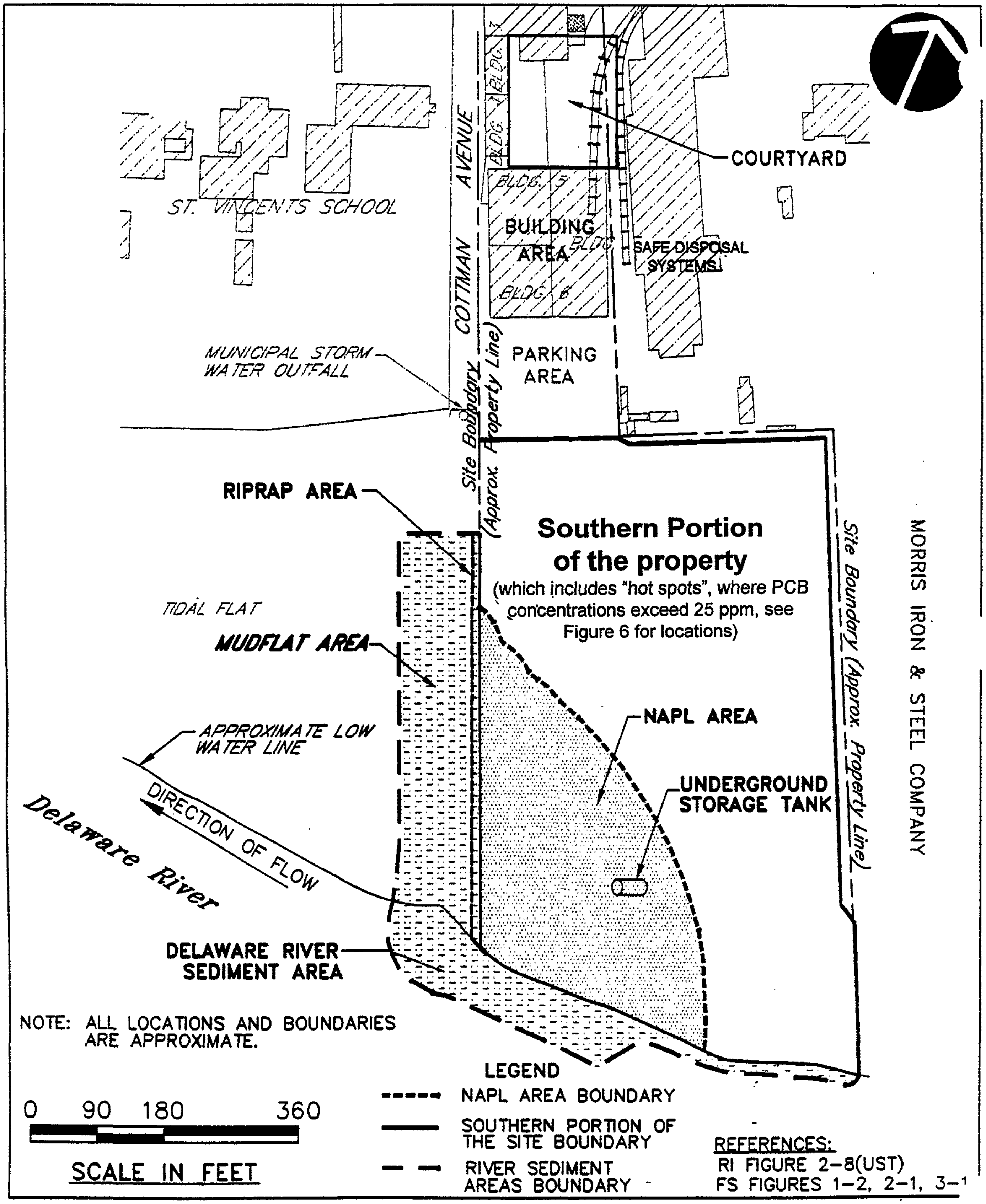

Figure 3
Site Plan
Metal Bank Site

to sell its assets (except for its properties at Cottman Avenue and New State Road) to The Union Corporation ("Union Corporation"). Union Corporation incorporated MBA, Inc. on December 9, 1968, and assigned its rights under the asset purchase agreement to MBA, Inc. The Metal Bank of America, Inc. liquidated in March of 1969, and its property, including the Site, was distributed to its shareholders, Irvin and John Schorsch. After the liquidation of the "old" Metal Bank of America, Inc., MBA, Inc. officially adopted that name ("Metal Bank") on December 7, 1971. Union Corporation leased the Site from the Schorsches for its subsidiary, the "new" Metal Bank, until 1980. In 1980, the Schorsches sold the Site and the New State Road property to the Philadelphia Authority for Industrial Development ("PAID"), and the Schorsches took back the mortgage. PAID and Metal Bank entered into a twenty year Installment Sale Agreement whereby Metal Bank purchased both the Site and the New State Road property. PAID assigned its rights to payment under this Agreement to the Schorsches. Metal Bank changed its name to U.C.O.-M.B.A. Corporation in June 1985. Although PAID continues to hold the title to the Site properties, Metal Bank has full possession of the premises and is the equitable owner of the Site under the Installment Sale Agreement.

Portions of the buildings on the premises were leased to various tenants: Lincoln Van and Storage for 8 to 10 years, ending in 1985; an automobile body repair shop for four or five years until approximately 1983; and Pennsylvania Alternator and Generator Exchange for approximately 1 year, until 1983. During the 1970's, Reisher Ford stored new cars on the premises.

B. Site Enforcement Activities

The following chronology highlights various activities, including enforcement actions, that have taken place at the Metal Bank property.

DATE	EVENT
1950 - 1967	Approximately 15 feet of fill from unknown origins was gradually placed in the Delaware River to create the southern portion of the property.
1972	The United States Coast Guard ("USCG") investigated reports of oil seeps into the Delaware River and concluded that the Metal Bank property was the source. Analyses using available technology did not detect polychlorinated biphenyls ("PCBs") in the oil samples. Metal Bank of America, Inc. ("Metal Bank") performed various remedial actions based on USCG recommendations including cleaning up spilled oil and improving housekeeping. Metal Bank also reported that it had ceased all transformer salvaging activities.
1977	EPA retested samples collected by USCG in 1973 using new procedures. The new analyses disclosed the presence of PCBs at concentrations over 800 ppm. The USCG, EPA, PADEP, the Army Corps of Engineers, the City of Philadelphia, the Fish and Wildlife Service, the National Oceanic and

Atmospheric Administration ("NOAA"), the Delaware River Basin Commission ("DRBC"), and others inspected the Site. Following these inspections, EPA prepared recommendations for remediation of the PCB problem and requested that Metal Bank complete the work. Metal Bank rejected EPA's recommendation and elected instead to perform additional studies.

1980 EPA filed suit in the District Court for the Eastern District of Pennsylvania for injunctive relief and costs against Metal Bank under the Resource Conservation and Recovery Act ("RCRA") and the Toxic Substances Control Act ("TSCA"). During the litigation, Metal Bank's consultant designed a groundwater recovery and treatment system. The system consisted of two recovery wells and several separation units which collected the oily materials.

1981 Metal Bank reported to PADEP in 1986 that the underground storage tank at the Site was drained, cleaned, and filled with concrete.

1983 EPA settled the suit with Metal Bank under a Stipulation that required Metal Bank to install and operate a groundwater recovery and treatment system until all recoverable oil was removed from the property. The system consisted of two recovery wells, several oil separation units, and several 55-gallon drums containing activated carbon to treat groundwater. The separated oily materials were collected in drums for disposal. The treated groundwater was discharged into the City of Philadelphia sanitary sewer system.

The Site was placed on the National Priorities List based on a Hazard Ranking System ("HRS") score of 33.23.

1987 In December, EPA sent letters to individuals and companies notifying them that they were Potentially Responsible Parties ("PRPs") under CERCLA. EPA's allegations were based on invoices which indicate that the PRPs sent, either directly or through brokers, transformers and other electrical equipment to Metal Bank.

1989 On January 13th, Metal Bank notified EPA pursuant to the Stipulation that it intended to shut down the oil recovery system, stating that all recoverable oil had been removed.

In March, EPA collected samples from monitoring wells on the property which showed the continued existence of PCB-contaminated oil floating on the uppermost aquifer.

On April 1st, due to the concern that PCB oil may have been burned at the Site, EPA conducted dioxin soil sampling at St. Vincent's School. The soil samples did not demonstrate a health risk from dioxin.

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On June 12th, the Court denied as moot a motion by the United States seeking to prevent permanent shutdown of the recovery system, the United States having agreed in substance with an order proposed by Metal Bank extending the period for EPA to conduct sampling until August 15, 1989. Subsequently, the recovery wells were permanently closed and the oil recovery system was dismantled and removed. The area was covered with fill and vegetated. All buildings and exterior grounds were reportedly cleared of trash and debris and fences were repaired and are maintained by Metal Bank.

In August, EPA measured groundwater elevations in each of the monitoring wells on the site to determine the thickness of the remaining oil layer. An oil layer of at least 3 inches was measured in some portions of the property.

1991 In June, EPA signed an Administrative Order by Consent with 10 PRPs to conduct a Remedial Investigation ("RI") and Feasibility Study ("FS"). The Site Owner declined to join the PRP Group which included the following utility companies:

Baltimore Gas & Electric Co.	Metropolitan Edison Co.
Consolidated Edison Co. of NY	Philadelphia Electric Co.
Delmarva Power & Light Co.	Potomac Electric Power Co.
Jersey Central Power & Light Co.	Public Service Electric & Gas Co.
Long Island Lighting Co.	Virginia Electric & Power Co.

III. COMMUNITY PARTICIPATION

EPA has several public participation requirements that are defined in Sections 113(k)(2)(B), 117, and 121(f)(1)(G) of CERCLA, 42 U.S.C. §§ 9613(k)(2)(B), 9617, and 9621(f)(1)(G), respectively. The documents that EPA used to develop, evaluate, and select a remedial alternative for the Metal Bank Site have been made available to the public in the Administrative Record maintained at the Northeast Branch of the Free Library of Philadelphia, located at 2228 Cottman Avenue, Philadelphia, and at the EPA, Region III, Philadelphia Office.

The RI/FS Reports and the Proposed Plan for the Site were released to the public in July of 1995. The Proposed Plan described remedial alternatives being considered by EPA and identified EPA's preferred alternative at that time. The notice of availability of the Proposed Plan and the Administrative Record was published in the *Philadelphia Inquirer* on July 20, 1995. This notice also invited the public to a meeting on July 27, 1995, to discuss the Proposed Plan with EPA. The public was encouraged to review the Proposed Plan and the Administrative Record files and to submit comments on the proposed remedial alternatives to EPA. The public comment period was initially scheduled to close on August 19, 1995, allowing for the statutorily required 30-day period. At the request of the Site Owner and the

PRP Group, EPA extended the comment period an additional 30 days until September 19, 1995. When the PRP Group requested additional time to complete a Treatability Study which it began in response to the Proposed Plan, EPA extended the comment period 30 additional days. The comment period, therefore, ended on October 18, 1995.

EPA held the public meeting on July 27, 1995, at the Disston Recreation Center located approximately ½ mile northwest of the Site. Attendees included members of the Tacony Civic Association ("TCA"), local citizens, representatives of local businesses, the PRP Group, and the Site Owner. TCA members and local citizens asked questions and provided comments during the meeting. EPA representatives answered questions about conditions at the Site and the remedial alternatives under consideration.

Responses to the comments received during the public comment period are included in the Responsiveness Summary, which is part of this ROD.

IV. SCOPE AND ROLE OF RESPONSE ACTION

The remedial action selected in this ROD is intended to address contamination in soils, sediment, groundwater, and surface water impacted by the release of hazardous substances from the Site. EPA does not contemplate further remedial action for the Site if the cleanup requirements in this ROD are achieved.

V. SITE CHARACTERISTICS

A. Surface Water

The Site is flat with a gentle slope towards the south and southeast. Surface water from the Site drains towards the Delaware River. The Delaware River provides drinking water for the City of Philadelphia through the Baxter Water Intake and several municipalities in New Jersey through the Delran Water Intake (*see* Figure 2). The river and its adjacent estuary also serve as habitat to numerous aquatic species, including the endangered Shortnose Sturgeon.

Surface elevation at the Site is approximately 10 feet above Mean Sea Level ("MSL") which is the expected height of water during a 100-year flood. Most of the southern area is within the 100-year floodplain (*see* Figure 2).

Baxter Water Intake: The Samuel S. Baxter Water Treatment Plant (formerly known as Torresdale until 1982) is located at 9001 State Road in the Torresdale section of Philadelphia. The plant is operated by the Philadelphia Water Department. Although the plant and its water supply intake are upstream of the Site, EPA concluded its presence was important based on the possibility that PCBs from the Site may reach the intake when tides in the Delaware River

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backwash against the river current. Dye studies have demonstrated that tides in the Delaware River can transport detectable amounts of contaminants as far as 6 miles upstream from its point of release. The main intake, which has been in operation since 1966, is approximately 2.2 miles[1] from the Site. An emergency intake, which has been in operation since the completion of the plant in 1909, is located approximately 1.9 miles from the Site. The emergency intake becomes operational for several days a year when the main intake is forced to be shut off. This occurs when freezing temperatures cause ice blockages at the intake gates or when a raw water storage basin adjacent to the intake undergoes maintenance.

The Baxter Water Intake obtains water directly from the Delaware River and supplies drinking water to the eastern half of the City of Philadelphia as far west and north as the Schuylkill River, bordering Roberts Avenue and Tabor Road. EPA estimates the population served by the Baxter Water Intake to be over 1 million people.

While the raw water from the river undergoes a series of standard water treatments (such as chlorination, flocculation, sedimentation and filtration), the plant does not have special equipment to remove PCBs. Additionally, the plant is not required to analyze for PCBs as part of its routine water quality control testing program.

Delran Water Intake: This intake is approximately two miles north of the Site, located across from the Baxter Water Intake at the intersection of Taylor Lane and the Delaware River in Delran, New Jersey. As part of the Tri-County Water Supply Project being built to reduce pumping and overburdening of New Jersey's groundwater aquifer, the intake will supply additional drinking water for Burlington, Camden and Gloucester counties. The intake and a new treatment plant have been in operation since the spring of 1996. Samples collected in 1989, during the design phase of the project, did not detect PCBs. Design studies also demonstrated that floatation markers released into the Delaware River washed three miles upstream.

B. Geology

Historical aerial photographs have shown that most of the southern area of the Metal Bank property was part of the Delaware River prior to 1950. This area was gradually filled in from 1950 to 1967. Approximately 15 feet of fill underlies the Site. The fill materials contain pieces of brick, lumber, cloth, metal, and concrete along with natural earth materials (sand, silt, gravel, etc.). The United States Department of Agriculture Natural Resource Conservation Service has not classified the soils on the property and other similar areas in Philadelphia County because identification of these reworked soils is not practical.

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1 The RI/FS, HRS, and other documents in the Administrative Record include various measures of the distance of the intake from the Site, including 1.2 miles. Based on comments received during the public comment period, EPA further researched this issue and information on the emergency intake location. The ROD includes the correct information.

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The Site is located near the western edge of the Atlantic Coastal Plain Physiographic Provence. The fall line boundary between the Atlantic Coastal Plain Physiographic Provence and the Piedmont Physiographic Provence is less than one mile to the northwest. Basement rocks beneath the Site are composed of a complex assemblage of Paleozoic crystalline metamorphosed sedimentary and igneous rocks. These rocks outcrop at the fall line. The depth to the basement rocks increases towards the east. Cretaceous sediments of the Raritan formation are unconformably overlying the basement rocks. A residual clay layer may separate the Raritan Formation from the underlying bedrock.

SITE GEOLOGY

Depth (feet)	Material
0 - 21	FILL
7 - 16	WATER LEVEL
30 - 50	ALTERNATING SAND & CLAY LAYERS
50	BEDROCK

The Raritan formation is composed of nonmarine clays, sands, and gravels. The lowermost Farrington Sand member of the Raritan is the only member present beneath the Site. The Farrington Sand member consists of yellowish gray to pale yellowish brown coarse sand and fine gravel which grade upward into medium to fine-grained sands. The thickness of the Farrington Sand member has been mapped to be around fifteen feet at the Site. The Farrington Sand member is continuous beneath the Delaware River. Cretaceous fluvial, estuarine Van Sciver Lake beds of the Trenton Gravels unconformably overlie the Farrington Sand member at the Site. The Van Sciver Lake beds consist of interbedded quartz sand and silts. This unit is between ten to fifteen feet thick at the Site. The Van Sciver Lake beds on the Pennsylvania side of the Delaware River are separated from those in New Jersey by Holocene clays beneath the river. The uppermost unit beneath the Site consists of recent fill material.

C. Hydrogeology

Generally, an unconsolidated and a bedrock aquifer are present at the Site. The unconsolidated sediments of the Farrington Sand member of the Raritan Formation, the Van Sciver Lake beds, and the fill material are in direct communication with each other at the Site. None of the potentially confining clay layers of the Raritan Formation appear to be present. No boreholes at the Site were drilled to bedrock. Therefore, the degree of connection between the deeper bedrock aquifer and the overlying unconsolidated aquifer is unknown. Depth to groundwater beneath the Site varies from seven to sixteen feet. Shallow ground water at the Site flows southward across the Site and discharges to the Delaware River. Based on regional well records, groundwater within the bedrock formation also flows towards the southeast. Vertical flow directions and the degree and direction of underflow beneath the Delaware River is unknown. The Raritan Formation is a major source of groundwater on both sides of the river.

The RI/FS estimated the range of hydraulic conductivity at the Site to be from 1.98×10^{-4} to 9.53×10^{-2} centimeters per second ("cm/sec"). This range was attributed to the different types of fill materials found on-site. Based on this hydraulic conductivity, the theoretical discharge into the river is between 0.09 to 1.44 feet per day or 0.016 to 0.043 cubic feet per second ("cfs").

D. River Tide

Tidal monitoring was conducted during the RI/FS to determine the degree of influence tides in the Delaware River have on the water levels at the Site. The tidal cycle in the Delaware River reaches maximum and minimum water levels every 12 hours. Water levels in monitoring wells MW4 and MW5, which are located near the shoreline, showed fluctuations similar to the tidal cycle. The remaining wells showed more limited or no river influence. The rate of fluctuation is expected to be influenced in part by the nature of fill material at the well location and the distance from the shoreline.

E. Extent of Contamination

This section summarizes analytical data collected during the RI/FS and information provided in or researched in response to comments received during the public comment period. Historical data, which may not have been included in the RI/FS, have been used in some instances to provide a more complete characterization of the extent of contamination at the Site. Documents have been included in the Administrative Record, as necessary, to support the use of these data.

Four areas of environmental concern have been identified at the Site (*see* Figure 3):

- the "Building Area," which includes the six buildings on the northern portion of the Metal Bank property;
- the "Courtyard," which is a open area adjacent to several of the buildings on the northern portion of the property;
- the "Southern Portion" of the property, which is an approximately six acre open area where the former transformer salvage operation was conducted;

UNITS OF MEASUREMENT

To provide continuity and ease of comparison, units of measurement in this document will be presented in parts per million ("ppm") or parts per billion ("ppb"), unless otherwise specified. One ppm is the equivalent of 1000 ppb. These units may differ from those used in the various reports for the Site (*e.g.*, RI/FS). Units typically used in these reports are as follows:

MEDIA	UNITS
solids (*i.e.*, soils, sediments)	mg/kg
water and groundwater	μg/l
concrete chips/dust	mg/kg/100cm^2
fish tissue	μg/g

Listed below are the respective conversion unit equivalents.

ppm = mg/kg, μg/g, ng/mg, pg/ug, mg/L, μg/mL, or ng/uL

ppb = μg/kg, ng/g, pg/mg, μg/L, ng/mL, pg/uL

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this area includes an underground storage tank buried inside a non-aqueous phase liquid area ("NAPL Area") where residual oil is suspected and where PCB "hot spots" have been identified; and

- the "River Sediment Area" along the shoreline of the Southern Portion of the property. This area includes the "Mudflat Area", the "Riprap Area", and the "Delaware River Sediment Area" shown in Figure 3.

DEFINITIONS OF PCBs, PAHs & TPHs

Polychlorinated Biphenyls ("PCBs"): A class of 209 individual chlorinated hydrocarbon compounds ("congeners") that contain a variable number of substituted chlorine atoms on the biphenyl ring. PCBs are man-made chemicals and classified as suspected human carcinogens based on scientific data from laboratory animals. PCBs are frequently identified through commercial mixture designations ("Aroclors") because it is less costly than analysis of individual congeners.

Polynuclear or Polycyclic Aromatic Hydrocarbons ("PAHs"): A group of Semi-Volatile Organic Compounds ("SVOCs") composed of two or more benzene rings. They are commonly found at gas manufacturing plants, wood preserving sites that used creosote or petrochemical waste sites. PAHs have also been found in fuel products such as heating oil, diesel fuel and No. 6 fuel oil. EPA has identified 16 PAHs as priority pollutants. Some of the four, five and six-ring PAHs such as chrysene, benzo[a]pyrene and indeno[1,2,3-cd]pyrene have been shown to be carcinogenic to animals. The two and three-ring PAHs, such as acenaphthene, acenaphthylene, anthracene, fluoranthene, fluorene, phenanthrene, and pyrene have been observed to have adverse non-carcinogenic health effects in animals.

Total Petroleum Hydrocarbons ("TPHs"): A measurement of the concentration of petroleum hydrocarbons in a given amount of air, soil, or water. The term "total" is a misnomer, in that procedures for quantifying hydrocarbons are not capable of measuring all fractions of petroleum hydrocarbons present. In addition, volatile hydrocarbons are usually lost during the analysis while some non-petroleum hydrocarbons may be accidentally included.

The maximum concentration of contaminants observed for surface water, groundwater, surface and subsurface soils, and river sediments has been summarized below. Tables presenting these data also identify the screening levels that were considered in determining whether a contaminant would be included in the quantitative risk assessment. These tables are based on data presented in the RI/FS and data from split samples taken by EPA. This section also discusses data collected in the buildings and the results of biological monitoring at the Site.

1. Building Area

The Building Area consists of six buildings. Buildings 2, 3, and 4 are on the northernmost end of the Site. Buildings 5, 6, and 7 comprise one large structure and are immediately south of Building 4. Building 7 is a large storage warehouse which contains railroad tracks that may have transported the PCB transformers, based on the location of PCBs in elevated concentrations near the track. Buildings 7

Table 1 - Total PCBs in Buildings

Building	Total PCBs (ppm)
2	9.7
5	12
6	19
7	372

and 2 were also used as part of the groundwater recovery and treatment system between 1983 and 1989. All that remains of Building 1, which was demolished in 1984, is an asphalt slab that occupies a portion of the Courtyard area. All the buildings are now empty and in advanced stages of disrepair. Buildings 3 and 4 were considered unsafe to enter. Since Buildings 3 and 4 were reportedly office structures and never used for PCB-related activities, these buildings were not sampled.

Twenty-five PCB samples were taken inside Buildings 2, 5, 6 and 7 between 1991 and 1993. Most samples were chips from stained areas on the building floors and on the masonry walls where spills were suspected to have occurred. PCB contamination occurred randomly throughout all the buildings. The highest level of PCBs (372 ppm) was found in a dust sample (B7-5) collected under a railroad track in Building 7.

2. Surface Water

A limited attempt was made during the RI to characterize the potential movement of PCBs from the Metal Bank property into the Delaware River. In 1991, standing water samples were collected from three locations in the Mudflat Area and analyzed for PCBs and pesticides. No PCBs were detected in these samples. Two pesticides, 4,4'-DDE and Endosulfan I were detected at one location at concentrations of 0.02 and 0.05 ppb, respectively. Because of the limited surface water data available, EPA completed the risk assessment for surface water at the Site by using groundwater contaminant concentrations multiplied by a dilution factor of 3,100:1. This dilution factor represents the surface water concentration that would result if an average volume of groundwater discharged from the Metal Bank property and mixed with river water within 50-feet of the shoreline under low flow conditions. Using this dilution factor, none of the Site-related contaminants exceeded EPA's criteria for protection of freshwater aquatic life.

Stormwater Sewer: No floor drains, pipes and other low spots were identified where PCBs may have accumulated and been discharged into the stormwater sewer. The stormwater basin located near monitoring well MW13 may be connected to a sewer line located under Cottman Avenue, which eventually discharges at the City's stormwater outfall and into the Mudflat Area. City maps do not show connections made by private parties before the 1980's.

3. Groundwater

In 1991, fifteen new monitoring wells were installed as part of the hydrogeologic investigation for the RI. Seven wells were sampled in 1991 and fifteen in 1992. While analysis of each sample varied, the parameters measured generally included VOCs, SVOCs, PCBs, pesticides and metals. Table 2 presents the maximum groundwater concentration detected for contaminants used in the human health risk assessment and the Region III risk-based screening level for tap water[2] as a point of reference.

PCBs were detected in groundwater samples collected from monitoring wells MW6 and MW7. Concentrations of total PCBs in MW6 were 12.3 and 25.6 ppb during the 1991 and 1992 samplings, respectively. Total PCBs of 1.3 ppb were detected in MW7 during the 1992 sampling.

The total concentrations of VOCs and SVOCs found at each monitoring well during the 1992 sampling are presented in Figures 4 and 5. These figures show the possibility that some groundwater contamination may reach the Site from upgradient sources. No monitoring wells were located off-site in the upgradient direction during the RI.

Table 2 - Groundwater Contaminant Concentrations

Contaminant	Maximum (ppb)	Screening Level (ppb)
Arsenic	67	0.038
Chromium	102	180
Total PCBs	25.6	0.0335
Acenaphthene	110	2,200
Anthracene	58	11,000
Benz[a]anthracene	160	0.092
Benz[b]fluoranthene	120	0.092
Benzo[a]pyrene	64	0.0092
Chrysene	79	9.2
Dibenz[ah]anthracene	12	0.0092
Fluoranthene	200	1,500
Fluorene	95	1,500
Indeno[1,2,3-cd]pyrene	38	0.092
Naphthalene	780	1,500

Non-Aqueous Phase Liquid (NAPL): In 1991, a sample was collected in the oil layer found floating on the groundwater in MW6. The PCB concentration in the oil sample was 1,090 ppm. During the 1992 sampling of MW6, the sampling technique used is likely to have disrupted any oil layer that may have been present. Only 7 ppb was detected in the oil layer while EPA's split sample detected 183 ppb. A bailer rather than a tube and low-yielding pump was used to purge the wells. Use of the bailer is likely to have dispersed any oil layer that may have been present and may have resulted in lowering the PCB levels in the oil. Previous PCB concentrations measured in the oil layer present at the Site were 1,539 ppm in 1977 prior to the oil recovery operation and 1,540 ppm in 1989 when the oil recovery operation was being terminated.

DNAPLs: PCB levels in the oil layer samples from the Site have historically been greater than those in water samples. When PCBs are released into the environment through transformer oil spills, they usually bond to the oil and float on top of the water table because the specific gravity of oil (0.8) is lighter than water (1.0). This oil layer is known as the Light Non-Aqueous Phase Liquid ("LNAPL") layer. However, the specific gravity of PCBs themselves are heavier than

2 The screening levels presented in the ROD are those used in the final risk assessment for the Site and are based on the EPA Region III Risk-Based Concentration ("RBC") Table dated February 9, 1995. Because the cancer slope factor for PCBs has been revised, the current PCB screening levels from the RBC Table dated March 17, 1997 are used.

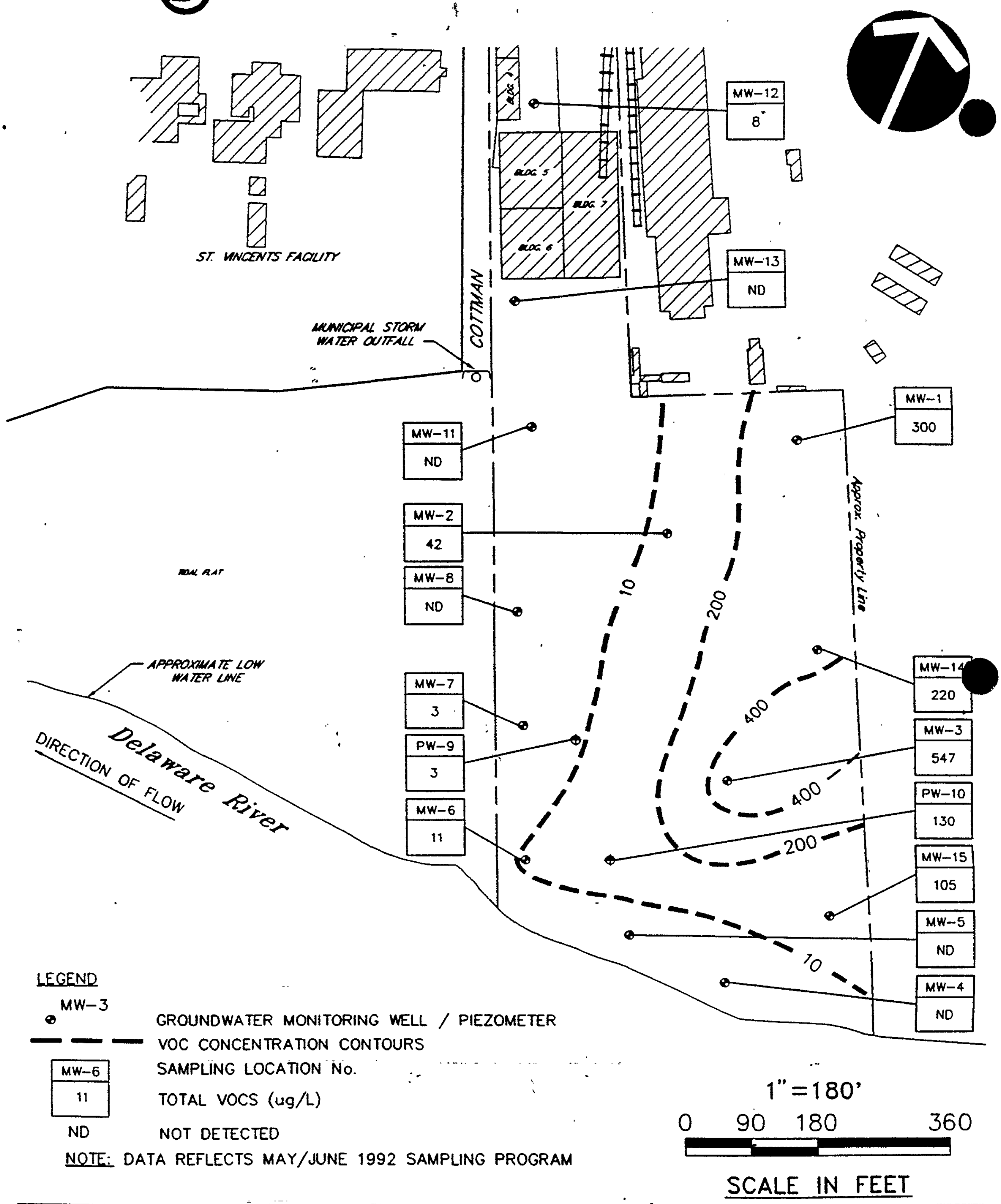

Figure 4 - Total VOCs in Groundwater

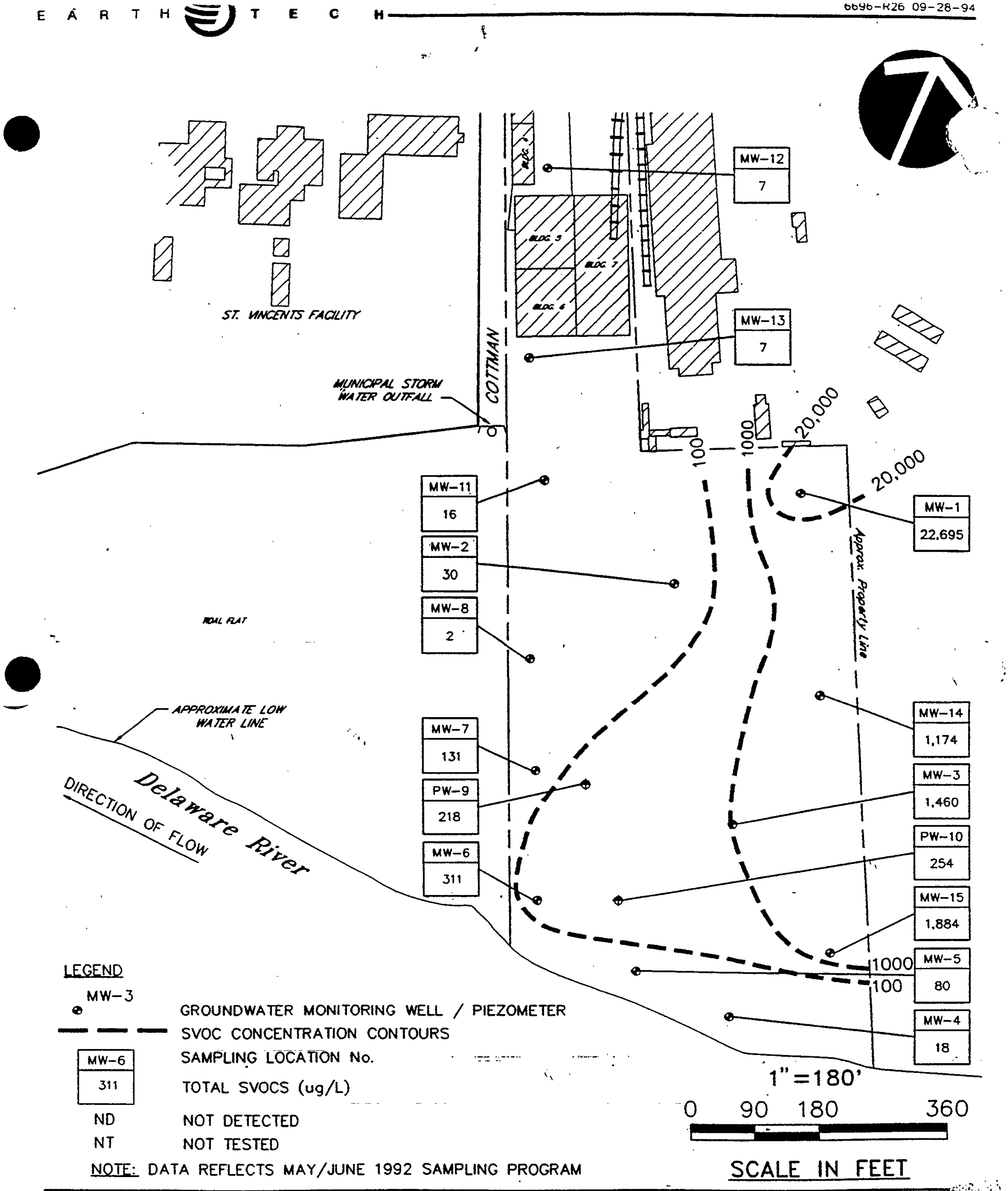

Figure 5 - Total SVOCs in Groundwater

water (between 1.18 to 1.57) which may cause PCBs to sink in the aquifer until an impermeable layer such as clay or a bedrock formation is encountered. This condition is known as the Dense Non-Aqueous Phase Liquid ("DNAPL") layer. At this phase, gravity dictates the flow of DNAPLs rather than the movement of oil. During the subsurface soil sampling performed during the RI, PCB concentrations were occasionally observed to be increasing with depth (*see* Table 6). None of the monitoring wells constructed at the Site were screened in the portion of the aquifer at the bedrock interface. Therefore, the presence or absence of a DNAPL layer was not confirmed.

Groundwater Seeps: Samples were collected from two locations in the river bank along the southern portion of the Site where seeps were observed. These samples were analyzed for PCBs, pesticides, and several metals. Table 3 presents the maximum concentrations observed for contaminants that exceeded Region III risk-based human health screening levels for tap water.

Table 3 - Groundwater Seep Concentrations

Contaminant	Maximum (ppb)	Screening Level (ppb)
PCBs (Aroclor 1254)	3.7	0.73
4,4'-DDD	0.68	0.28
4,4'-DDE	2.3	0.2
Dieldrin	0.1	0.0042
Manganese	621	180

4. Surface Soils

Courtyard: In 1991, soil samples were collected and analyzed for PCBs in the Courtyard near the entrance to Building 2 and near the railroad tracks entering Building 7. Two samples were collected at each location--one from the top six inches and one from 6 - 24 inches. PCBs were detected in the top six inches at concentrations of 52 ppm near Building 2 and 140 ppm near Building 7. At the lower depth, PCBs were not detected in Building 2 and were detected at 6.5 ppm at Building 7. In 1993, additional soil sampling was conducted in the Courtyard. Samples were analyzed using a field screening technique with laboratory confirmation of 20% of the samples. Thirty-seven locations were sampled at a depth of 0 - 2 feet. An additional sample was collected at a depth of 2 - 4 feet, where possible, at locations that had greater than 5 ppm of PCBs in the surface sample. At 28 of the 37 locations, the field screening results indicated that PCB concentrations were less than 5 ppm. Samples from four of these locations were sent to the laboratory for analysis and concentrations were below detection limits for three samples and 0.43 ppm for the fourth. At two locations, the field screening results indicated PCBs were present at concentrations between 5 - 10 ppm at a depth of 0 - 2 feet and less than 5 ppm at a depth of 2 - 4 feet. Laboratory confirmation samples from the 0 - 2 foot depth at these locations detected PCBs at 0.46 and 8.1 ppm. Field screening results at the remaining seven locations indicated that PCBs were present at greater than 50 ppm at the 0 - 2 foot depth and at less than 5 ppm at depths of 2 - 4 feet. Two laboratory confirmation samples from the 0 - 2 foot depth at these locations had PCB concentrations of 1.1 and 70 ppm. One confirmation sample from the 2 - 4 foot depth detected PCBs at 0.97 ppm. Based on the field screening, an area approximately 100 x 50 feet immediately north of Buildings 5 and 7 was delineated as potentially exceeding 50 ppm.

Southern Portion: In 1989, one to two feet of soil was placed over the Southern Portion of the Site. As part of the RI, sixteen soil samples were collected from the 0 - 2 foot depth in this portion of the property to characterize this cover material. All the samples were analyzed for PCBs and pesticides and five samples were also analyzed for metals and SVOCs. Table 4 presents the maximum soil concentrations observed and the Region III risk-based screening level based on incidental ingestion of soil on a property being used for industrial purposes.

5. Subsurface Soils

In 1991, samples were collected at various depth intervals from soil borings at 23 locations. All samples were analyzed for PCBs and one sample from each boring was analyzed for metals and SVOCs. Thirteen samples were also analyzed for VOCs, dioxins and furans. In 1993, samples from various depths in eight additional borings were collected. Samples from five borings located in the vicinity of borings B-17 and B-18 from the 1991 sampling were screened for PCBs in the field and submitted for laboratory analysis for lead and VOCs. One sample from each of these five borings was also submitted for PCB laboratory analysis. The three remaining borings were located in the central and northeastern portion of the Metal Bank property. All samples were submitted for PCB, VOC and lead laboratory analysis. One composite sample from each boring was analyzed for SVOCs.

Table 4 - Surface Soil Contaminants (Southern Portion)

Contaminant	Maximum (ppm)	Screening Level (ppm)
Arsenic	6.8	3.3
Beryllium	1.1	1.3
Chromium	57.4	10,000
Total PCBs	4.7	2.86
Acenaphthene	0.052	120,000
Anthracene	0.34	610,000
Benz[a]anthracene	1.2	7.8
Benz[b]fluoranthene	1.4	7.8
Benzo[a]pyrene	1	0.78
Chrysene	1.1	780
Fluoranthene	2.7	82,000
Indeno[1,2,3-cd]pyrene	0.56	7.8
Pyrene	2.2	61,000

In August 1995, during the public comment period on the Proposed Plan, the PRP Group requested the opportunity to excavate test pits and collect additional soil samples from the southern portion of the Metal Bank property. EPA allowed the additional sampling and samples were collected and analyzed for PCBs from 14 test pits.

In addition to the above parameters, many samples were analyzed for total petroleum hydrocarbons ("TPH"). Although high PCB levels were observed in oily samples, the TPH measurements were not found to correlate well with the presence of PCBs. The TPH data is

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useful in identifying areas where oil may have been spilled, however, specific analysis for PCBs is necessary to quantify potential PCB contamination. Table 5 presents the maximum concentrations of other contaminants detected in the subsurface soils samples as well as the Region III risk-based screening levels associated with incidental ingestion of soil from a property being used for industrial purposes. Table 6 summarizes the total PCB concentrations detected in the soil boring and test pit samples. Data in parentheses are field screening results. Figure 6 shows the locations of the soil borings and test pits. The locations that are underlined are those that had at least one sample with a concentration of 25 ppm or higher total PCBs. The highest levels of PCBs were found in the southwest portion of the Metal Bank property. This corresponds with the groundwater results which were also highest in this portion of the Site.

Table 5 - Subsurface Soil Contaminants

Contaminant	Maximum (ppm)	Screening Level (ppm)
Antimony	123	820
Arsenic	21.1	3.3
Beryllium	8.2	1.3
Cadmium	31	1,000
Chromium	2,730	10,000
Lead	227,000	—
Total PCBs	230	2.86
Acenaphthene	53	120,000
Anthracene	77	610,000
Benz[a]anthracene	140	7.8
Benzo[b]fluoranthene	110	7.8
Benzo[k]fluoranthene	110	78
Benzo[a]pyrene	140	0.78
Chrysene	130	780
Dibenz[ah]anthracene	8.2	0.78
3,3'-dichlorobenzidine	37	13
Fluoranthene	220	82,000
Fluorene	93	82,000
Indeno[1,2,3-cd]pyrene	83	7.8
Naphthalene	270	82,000
Pyrene	280	61,000
2,3,7,8-TCDD (dioxin)	0.004	0.00004

6. Sediments

Sediment samples were collected from different portions of the aquatic environment surrounding the Metal Bank property. Samples were collected from the mud flat immediately west of the property which is exposed during low tide; samples were collected from the rip rap bank along the west and southwestern perimeters of the property; samples were collected from the river immediately beyond the low water line; and samples were collected at depths ranging from the surface to ten feet from borings located in the river at distances of up to 300 feet from the low water line.

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Table 6 - PCBs in Subsurface Soils (Southern Portion)

Boring	Total PCBs (ppm)	Depth (feet)
B-1	1.7	3
	28	10.5
B-2	0.9	2
	1.1	6
B-3	0.2	2.5
B-4	10.2	2
	2.5	5.5
B-5	5.1	2
	0.7	5.5
	4.8	9.5
B-6	0.3	6
B-7	1	3
	4.7	6.5
B-8	4.2	2.5
B-9	0.4	6.5
	6.6	14.5
B-10	29	8
	11.7	10
	0.4	14
B-11	1	2.5
	0.2	6
B-12	3.1	1
B-13	0.6	5.5
	0.8	11
B-14	3.2	3
	18.2	10.5
	9.1	12.5

Boring	Total PCBs (ppm)	Depth (feet)
B-15	5	8.5
B-16	3.9	5.5
	0.4	11.5
B-17	26	3
	42	6.5
	3	12.5
B-18	0.1	8
	1	10
	3.2	12
	7.5	14
B-19	3.6	3
	6.3	6.5
B-20	13.7	6
	3.6	8
	0.4	16
B-21	25	3
	6.5	6.5
	8.7	14.5
B-22	2.8	6
	6.6	8
	0.3	14
B-23	7	3
	7.8	8.5
	4.7	10.5
B101	(10-50)	6
	5.3	8
	(<5)	10

Boring	Total PCBs (ppm)	Depth (feet)
B102	24.6	10
B103	(10-50)	8
	(5-10)	11
	0.8	15
B104	(10-50)	10
	(10-50)	12
	7.3	14
B105	(10-50)	8
	(10-50)	10
	3.7	12
	12	14
	12	16
B106	1.8	6
	5.5	10
	(10-50)	12
	15	14
B107	1.8	6.0
	1.4	8.0
	0.8	12.0
	1.1	14.0
TP-1	22	10
	10	12
TP-4	36	5
	45	10
	50	11.5
TP-8	2	15
TP-9	35	5

Boring	Total PCBs (ppm)	Depth (ppm)
TP-12	4.4	5
	7.7	10
TP-T-1	108	5
	10.5	10
	57	15
TP-T-2	230	5
	150	10
	77	12
TP-T-3	0.77	5
	0.87	15

Concentrations potentially ≥ 25 ppm are shaded.

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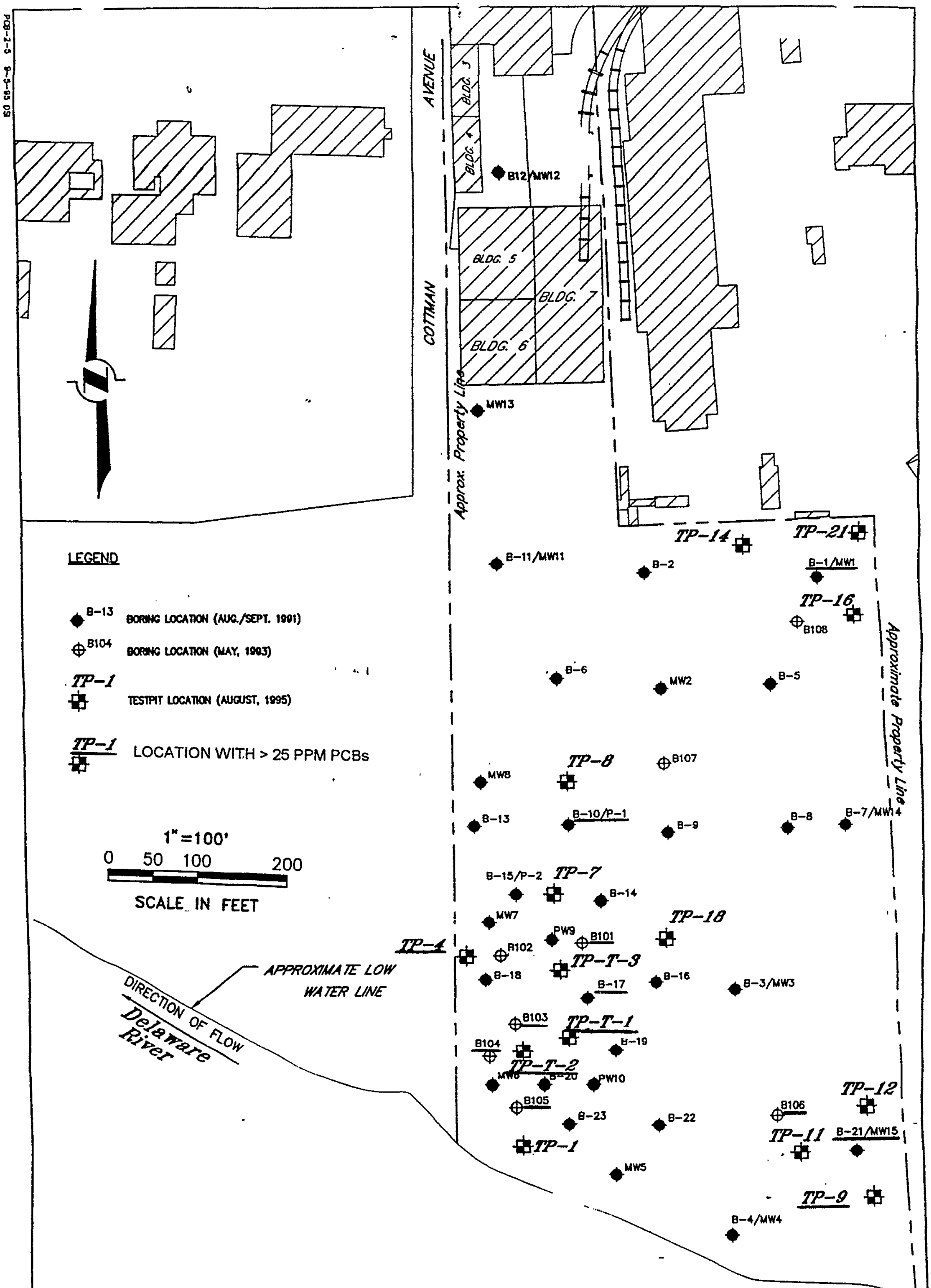

Figure 6 - Soil Boring/Test Pit Locations with Total PCBs ≥ 25 ppm

Mudflat Sediment: In 1991, sediment samples were collected at twelve locations in the mudflat and analyzed for PCBs, pesticides, and SVOCs. Samples were again collected at six of the locations and analyzed for PCBs (including PCB congeners) during a subsequent benthic organism survey. One additional sediment sample was collected just below the low water line at the downstream edge of the mud flat and analyzed for PCBs, pesticides, SVOCs, and metals. In 1993, 35 samples were collected from the mud flat using a 60 x 40 foot grid pattern. All the samples were field screened for PCBs. Eight samples were sent to a laboratory for PCB and SVOC analysis.

Table 7 - Total PCBs in Mudflat Sediments

Sample	PCBs (ppm)	Sample	PCBs (ppm)
MF-3	1.1	MF113	(1-5)
MF-5	2.1	MF114	(1-5)
MF-10	1.1	MF115	(1-5)
MF-11	1.2	MF116	(1-5)
MF103	(1-5)	MF117	(1-5)
MF104	(>5)	MF118	(1-5)
MF106	(>5)	MF127	2.7
MF107	19.6	MF128	(1-5)
MF108	(1-5)	MF129	(1-5)
MF109	(1-5)	MF130	(1-5)
MF112	(1-5)		

Mudflat sediment samples with total PCB concentrations greater than one ppm are listed in Table 7 along with the maximum concentration observed at that location. Figure 7 shows the mud flat sampling locations. Those locations which had at least one sample with total PCB concentrations greater than one ppm, the target cleanup level, are underlined.

Riprap Sediment: Sediment samples were collected at five locations along the property shore at or near the high-tide line. The shoreline area is largely paved with stone, brick, and concrete riprap. Samples were collected from three locations along the western property line (RR-1, RR-2, and RR-3). At two of these locations (RR-2 and RR-3), three samples were collected at six inch depth intervals (*i.e.,* 0-6"; 6-12"; and 12-18"). Samples from these same depth intervals were also collected at the southwest corner of the property (RR-4). A single sample was collected from a location approximately midway along the southern property line (RR-5). All samples were submitted for laboratory analysis for PCBs, pesticides, and SVOCs. Two samples were also analyzed for dioxins and furans.

PCBs were detected at two sampling locations along the western property line. At RR-2, which is located approximately midway along the western shoreline, total PCB concentrations of 2.2 and 2.34 ppm were detected at the 0-6" and 6-12" depths, respectively. At RR-3, which is located midway between RR-2 and the southwest corner of the property shoreline, total PCB concentrations of 6.5, 5.9, and 14 ppm were detected at the 0-6", 6-12", and 12-18" depths, respectively.

River Sediment: In 1991, sediment samples were collected from three transects along the southern property shoreline. Four additional transects were sampled in 1993. The number of

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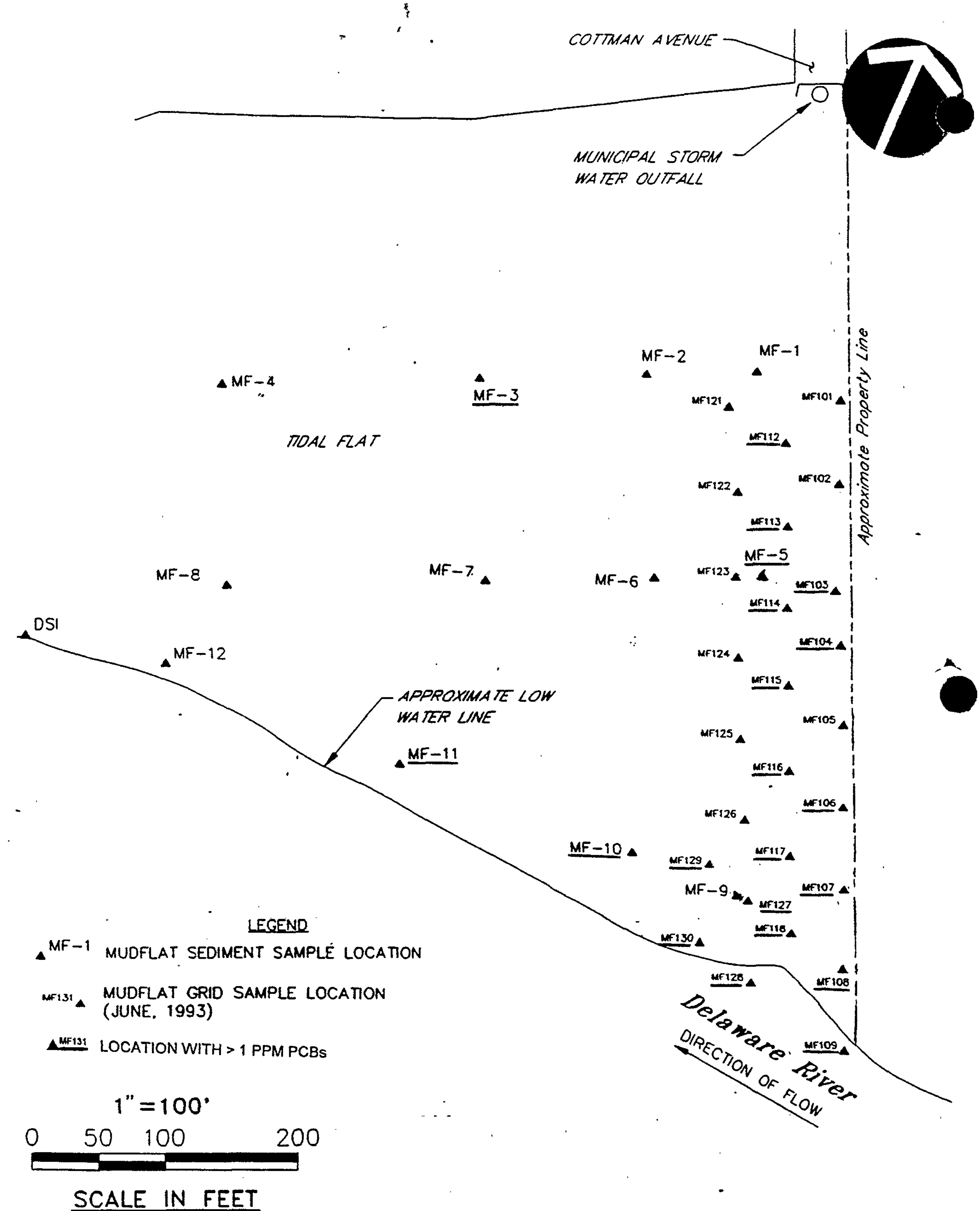

Figure 7
Mudflat Sediment Sampling Locations with Total PCB Concentrations ≥ 1 ppm

samples in these transects ranged from two to four with the first samples being collected near the low water line and the remaining samples being collected further out into the river. All 1991 transect samples were analyzed for PCBs and pesticides. Two samples collected from the transect just upstream of the Metal Bank property line were analyzed for SVOCs and metals. Samples from two of the 1993 transects were analyzed for PCBs and SVOCs. Samples from the other two transects were only analyzed for SVOCs.

Table 8 - Total PCBs in River Sediments

Sample	PCBs (ppm)	Sample	PCBs (ppm)
DR-8	6.8	S5	1.2
MF110	(1- 5)	S6	1.3
MF111	(1-5)	S7	1.7
MF131	(1-5)	S8	1.3
MF132	(1-5)	S9	1.2
MF133	2.3	S16	1.5
MF134	(>5)	S20	4.6
MF137	(1-5)	S21	1.5
MF138	(1-5)	S22	1.6
MF139	(>5)		

Eight additional samples were collected below the low water line along the southwestern shoreline and south of the mud flat area. These samples were field screened for PCBs with 20% of the samples sent for laboratory confirmation. In 1995, further sampling was conducted to characterize PCB levels in sediments extending further into the river and to evaluate the distribution of PCBs with depth. Samples were collected at depth from 0 - 10' at 26 boring locations. All samples were submitted for laboratory PCB analysis.

Figure 8 shows the river sediment sampling locations associated with the various sampling events. Locations where PCBs were detected at 1 ppm or greater are underlined. Table 8 presents the maximum PCB concentration found at each of these locations. Field screening results are presented in parentheses.

SVOCs, Pesticides, and Metals: Table 9 presents the maximum concentrations of SVOCs, pesticides, and metals detected in sediment samples collected at the Site for contaminants that exceed the Region III biological screening levels for the protection of sediment fauna. These screening levels provide a conservative guideline for the evaluation of sampling data at Superfund sites and are based upon the lowest value from a combination of sources considered to be protective of the most sensitive organisms in a medium. Sources include peer reviewed literature, regulatory agency criteria, and technical experts from federal agencies.

7. Fish and Other Living Organisms ("Biota")

In 1991, Asiatic clams (*Corbicula*) were collected at five sediment sampling locations in the mud flat area. Total PCB concentrations in *Corbicula* tissue derived by summing the PCB congener analytical results ranged from 0.23 to 1.03 ppm.

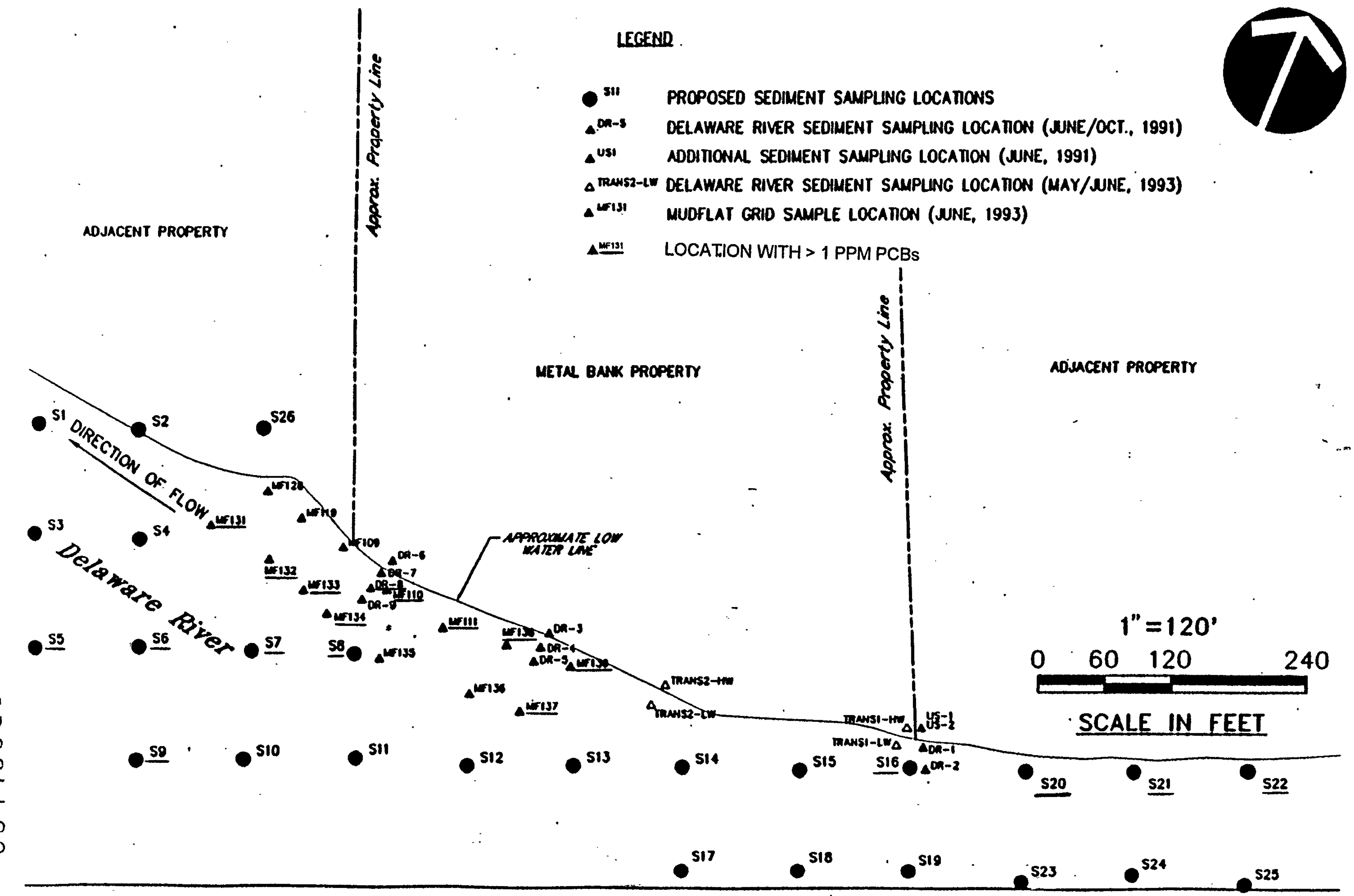

Figure 8 - River Sediment Sampling Locations With Total PCBs ≥ 1 ppm

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In 1993, fish samples were collected from the Delaware River in areas near the shoreline where water depths ranged from 3 to 20 feet. Nine whole body catfish samples were analyzed for PCBs with results ranging from 1.08 to 4.0 ppm. Total PCB concentrations in ten catfish fillet samples ranged from 0.41 to 1.48 ppm. Thirteen whole body silvery minnow samples had total PCBs ranging from 0.55 to 2.8 ppm. The Region III risk-based screening level for human consumption of fish containing PCBs is 0.00041 ppm.

The Commonwealth of Pennsylvania presently has an advisory in effect warning against the consumption of catfish, white perch, and American eel from the Delaware River due to elevated concentrations of PCBs and chlordane. The advisory extends from Burlington Island to Tinicum Island, and includes the Site area.

VI. RISK ASSESSMENT

Based on the data provided in the Remedial Investigation, analyses were conducted to estimate the human health and environmental hazards that could result if contamination at the Site is not cleaned up. EPA completed the human health risk assessment at this Site. To evaluate environmental impacts, EPA, with the aid of Fish and Wildlife Service performed the terrestrial risk

Table 9 - Sediment Contaminants

Contaminant	Maximum (ppm)	Screening Level
Arsenic	290	8.2
Cadmium	10.8	1.2
Copper	695	340
Lead	2,030	46.7
Mercury	0.554	0.15
Nickel	35.2	20.9
Silver	490	1
Zinc	1,110	150
4,4'-DDD	0.31	<0.016
4,4'-DDE	0.34	0.0022
4,4'-DDT	0.016	0.00158
2,4-Dimethylphenol	19	0.029
4-Methylphenol	26	0.067
Acenaphthene	67	0.016
Acenaphthylene	11	0.044
Anthracene	69	0.0853
Benzo(a)anthracene	60	0.261
Benzo(a)pyrene	46	0.43
Benzo(b)fluoranthene	38	3.2
Benzo(g,h,i)perylene	19	0.67
Bis(2-ethylhexyl)phthalate	1,900	1.3
Chrysene	17	0.384
Dibenz(a,h)anthracene	1.6	0.00634
Fluoranthene	27	0.6
Fluorene	76	0.019
Indeno(1,2,3-cd)pyrene	66	0.6
Naphthalene	53	0.16
Phenanthrene	67	0.24
Pyrene	130	0.665

assessment, while NOAA conducted the aquatic risk assessment.

Actual and threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, and the environment.

A. Human Health Risk Assessment

Contaminants which exceeded risk-based screening levels developed by EPA Region III were included in the Site-specific Baseline Human Health Risk Assessment. The primary contaminants posing a potential human health risk at the Site are PCBs. In addition, antimony, arsenic, beryllium, cadmium, chromium, 3,3'-dichlorobenzidine, PAHs, and dioxin were observed at levels of potential concern. To assure that the assessment was protective of human health overall, contaminants exceeding screening levels in one medium (*e.g.*, soils, sediments, groundwater) were assessed in all other media.

EPA identifies potential human health risks by estimating a carcinogenic risk level ("cancer risk") and a noncarcinogenic hazard index ("HI"). The National Oil and Hazardous Substances Pollution Contingency Plan ("NCP") establishes the acceptable range of carcinogenic risk at Superfund sites to be from one excess case of cancer per 10,000 people exposed to one excess case per 1,000,000 people exposed. Expressed as scientific notation, this carcinogenic risk range is between 1.0E-04 and 1.0E-06. Remedial action is warranted when the total estimated cancer risk from site contaminants to potentially exposed individuals exceeds 1.0E-04. However, since EPA's cleanup goal is generally to reduce the risk to 1.0E-06 or less, EPA also may take action where the risk is within the range between 1.0E-04 and 1.0E-06.

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (*i.e.*, the chronic daily intake) with the toxicity of the contaminant for a relatively similar duration of exposure (*i.e.*, the reference dose). The ratio of exposure to toxicity is called a hazard quotient. An HI is generated by adding the appropriate hazard quotients for contaminants to which a given population may reasonably be exposed. The NCP also states that sites should not pose a health threat due to a noncarcinogenic, but otherwise hazardous, chemical. If the HI exceeds one (1.0), concern for the potential noncarcinogenic health effects associated with exposure to the chemicals may exist. The HI identifies the potential for the most sensitive individuals to be adversely affected by the noncarcinogenic effects of chemicals. Generally, the greater the value of the HI above 1.0, the greater the level of concern.

The current zoning classification for the Site and the adjacent properties is Least Restricted Industrial which allows any lawful industrial use. Areas immediately beyond these properties are zoned as General Industrial, which include a broad range of industrial activities, along with some commercial areas. The nearest area zoned as Residential is approximately one-half mile from the Site beyond Interstate 95 and the railroad line, although some

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residential uses exist nearer the Site, including the St. Vincent's School. Based on the type of development that has occurred in the vicinity of the Site over the last decade, significant changes in land use are not expected to occur.

Based on the current and expected future use of the Site and surrounding areas, EPA identified the groups of individuals who could be potentially exposed to contaminants from the Site to include current and future off-site residents, future on-site industrial workers, future on-site construction workers, and current and future recreational boaters who fish near the Metal Bank property. Table 10 summarizes the potential cancer risks to these groups of individuals estimated in the final Baseline Human Health Risk Assessment. The hazard index for each group is less than one which indicates that Site contaminants do not pose an unacceptable noncarcinogenic risk.

TABLE 10: SUMMARY OF HUMAN HEALTH CANCER RISKS

EXPOSURE PATHWAYS	Off-site Resident	Industrial Worker	Construction Worker	Recreational Boater	
				Adult	Child
Ambient Air Inhalation	2.02E-06	4.42E-07	1.63E-06	NA	NA
Soil Ingestion:	NA			NA	NA
Courtyard surface soil		(6.77E-05) 1.76E-05	9.42E-06		
S. Portion surface soil		2.55E-06			
Building dust		3.86E-06			
Dermal Contact with Ground Water	NA	NA	6.37E-06	NA	NA
Dermal Contact with LNAPL	NA	NA	(6.00E-03) 1.56E-03	NA	NA
Surface Water Ingestion	NA	NA	NA	1.2E-10	5.97E-10
Dermal Contact with Surface Water	NA	NA	NA	3.41E-07	1.59E-07
Sediment Ingestion	NA	NA	NA	3.17E-06	7.24E-06
Fish Ingestion	NA	NA	NA	(2.62E-04) 6.79E-05	(1.53E-04) 3.96E-05
TOTAL	2.02E-06	(7.46E-05) 2.45E-05	(6.01E-03) 1.58E-03	(2.65E-04) 7.14E-05	(1.60E-04) 4.61E-05

NA - Not applicable

Subsequent to completion of the final Baseline Risk Assessment for the Site, EPA revised the cancer slope factor for PCBs from 7.7 kg·d/mg to 2.0 kg·d/mg. Because the

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potential risk from several exposure pathways resulted from PCB contamination, EPA reevaluated these pathways and the total cancer risk to relevant groups of individuals using the revised slope factor. The exposure pathways which made a significant contribution to the total cancer risk from PCB contamination include ingestion of Courtyard surface soil, dermal contact with LNAPL, and ingestion of fish. The cancer risks calculated using the revised PCB slope factor associated with these pathways are underlined in Table 10 and the cancer risks based on the PCB slope factor used for the 1995 Risk Assessment are presented in parentheses above the underlined values. The resulting change in the total cancer risk using the new PCB slope factor is also presented below the value from the final Baseline Human Health Risk Assessment, which is in parentheses.

Off-Site Residents: The potential route of exposure for off-site residents is inhalation of dust from Site surface soils. The potential cancer risk associated with this exposure pathway is calculated to be 2.02E-06, which is within the acceptable risk range and near the target cleanup goal of 1.0E-06. The change in the PCB slope factor does not affect this calculation. The people who would be potentially exposed would be adults and children living adjacent to the Site, such as those at the St. Vincent's School. No HI for noncarcinogenic risk was calculated since none of the Site-related contaminants have inhalation reference doses.

Future Industrial Workers: The potential cancer risk associated with future industrial employees working at the Site on a regular basis is estimated to be 2.45E-05 using the revised PCB slope factor, which is within the acceptable risk range, but exceeds the target cleanup goal of 1.0E-06. The primary route of exposure is incidental ingestion of contaminated soil, particularly soil in the Courtyard contaminated with PCBs. Incidental ingestion may occur when an individual eats food with hands that have been in contact with contaminated soils. Arsenic, beryllium, and chromium in surface soils in the Southern Portion of the property and PCB contamination in dust from the Building Area also contributed to the cancer risk associated with soil ingestion, but at substantially lower levels. Risk from exposure through inhalation of ambient air was calculated, but did not contribute significantly to the overall cancer risk. EPA did not consider future ingestion of groundwater from the Site as a realistic exposure pathway for future industrial workers since any future commercial tenants of the property are likely to use public water supplies. The HI for noncarcinogenic risk associated with ingestion of surface soils in the Southern Portion of the Site is 5.64E-03, which is substantially below the acceptable level of 1.0. No HI values were calculated for the remaining exposure pathways because appropriate reference doses are not available.

Future Construction Workers: The potential cancer risk to construction workers who spend one year working at the Site is estimated to be 1.58E-03 using the revised PCB slope factor, which exceeds the acceptable risk range. This risk is primarily from workers coming into contact with PCBs found in the oil layer floating on the groundwater at the Site. Other exposure pathways contributing to the risk are incidental ingestion of subsurface soil from the Southern Portion of the property, inhalation of ambient air, and dermal contact with groundwater. As with the industrial workers, ingestion of groundwater from the Site was not considered a viable exposure pathway. The HI for noncarcinogenic risks is 0.3, which is below the acceptable level of 1.0.

Recreational Boaters: The potential cancer risks to recreational boaters are estimated to be 7.14E-05 and 4.61E-05 using the revised PCB slope factor for adults and children, respectively. These risks are within the acceptable range, but exceed the target cleanup goal of 1.0E-06. The primary exposure route is consumption of fish caught in the Delaware River while boating. Other exposure pathways contributing to the overall cancer risk include ingestion of and dermal contact with surface water and incidental ingestion of sediments. The HI values for recreational boaters are 1.07E-03 and 9.98E-03 for adults and children, respectively, both of which are below the acceptable level of 1.0.

B. Aquatic Ecological Risk Assessment

The Metal Bank property is located adjacent to a three-acre tidal mudflat and the Delaware River. Both are sensitive freshwater ecological systems that provide permanent and seasonal habitat for numerous species of anadromous, catadromous, estuarine, and freshwater fish. To assess the impact from various Site contaminants, the Aquatic Ecological Risk Assessment ("Aquatic Assessment") for the Site identified potential receptors, contaminants of concern, and exposure pathways. Potential risks to receptors from Site contaminants were calculated in a manner similar to that used to estimate noncarcinogenic risk in the Baseline Human Health Risk Assessment. Levels of contaminants found in media (*e.g.*, sediment, groundwater, surface water) to which receptors could be exposed were compared to levels considered to be toxic based on research literature. If the ratio between the contaminant level observed and the toxicity level exceeds 1.0, the potential for an adverse impact exists.

Receptors: Receptors considered during the Aquatic Assessment to evaluate potential impacts from the Site include shortnose sturgeon, channel catfish, silvery minnow, white perch, and benthic invertebrates. The shortnose sturgeon has been designated an endangered species both federally and by the Commonwealth of Pennsylvania. Shortnose sturgeon live their entire life cycle in the Delaware River and are known to be present in the river reach that includes the Site during summer after spawning in upstream areas.

Channel catfish serve as a representative of a benthic freshwater fish species that feed on a variety of prey types and are likely to live in the river near the Site for some time. Channel catfish are also used as a surrogate species for the shortnose sturgeon. Silvery minnow are an important forage fish species that feed in shallow water areas, such as the mudflat next to the Site. White perch are an anadromous fish species that is abundant near the Site and recreationally important.

Benthic invertebrates, such as Asiatic clams (*Corbicula fluminea*), are present in the mudflat and Delaware River at the Site. The invertebrates were considered as a single group in the Aquatic Assessment. Benthic invertebrates may provide an important exposure pathway for higher trophic level fish and wildlife species that feed in the intertidal and nearshore Delaware River habitats.

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Contaminants of Concern: PCBs were identified as the contaminants of primary concern because of their presence at elevated concentrations in groundwater, NAPL, and sediment. Other contaminants were screened for consideration in the Aquatic Assessment using EPA's chronic ambient water quality criteria for surface water and groundwater and Effects-Range Low values compiled from research literature for sediment. Other contaminants of concern included PAHs, phthalates, DDT and its metabolites DDE and DDD, and cadmium.

Exposure Pathways: The contaminant concentrations that receptors may contact were estimated for pathways including surface water, direct exposure to NAPL, and contact with sediment. Exposure-point concentrations for surface water in the Delaware River which could result from Site groundwater discharges were estimated using dilution factors calculated for a 15-meter zone of the river adjacent to the Metal Bank property during average- and low-flow conditions. Exposure-point concentrations for NAPL were estimated based on the concentrations of PCBs, PAHs, and phthalates collected from monitoring well MW6 during the 1991 sampling event.

For sediments, the mean and upper 95 percent confidence limit values were determined using one-half the detection limits for values below detection if at least one sample had concentrations above the detection limit for that contaminant. PCB data from the January 1995 sediment sampling event were not used in the Aquatic Assessment. Most of these data were collected in the farfield area and appear consistent with earlier results. Because sediment concentrations for PCBs, PAHs, and several phthalates decreased in concentration with distance from the Metal Bank property boundary, sediments were evaluated in three separate zones: samples from the riprap area; samples from the mudflat and Delaware River within 30 meters of the property boundary (referred to as nearfield samples); and samples from the mudflat and Delaware River greater than 30 meters from the property boundary (referred to as farfield samples). Table 11 presents the mean and upper 95% confidence limits for total PCBs normalized to dry weight which were calculated for these three zones. No similar gradient was apparent in sediment concentrations of DDTs and cadmium. Therefore, the aquatic risk evaluation for these contaminants was based on the combined values for all sediment samples.

PCB concentrations found in fish tissue integrate all the above exposure pathways, since fish accumulate most of their PCB body burden through the food web. Whole body concentrations in silvery minnow and channel catfish collected in the fall of 1993 from the Delaware River near the Metal Bank property were used to estimate concentrations in other fish species.

Table 11 - Total PCBs in Sediment with Increased Distance from the Metal Bank Property

Area	Total PCBs (ppm)	
	Mean	Upper 95% Conf. Limit
Riprap	5.9	9.4
Nearfield	3.8	5.0
Farfield	0.87	1.2

Toxicity: Contaminant concentrations that a receptor may be exposed to at the Site were compared to concentrations considered to be toxic (*i.e.*, toxicity reference values). For surface water, toxicity reference values were based on EPA's chronic ambient water quality criteria for the protection of freshwater organisms. Because of the endangered species status of the shortnose sturgeon, the limited amount of available chronic toxicity data for fish species, and the lack of species-specific toxicity information, a safety factor of 100 was applied to the toxicity reference value for sturgeon. Toxicity reference values for NAPL were based on EPA's acute ambient water quality criteria. No similar criteria are available for sediments. Therefore, the sediment toxicity reference concentrations are based on research which compiled a large number of studies on the adverse effects of sediment contaminants on aquatic organisms and calculated the mean and lower tenth percentile concentrations when such effects were observed. The mean concentrations, referred to as the Effects Range-Medium or ER-M, is the concentration at which effects are considered probable but not assured. The lower tenth percentile concentration, referred to as the Effects Range-Low or ER-L, is the concentrations below which adverse biological effects would be unlikely. If these reference values were not available for a contaminant, the less conservative Apparent Effects Threshold ("AET") was used. These concentrations represent levels at which some biological injury was always observed in a study conducted in the Puget Sound. Toxicity reference values for PCBs in fish tissue were also derived from a compilation of published studies linking adverse effects to PCB tissue concentrations in a variety of fish species. The lower tenth percentile and the mean of the data set of tissue effects concentrations are used in the Aquatic Assessment as toxicity reference values for PCBs in tissues for all fish species.

Risk Characterization: To determine the potential risk posed by a Site contaminant, the site-specific exposure-point concentration for a contaminant is compared to the appropriate toxicity reference value. If the ratio of the exposure-point concentration to the toxicity reference value is greater than one (*i.e.,* if the exposure-point concentration exceeds the toxicity reference value), a potential risk is present. This ratio is referred to as the hazard quotient ("HQ"). Since exposure-point concentrations were developed using both the mean and upper 95th percentile values and several toxicity reference values were used for some contaminants, a range of HQ values was generated for various contaminants. In general, if any HQ value calculated was greater than one, a potential risk exists. In order to fully consider all aspects influencing the risk, the frequency and duration an organism would be exposed to that media was also considered.

Surface Water Risks: Surface water exposure from groundwater discharge is reduced rapidly with dilution from the Delaware River. Only PCBs were considered a contaminant of concern for surface water. Any exposure to PCB concentrations exceeding toxicity reference concentrations would be confined to a 15-meter-wide band of the river next to the Metal Bank property. The risk of adverse effects is expected to be low. Under low-flow conditions, which represents a worst-case scenario, PCB concentrations in this area of the Delaware River were estimated to be between 1.34 and 1.97 nanograms per liter ("ng/l"). These concentrations are considerably below the toxicity reference value of 100 ng/l considered protective of most aquatic organisms. These concentrations slightly exceed the conservative toxicity reference value of 1 ng/l used for the shortnose sturgeon, indicating a possible risk. However, the likelihood that individual shortnose sturgeon would remain in the exposure area

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long enough to receive chronic exposure is very low.

NAPL Risks: Exposure to NAPL would occur if organisms directly ingest water from seeps prior to dilution by the river. The PCB concentration of 1,090 ppm in NAPL at monitoring well MW6 greatly exceeds the toxicity reference of 2 ppb which is considered protective of most aquatic organisms. Individual PAH concentrations also exceeded toxicity reference values by factors ranging from 20 to 4,500 and the bis(2-ethylhexyl)phthalate concentration of 590 ppm is 1,500 times greater than the toxicity reference value. While direct seepage of oil to the surface in the riprap or mudflat areas is likely to be highly localized, exposure to the high concentrations of PCBs, PAHs, and phthalates in any NAPL seep is likely to result in acute toxicity to organisms located in the path of these seeps. In addition, species with limited mobility, such as clams, that occupy the mudflat may experience long-term exposure to elevated PCB concentrations from NAPL discharges.

Sediment Risks: Contact with sediment is the primary route of exposure for benthic organisms, and subsequently the fish and other organisms that feed on them, in the nearshore areas of the Delaware River and mudflat near the Metal Bank property. The range of hazard quotients calculated for PCBs, PAHs, and bis(2-ethylhexyl)phthalate, di-n-butyl phthalate, di-n-octyl phthalate, DDT, DDE, DDD, and cadmium are presented in Table 12. Shaded blocks in the table indicate that the entire range of hazard quotients calculated for that contaminant exceeds the acceptable level of 1.0. The highest values resulted from using an exposure-point concentration based on the upper 95% confidence limit of the data set and the ER-L (or lowest AET if no ER-L value is available) for the contaminant. The lowest hazard quotients were calculated using the mean concentration and the ER-M.

Table 12 - Hazard Quotients for Aquatic Receptors Exposed to Sediment

Contaminant	Hazard Quotient Range		
	Riprap Area	Nearfield Area	Farfield Area
Total PCBs	32.9 - 414.3	21.2 - 220.6	4.8 - 52.4
Total PAHs	6.9 - 245.8	1.2 - 22.0	0.1 - 1.0
Bis(2-ethylhexyl)phthalate	92.6 - 623.1	1.0 - 3.8	0.1 - 0.4
Di-n-butyl phthalate	0.4 - 2.0	0.1 - 0.5	0 - 0.5
Di-n-octyl phthalate	3.2 - 140.0	0.2 - 4.0	0 - 0.9
DDT	15.1 - 131		
DDE	5.1 - 75.9		
DDD	7.0 - 83.5		
Cadmium	7.6 - 144.2		

For total PCBs, total PAHs, and phthalates, the hazard quotients reflect the decreasing pattern of contamination observed with distance from the Metal Bank property. No spatial pattern was observed in the concentrations of DDT, DDD, DDE, and cadmium based on the limited data sets available. Even though the hazard quotients for total PCBs decrease with distance from the property, all values exceed the acceptable limit of 1.0. For total PAHs, the entire range of hazard quotients exceeds 1.0 in the riprap and nearfield areas. Hazard quotients for bis(2-ethylhexyl) phthalate and di-n-octyl phthalate exceed the acceptable level of 1.0 for the entire range in the riprap area. The hazard quotients calculated for DDT, DDE, DDD, and cadmium using all the sediment data also exceed the acceptable level for the entire range of values.

Fish & Organism Tissue Risks: Concentrations of PCBs in the tissues of fish species represent an integration of all exposure pathways. PCBs were found in *Corbicula*, channel catfish, and silvery minnows collected from the Delaware River next to the Metal Bank property. Because invertebrates appear to be much less sensitive to PCB tissue residues than fish species, the PCB concentrations in the *Corbicula* were not evaluated for potential toxicity due to tissue residue effects.

To estimate the potential risk to channel catfish, and indirectly to other fish species including the shortnose sturgeon, the mean and upper 95% confidence limit of the PCB concentrations found in whole body catfish samples (2.1 and 2.9 ppm, respectively) were compared to the toxicity reference values. Hazard quotients ranged from 10.5 to 14.3 using the toxicity reference value based on the lower tenth percentile of tissue effects concentrations from compiled studies. The hazard quotients calculated using the less conservative toxicity reference value based on the mean tissue effects concentrations were less than 1.0. Similar results were observed using the silvery minnow tissue data. Using these species as representative of other fish species with potential exposure to the nearshore PCB-contaminated sediments or to nearshore food webs, the results suggest a potential risk of reproductive effects in sensitive fish species. Although the shortnose sturgeon occupy a lower trophic level than the channel catfish, the sturgeon may be particularly prone to accumulating and transferring high concentrations of PCBs to their developing offspring due to their benthic feeding habit, longevity (known to live over 60 years), late age of sexual maturity, and high lipid content of their eggs. Thus, the potential risk to shortnose sturgeon resulting from accumulation of PCBs from all exposure pathways at the Site may be greater than for other fish species because of these life-history characteristics.

C. Terrestrial Ecological Risk Assessment

Potential risks to terrestrial plants and animals from Site contaminants were estimated by comparing the concentrations found in various media (*i.e.*, soil, sediment, groundwater, surface water) to toxicity values based on published criteria documents and literature reviews. The approach used in the Terrestrial Ecological Risk Assessment ("Terrestrial Assessment") does not focus on impacts to specific receptors because species-specific data was not collected as part of the Remedial Investigation. Therefore, the toxicity values are based on the most conservative toxicity values available to provide the greatest degree of protection.

The expected environmental concentrations ("EEC") used in the Terrestrial Assessment were generally based on the upper 95% percent confidence limit of the data collected for each contaminant in each medium. The ratio of the EEC to the relevant toxicity value is referred to as the environmental effects quotient ("EEQ"). Any contaminant with an EEQ that exceeded 1.0 was included as a contaminant of concern. The EEQs for all contaminants found in a particular medium were added. Any media with EEQs totaling more than 10 is considered to have a potentially high adverse impact on terrestrial receptors.

The media evaluated in the Terrestrial Assessment include groundwater, soil, mudflat sediments, and riprap sediments. The findings are summarized below.

Groundwater: Terrestrial receptors may be exposed to contaminants in groundwater directly through seeps and springs and indirectly as a result of contaminant transport to other media such as surface water and sediment. Table 13 lists the groundwater contaminants, which have potential to adversely impact terrestrial receptors (*i.e.*, have an EEQ > 1), and their EEQs. The total EEQ for groundwater is 978, which exceeds the acceptable level of 10 and indicates a potential risk.

Table 13 - Groundwater Environmental Effects Quotients

Contaminant	EEQ	Contaminant	EEQ
Cadmium	3.61	Zinc	6.66
Lead	115	DDT	26.9
Mercury	251	DDE	487
Chloride	1.25	Endosulfan	4.91
Chromium (VI)	26.9	Phenanthrene	4.43
Copper	7.47	Heptachlor	42.6
		Total	978

Table 14 - Sediment Environmental Effects Quotients

Contaminant	Sediment EEQs		
	Riprap	Nearfield	Farfield
Total PCBs	188	100	24
4,4'-DDD	--	235	115
4.4'-DDE	--	--	33
Acenaphthene	1,600	--	--
Anthracene	2,910	--	--
Benzo[a]anthracene	950	3	--
Benzo[a]pyrene	419	3	--
Chrysene	510	2	--
Dibenz[ah]anthracene	290	38	--
Fluoranthene	462	2	--
2-methylnaphthalene	6,750	2	--
Phenanthrene	1,670	--	--
Napthalene	706	--	--
Phenanthrene	2,430	--	--
Pyrene	--	3	--
Total	-18,885	388	172

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Soil: Methyl ethyl ketone was the only soil contaminant with an EEQ greater than one. This contaminant was found in the subsurface soil in the Southern Portion of the property and had an EEQ of 9.66. Although this value indicates a potential risk, the risk is associated with soils deep in the profile and would likely be an exposure route only for deeply rooted vegetation.

Sediment: Contamination in the mudflat and riprap sediments are of concern in the Terrestrial Assessment because of the potential for impact to benthic and intertidal zone organisms and opportunistic birds and mammals that may use the area on either a diurnal or seasonal basis. Table 14 lists the sediment contaminants, which have potential to adversely impact terrestrial receptors (*i.e.*, have an EEQ > 1), and their EEQs. The sediments have been divided into the same three areas used in the Aquatic Assessment: the riprap area, nearfield sediments, and farfield sediments. The total EEQs for these three areas are 18,885, 388, and 172, respectively, which all exceed the acceptable level of 10 and indicate a potential risk.

The EEQs presented in Table 14 differ slightly from those presented in the Terrestrial Assessment because the upper 95% confidence limits for total PCBs calculated in the Aquatic Assessment for the three sediment areas were used as the EECs for consistency. The remaining EECs used throughout the Terrestrial Assessment were based on the data summary used to prepare the 1994 Baseline Human Health Risk Assessment. As noted previously, this data summary did not provide a complete summary of the data collected at the Site during the 1991 and 1993 sampling events and was subsequently revised after completion of the Terrestrial Assessment. However, the revised data summary did not significantly change the EECs used in the Terrestrial Assessment, so the Terrestrial Assessment was not revised.

VII. DESCRIPTION OF ALTERNATIVES

The Feasibility Study for the Metal Bank Site screened possible approaches for cleaning up the contamination at the Site. Based on this screening, five alternatives, including a required no action alternative, were developed and evaluated. EPA modified one of these alternatives as its preferred alternative in the Proposed Plan. Descriptions of each of these six alternatives are presented below.

Alternative C-1: No Action; Monitoring

Capital Cost:	$ 0
Annual Operation and Maintenance ("O&M") Costs:	$ 347,000 (years 1-2)
	$ 87,000 (years 3-30)
Present Worth Cost:	$1,821,000
Implementation Time:	3 weeks

The NCP requires that a no action alternative be considered at every Site. This alternative serves as a baseline for the comparison of other alternatives. Although no cleanup action would be performed under this alternative, monitoring of sediments, groundwater, surface water and LNAPL would be performed for a period of 30 years.

Alternative C-5: Limited Soil Excavation and Disposal; Sediment Excavation and Consolidation; Oil Collection System; Impermeable Cap

Capital Cost:	$ 10,405,000
Annual O&M Costs:	$ 455,000 (years 1-2)
	$ 195,000 (years 3-30)
Present Worth Cost:	$ 13,889,000
Implementation Time:	12 months

Soil in Courtyard Area with PCB concentrations exceeding 10 ppm within two feet of the surface (an estimated 600 cubic yards) would be excavated and disposed off-site at a permitted facility. An estimated 11,750 cubic yards of sediments with PCB concentrations exceeding 1 ppm within approximately 100 feet of the Metal Bank property boundary would be excavated and dewatered. These sediments would then be consolidated with soil on the Southern Portion of the property, if PCB concentrations are less than 25 ppm, or disposed off-site at a permitted facility if PCB concentrations are greater than 25 ppm. Excavated areas would be backfilled with clean material. A temporary sheet pile cofferdam would be installed prior to sediment excavation to keep water from the Delaware River out of the excavation area. Water that has been removed from the sediments would be treated, if necessary, and disposed on-site after the oil collection system is installed. Riprap along the property perimeter would be removed prior to excavation, decontaminated, and replaced along the perimeter after excavation is completed.

The underground storage tank in the Southern Portion of the property would be removed. Tank contents would be sampled and disposed off-site at a permitted facility. The tank would be decontaminated and disposed as scrap metal. Debris and soil in the vicinity of the tank that exceed PCB concentrations of 50 ppm would be disposed off-site at a permitted facility. Excavated sediment would be used to fill this area.

An oil collection system would be installed along the western and southern perimeter of the Metal Bank property. The system would include a permanent sheet pile wall along the mudflat and river shoreline. Groundwater interceptor trenches would be excavated inside the sheet pile wall and oil-water separators and sump pumps, or an equivalent system, would be placed in the trenches to collect oil that seeps from the soil and groundwater on the Southern Portion of the property. Oil collected in the oil-water separator would be disposed off-site at a permitted facility.

Following completion of the above activities, an impermeable cap would be installed over the Southern Portion of the property. Access to the property would be limited by fencing the area and requiring deed restrictions to prevent improper use. Long-term monitoring would be performed and warning signs would be posted advising against consumption of fish caught in the

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Delaware River in the vicinity of the Site.

Alternative C-7: Limited Soil Excavation and Disposal; Sediment Excavation and Consolidation; Soil/Sediment Stabilization; Oil Collection System; Impermeable Cap

Capital Cost:	$ 14,753,000
Annual O&M Costs:	$ 451,000 (first two years)
	$ 190,000 (years 3-30)
Present Worth Cost:	$ 18,159,000
Implementation Time:	27 months

Alternative C-7 includes all the components discussed above under Alternative C-5 along with an additional treatment component. An estimated 11,750 cubic yards of excavated sediment would be consolidated with an estimated 10,000 cubic yards[3] of soil from the Southern Portion of the Metal Bank property which have PCB concentrations exceeding 25 ppm and treated using a stabilization process. A treatability study would be required prior to implementation to determine the appropriate mix of reagents necessary to immobilize the contaminants. Treatment would occur after the oil collection system had been installed. The stabilized material would be placed back on the Southern Portion of the property prior to installation of the impermeable cap.

Alternative C-7A: Soil Excavation and Disposal; Sediment Excavation and Consolidation; Oil Collection System; Soil Cover

Capital Cost:	$ 14,499,000
Annual O&M Costs:	$ 409,000 (years 1-2)
	$ 149,000 (years 3-30)
Present Worth Cost:	$ 17,273,000
Implementation Time:	27 months

Alternative C-7A includes all the components of Alternative C-5 with the exception of the impermeable cap. Alternative C-7A would require the use of a soil cover rather than an impermeable cap. In addition, Alternative C-7A requires excavation and off-site disposal at a permitted facility of contaminated soil from the Southern Portion of the Metal Bank property

3 For Alternatives C-7, C-8, and C-12, the FS estimated the volume of soil requiring remediation in the Southern Portion of the Metal Bank property to be 71,000 cubic yards based on TPH concentrations. EPA has determined that TPH measurements do not correlate with the presence of PCBs and, therefore, do not provide an adequate basis for measuring protection of human health and the environment. EPA has estimated the volume of soil requiring remediation in the Southern Portion of the property to be approximately 10,000 cubic yards based on PCB data collected at the Site. This volume represents soils which are estimated to have PCB concentrations exceeding 25 ppm. The cost estimates for these alternatives have been revised from those presented in the FS to reflect this lower volume and included in the Administrative Record for the Site.

with PCB concentrations exceeding 25 ppm. Excavated areas would be backfilled with excavated sediment and a 24 inch soil cover would be placed over the Southern Portion of the property. The soil would be graded and seeded to establish an erosion-resistent vegetative cover. A similar soil cover 12 inches in depth would be placed over the soil in the Courtyard area.

Alternative C-8: Limited Soil Excavation and Disposal; Sediment Excavation and Consolidation; Soil/Sediment Stabilization; Oil Collection System; Impermeable Cap

Capital Cost:	$ 19,540,000
Annual O&M Costs:	$ 451,000 (years 1-2)
	$ 190,000 (years 3-30)
Present Worth Cost:	$ 22,946,000
Implementation Time:	34 months

Alternative C-8 is the same as Alternative C-7 except that excavated soil and sediment is treated using a soil washing process rather than a stabilization process. Soil washing is a technology in which contaminated soil/sediment would be flushed with solvents to dissolve and remove the contamination. The spent solvent would be recovered for continued treatment and the concentrated contaminants would be disposed at a permitted facility.

Alternative C-12: Soil Excavation and Disposal; Sediment Excavation and Consolidation; Oil Collection System; Impermeable Cap

Capital Cost:	$ 15,917,000
Annual O&M Costs:	$ 451,000 (years 1-2)
	$ 190,000 (years 3-30)
Present Worth Cost:	$ 19,323,000
Implementation Time:	21 months

Alternative C-12 is the same as Alternative C-7A except for the soil cover component. Alternative C-12 would not require any soil cover, but would require an impermeable cap over the Southern Portion of the Metal Bank property following implementation of the other components of the remedy.

VIII. ANALYSIS OF ALTERNATIVES

Each of the six remedial alternatives summarized in this ROD, including the No Action Alternative, has been evaluated against the nine evaluation criteria set forth in the NCP, 40 C.F.R. Section 300.430(e)(9). These nine criteria can be categorized into three groups: threshold criteria, primary balancing criteria, and modifying criteria. A description of the evaluation criteria is presented below. This section evaluates each alternative based on these

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criteria.

Threshold Criteria:

1. *Overall Protection of Human Health and the Environment* addresses whether a remedy provides adequate protection and describes how risks are eliminated, reduced, or controlled.

2. *Compliance with Applicable or Relevant and Appropriate Requirements* ("ARARs") addresses whether a remedy will meet all of the applicable, or relevant and appropriate requirements of environmental statutes.

Primary Balancing Criteria:

3. *Long-term Effectiveness* refers to the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals are achieved.

4. *Reduction of Toxicity, Mobility, or Volume through Treatment* addresses the degree to which alternatives employ recycling or treatment that reduces toxicity, mobility, or volume of contaminants.

5. *Short-term Effectiveness* addresses the period of time needed to achieve protection and any adverse impacts on human health and environment that may be posed during the construction and implementation period until cleanup goals are achieved.

6. *Implementability* addresses the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

7. *Cost* includes estimated capital, operation and maintenance costs, and present worth costs.

Modifying Criteria:

8. *State Acceptance* indicates whether, based on its review of backup documents and the Proposed Plan, the State concurs with, opposes, or has no comment on the preferred alternative.

9. *Community Acceptance* includes assessments of issues and concerns the public may have regarding each alternative based on a review of public comments received on the Administrative Record and the Proposed Plan.

A. Overall Protection of Human Health and the Environment

Soils: Alternatives C-5, C-7, C-7A, C-8, and C-12 protect human health and the environment by minimizing the potential for exposure to contamination in the Courtyard surface soils and the subsurface soils in the Southern Portion of the Metal Bank property. These alternatives also reduce the potential for migration of contamination to the nearby aquatic environment thereby enhancing the overall level of protection. Alternative C-1 is not protective of human health or the environment because potentially unacceptable human health and environmental risks from exposure to contaminated soils remain at the Site.

Sediments: Alternatives C-5, C-7, C-7A, C-8 and C-12 protect the aquatic environment currently impacted by Site contaminants by removing contaminated sediments from areas within approximately 100 feet of the Metal Bank property and backfilling this area with clean material. Alternative C-1 is not protective of the aquatic environment because potentially unacceptable risks from exposure to contaminated sediments remain at the Site.

Oil/LNAPL Layer: Alternatives C-5, C-7, C-7A, C-8, and C-12 protect human health and the environment by installing an oil collection system along the southern and western perimeter of the Metal Bank property to passively remove remaining oil as it accumulates on the surface of the shallow groundwater. Direct contact with contaminants in the floating oil layer is prevented through a deed restriction prohibiting excavation that would encounter the water table. Migration of contaminants from the Southern Portion of the property into the adjacent aquatic environment is prevented by the oil collection system and associated sheet pile wall along the property perimeter. Alternative C-1 is not protective because potentially unacceptable human health and environmental risks remain at the Site from exposure to contaminants in the oil layer which could occur during future construction activities or through surface discharges to the aquatic environment.

Overall, Alternatives C-5, C-7, C-7A, C-8, and C-12 provide overall protection of human health and the environment, but Alternative C-1 does not. Therefore, since Alternative C-1 does not meet this threshold criterion, it will not be evaluated further in this comparative analysis.

B. Compliance with ARARs

Section 121(d) of CERCLA requires that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate federal and State standards, requirements, criteria, and limitations which are collectively referred to as "ARARs", unless such ARARs are waived under CERCLA Section 121(d)(4).

Applicable requirements are those cleanup standards, standards of control, or other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental law or facility siting laws that specifically address hazardous substances, pollutants, contaminants, remedial actions, locations, or other circumstances at a CERCLA

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site. Relevant and appropriate requirements are those same requirements that, while not directly applicable at a CERCLA site, address problems or situations sufficiently similar to those encountered that their use is well suited to the particular site. Only those state standards that are identified in a timely manner and are more stringent than federal requirements may be applicable or relevant and appropriate. On-site actions must comply with ARARs, but need comply only with the substantive parts of those requirements. By contrast, off-site actions must comply with legally applicable requirements, including both substantive and administrative parts of those requirements.

The ARARs for the alternatives developed in this ROD are listed below.

1. Chemical-Specific ARARs

Soils: PADEP has identified Pennsylvania's Land Recycling and Environmental Standards Act (Act 2) and its implementing regulations (Administration of the Land Recycling Program, 25 Pa. Code Chapter 250), as an ARAR. Act 2 sets forth three alternative cleanup standards: (1) background; (2) statewide health-based standards; and (3) site-specific risk-based standards. EPA chose a site-specific risk-based approach to develop cleanup standards for PCBs at the Site. EPA has generally endeavored to develop a consistent approach to PCB remediations at Superfund sites, and has relied on EPA's *Guidance on Remedial Actions for Superfund Sites with PCB Contamination* (EPA/540/G-90/007, August 1990). EPA has established the PCB cleanup levels of 10 ppm for surface soil and 25 ppm for subsurface soil at the Site based, in part, on this guidance. The more conservative level of 10 ppm is used for the surface soils because the potential for exposure is greater. These established PCB standards are in line with the recommended ranges in EPA's guidance document, which are designed to put the resultant risks to humans within the acceptable risk range (between 1.0E-04 and 1.0E-06 for potential carcinogens). Cleanup levels were not established for other contaminants present at the Site because their contribution to the risks were substantially less than those attributed to PCBs. Therefore, incidental removal of these contaminants found in soils being remediated because of their PCB concentrations will likely result in acceptable risk levels for these contaminants as well. Alternatives C-5, C-7, C-7A, C-8 and C-12 all effectively limit potential exposure to PCB contamination above the recommended cleanup levels either by isolating these soils with an impermeable cap or clean cover of soil, treating or removing the soils, or both.

Sediments: EPA has established the PCB cleanup level of 1 ppm for sediments again based, in part, on the above mentioned guidance. The 1 ppm standard is designed to be protective of sensitive ecological receptors. As shown in Table 11 earlier in this ROD, total PCB concentrations in samples collected more than 100 feet from the Metal Bank property boundary averaged less than 1 ppm (0.87 ppm) while total PCB concentrations in samples collected less than 100 feet from the property and in the riprap area averaged 3.8 and 5.9 ppm, respectively. Alternatives C-5, C-7, C-7A, C-8, and C-12 all require excavation of sediments near the property with total PCB concentrations above 1 ppm and, therefore, achieve the recommended cleanup level.

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2. Action-Specific ARARs

Alternatives C-5, C-7, C-7A, C-8, and C-12 would comply with all ARARs associated with the actions being taken. These action-specific ARARs are summarized below.

Excavation: The substantive requirements of the Pennsylvania Erosion Control Regulations at 25 Pa. Code, Chapter 102 are applicable to earthmoving work performed on the Site including soil and sediment excavation and earthmoving necessary to install impermeable caps and soil covers.

Storage of Excavated Soil/Sediment and Recovered NAPL: The Pennsylvania Residual Waste Management ("PRWM") Regulations at 25 Pa. Code Chapter 299, Subchapter A (Standards for Storage of Residual Waste) are applicable to the storage of excavated soil and sediment and recovered NAPL at the Site. In addition, the Pennsylvania Hazardous Waste Management ("PHWM") Regulations at 25 Pa. Code Chapter 264, Subchapter I (Use and Management of Containers) are relevant and appropriate for storage in containers of excavated soil and sediment and recovered NAPL that are determined to be hazardous. PHWM Regulations at 25 Pa. Code Chapter 264, Subchapter L (Waste Piles) are relevant and appropriate for storage of excavated soil and sediment in piles. The Toxic Substances Control Act ("TSCA") Regulations at 40 C.F.R. § 761.65 are applicable to the storage of any excavated soil and sediment and recovered NAPL with PCB concentrations of 50 ppm or greater.

Transportation of Excavated Soil/Sediment and Recovered NAPL: The general requirements (§ 299.211) of the PRWM Regulations at 25 Pa. Code Chapter 299, Subchapter B are applicable to the transportation of excavated soil and sediment from the Site. If the soils, sediments, and NAPL are determined to be hazardous under the PHWM Regulations at 25 Pa. Code Chapter 261, Subchapter C, the transporter of the waste would be required to meet the PHWM Regulations at 25 Pa. Code Chapter 263.

Disposal of Excavated Soil/Sediment and Recovered NAPL: For soils, sediments, and NAPL that are determined to be hazardous under the PHWM Regulations at 25 Pa. Code Chapter 261, Subchapter C, disposal would be required at a landfill in compliance with the PHWM Regulations at 25 Pa. Code Chapter 264, Subchapter N (Landfills) or 25 Pa. Code 265, Subchapter N (Landfills). For soils, sediments, and NAPL with PCB concentrations of 50 ppm or greater, disposal would be required at a facility in compliance with the TSCA Regulations at 40 C.F.R. § 761.60. Soils, sediment, and NAPL that are not hazardous and have PCB concentrations of less than 50 ppm would be disposed of at a landfill in compliance with the PRWM Regulations at 25 Pa. Code Chapter 288 (Residual Waste Landfill).

Air Emissions: The substantive requirements of the Pennsylvania Air Resources Regulations at 25 Pa. Code §§ 123.1 (prohibition of certain fugitive emissions), 123.2 (fugitive particulate matter), and 123.31 (limitations on odor emissions) are relevant and appropriate to remedial activities such as excavation and materials handling.

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Underground Storage Tank Removal: The substantive requirements of RCRA Regulations at 40 C.F.R. Part 280, Subpart G are relevant and appropriate to the removal of the underground storage tank ("UST") at the Site. In addition, PHWM regulations at 25 Pa. Code Chapter 265, Subchapter J are applicable to the treatment of hazardous waste in the tank.

Discharges to Surface Water: The more stringent of the substantive requirements of the Clean Water Act at 40 C.F.R. Part 122 (National Pollutant Discharge Elimination System ("NPDES")) or the Pennsylvania Clean Streams Law at 25 Pa. Code Chapter 92 (NPDES Program), and 25 Pa. Code Chapter 93 (Water Quality Standards) and 25 Pa. Code Chapter 16 (Toxic Substances Water Quality Criteria) would be applicable to discharges from the Site of groundwater from the oil collection system, decontamination water, or water from the sediment dewatering process. In addition, the Delaware River Basin Commission's Water Quality Regulations, as amended through October 23, 1996, as they relate to the Delaware River Basin Compact would be applicable to discharges from the Site of groundwater from the oil collection system, decontamination water, or water from the sediment dewatering process.

On-Site Treatment of Soil/Sediment: The PRWM Regulations at 25 Pa. Code Chapter 299, Subchapter A (Standards for Storage of Residual Waste) are applicable to on-site treatment of non-hazardous soil/sediment, and the PHWM Regulations at 25 Pa. Code Chapter 264, Subchapter I (Use and Management of Containers), Subchapter J (Tank Systems), and Subchapter L (Waste Piles) are relevant and appropriate to on-site treatment of soils/sediments determined to be hazardous to the extent that containers, tanks, or waste piles are used to stabilize or wash the excavated soil/sediment in Alternatives C-7 and C-8, respectively. For any waste stream generated during the treatment process that is hazardous under the PHWM Regulations at 25 Pa. Code Chapter 261, Subchapter C, off-site disposal would be required at a facility in compliance with PHWM Regulations at 25 Pa. Code Chapter 264 or 265.

Impermeable Cap: The PRWM Regulations at 25 Pa. Code Chapter 288, Subchapter C, would be relevant and appropriate in designing and constructing an impermeable cap in Alternatives C-5, C-7, C-8, and C-12. Relevant provisions include, but are not limited to, 288.212 (access control), 288.234 (final cover and grading), 288.236 (revegetation), 288.237 (standards for successful revegetation), and 288.242 (soil erosion and sedimentation control).

Soil Cover: The PRWM Regulations at 25 Pa. Code §§ 288.234(d), (e), (f), (g) (final grading), 288.236 (revegetation), 288.237 (standards for successful revegetation), and 288.242 (soil erosion and sedimentation control) would be relevant and appropriate to establishing the erosion-resistant vegetative cover required under Alternative C-7A.

3. Location-Specific ARARs

Floodplain: Federal Executive Order 11988 on Protection of Floodplains and implementing procedures at 40 C.F.R. Part 6, Appendix A require actions to avoid adverse effects, minimize potential harm, and restore and preserve natural and beneficial values of floodplains and are applicable to cleanup actions at the Site, most of which will occur within the 100-year

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floodplain. The Pennsylvania Floodplain Management Act, 25 Pa. Code Chapter 106 is also applicable to cleanup actions at the Site.

Wetlands: Federal Executive Order 11990 on Protection of Wetlands and implementing procedures at 40 C.F.R. Part 6, Appendix A require actions to avoid adverse effects, minimize potential harm, and restore and preserve natural and beneficial values of wetlands and are applicable to cleanup actions at the Site in wetland areas. The Pennsylvania Dam Safety and Encroachment Act, 25 Pa. Code Chapter 105 is also applicable to cleanup actions at the Site.

Endangered Species/Wildlife: The Federal Endangered Species Act Regulations at 50 C.F.R. Parts 222 and 402 mandate the protection of fish and other species threatened with extinction and are applicable to cleanup actions at the Site that could impact habitat used by the shortnose sturgeon.

C. Long-Term Effectiveness and Permanence

Alternatives C-7A, C-8, and C-12 provide the greatest degree of long-term effectiveness and permanence by removing much of the contaminants from the Site that pose a potential threat to human health and the environment. Alternatives C-7A and C-12 remove the contamination by transporting contaminated soil (and sediment if PCB concentrations exceed 25 ppm) off-site for disposal. Alternative C-8 removes the contaminants using the soil washing treatment process. Concentrated contaminants washed from the soil and sediment are then transported off-site. Alternatives C-8 and C-12 prevent exposure to low level contaminants remaining on the Southern Portion of the property through use of an impermeable cap. This cap will also reduce migration of residual contaminants by reducing infiltration of surface water. While reduced contaminant migration typically increases long-term effectiveness and permanence, the use of an impermeable cap in this case is likely to impede recovery of the NAPL through the oil collection system, thus reducing long-term effectiveness and permanence. The soil cover required in Alternative C-7A, on the other hand, prevents exposure to low level contaminants remaining in both the Courtyard and the Southern portion of the property, but will not impede collection of NAPL through the oil collection system.

Alternative C-7 provides somewhat less long-term effectiveness and permanence than the above alternatives because the contaminants, while immobilized through treatment, remain at the Site. The permanence of this alternative depends upon the ability of the contaminants to remain bound in a stabilized mass over time. Features of the Site including the variability of the fill material on the Southern Portion of the property and the location of the property in the floodplain increase the uncertainty regarding the long-term reliability of stabilizing the PCB contamination. Alternative C-7 also includes use of an impermeable cap which could impede the collection of NAPL.

The long-term effectiveness and permanence of Alternative C-5 is somewhat lower than the above alternatives because the contaminants remain at the Site without any treatment to limit mobility. The impermeable cap will reduce infiltration of surface water and, therefore, reduce migration. However, contaminant migration associated with groundwater movement could continue.

D. Reduction of Toxicity, Mobility, or Volume through Treatment

Alternatives C-7 and C-8 both utilize treatment technologies to address contaminated soil in the Southern Portion of the Site. Alternative C-7 uses a stabilization/solidification process to reduce the mobility of the contaminants in the soil. Alternative C-8 uses soil washing to remove the contaminants from the soil. Concentrated contaminants recovered from the spent solvents used in the process are then disposed off-site, most likely through off-site incineration. Therefore, Alternative C-8 would provide the greatest reduction in toxicity, mobility, and volume through treatment.

While Alternatives C-5, C-7A, and C-12 do not treat the excavated soils and sediments, they do reduce the mobility of Site contaminants either through use of an impermeable cap or through off-site disposal in a regulated landfill.

E. Short-Term Effectiveness

Alternative C-5 provides the greatest degree of short-term effectiveness because it requires the least amount of time to implement and does not require as much excavation and handling of contaminated material. Alternatives C-7A and C-12 require more excavation as well as off-site transportation of contaminated material, so the potential for adverse impacts increases slightly. However, the short-term impacts associated with excavation and transportation can be readily addressed through use of the proper equipment and handling techniques. Alternatives C-7 and C-8 require excavation of contaminated material and on-site treatment. The treatment processes require additional handling of the contaminated material and, therefore, again increase the potential for adverse impacts. As with Alternatives C-7A and C-12, however, these impacts can be readily mitigated by proper equipment and handling techniques.

All the alternatives have the potential to have adverse short-term impacts on Site workers conducting the remediation activities. These short-term risks can be minimized through use of the proper health and safety protocols. Similarly, all the alternatives have the potential for some short-term impacts to ecological receptors during sediment excavation. Measures such as the use of cofferdams would minimize the off-site transport of contaminated sediment during excavation.

F. Implementability

Implementability issues relating to excavation of sediments, removal of the underground storage tank, excavation of soil, and installation of the oil collection system are common to all the alternatives. Equipment and services are readily available to implement

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these components of the remedy. Cofferdam installation becomes more difficult and expensive with greater distance from the shoreline. The location and specifications for installing the temporary cofferdam will be determined during the remedial design.

For Alternatives C-7A and C-12, transportation and off-site disposal of contaminated soil can be readily implemented. Similarly, the equipment and materials needed to install the soil cover in Alternative C-7A and the impermeable cap in Alternatives C-7, C-8, and C-12 are readily available.

The treatment technologies used in Alternatives C-7 and C-8 will require treatability studies during the remedial design to ensure that these technologies can be implemented given the specific conditions at the Site. The stabilization treatment used in Alternative C-7 can be difficult to implement if soils have a high oil and grease content (usually > 25%) or if the matrix to be stabilized is highly variable. Similarly, variability in size of the materials to be washed can create materials handling problems with the soil washing technology used in Alternative C-8.

G. Cost

Table 15 provides the capital cost, the operation and maintenance ("O&M") cost, and the present worth cost associated with Alternatives C-5, C-7, C-7A, C-8 and C-12.

Table 15 - Summary of Costs

Alternative	Capital Costs	Annual O&M Costs	Total Present Worth Costs
C-5	$10,405,000	$455,000 (years 1-2) $195,000 (years 3-30)	$13,889,000
C-7	$14,753,000	$455,000 (years 1-2) $195,000 (years 3-30)	$18,159,000
C-7A	$14,499,000	$409,000 (years 1-2) $149,000 (years 3-30)	$17,273,000
C-8	$19,540,000	$455,000 (years 1-2) $195,000 (years 3-30)	$22,946,000
C-12	$15,917,000	$455,000 (years 1-2) $195,000 (years 3-30)	$19,323,000

H. State Acceptance

PADEP has had the opportunity to review and comment on all the documents in the Administrative Record and has participated in selecting the remedy for this Site. PADEP's comments on this ROD have been incorporated to the extent possible. The Commonwealth

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has concurred with this ROD.

I. Community Acceptance

Local citizens and members of the Tacony Civic Association provided comments on the Proposed Plan during the public meeting on July 27, 1995. The meeting transcript has been included in the Administrative Record for the Site. Comments have also been summarized and responses provided in the Responsiveness Summary in this ROD. Generally, the comments indicate the community's support for the selected remedy, Alternative C-7A. The community also expressed concern about: (1) the impact of the Site on the Baxter Water Intake; and (2) the ability to use the Metal Bank property for recreational purposes such as a bicycle path or residential development in the future.

The PRP Group, which performed the RI/FS for the Site, had several concerns about Alternative C-7A. These comments and EPA's responses are also presented in the Responsiveness Summary.

The Site Owner provided the most extensive comments and challenged most of the findings in the RI/FS and the Proposed Plan. Major arguments presented are: (1) the Site is not the source of PCBs and other contamination; (2) if the Site was the source, contamination is not migrating from the Site; (3) if contamination was migrating from the Site, there is no risk because EPA's risk assessments are faulty; and (4) if there is a risk, the proposed remedy is inefficient and costly. The Site Owner's comments are summarized along with EPA's responses in the Responsiveness Summary.

IX. SELECTED REMEDY AND PERFORMANCE STANDARDS

Based on the evaluation of the nine criteria, EPA is selecting Alternative C-7A as the remedy for this Site. The components of this remedy and the performance standards that must be attained during remedy implementation are presented in this section.

A. Soil/Sediment Excavation Performance Standards

1. Soils in the Courtyard Area which have PCB concentrations exceeding 10 ppm and are within two feet of the surface shall be excavated. The volume of soil to be excavated is estimated to be 600 cubic yards based on existing information. The extent of excavation shall be further defined during the remedial design and approved by EPA.

2. Soils in the Southern Portion of the Metal Bank property which have PCB concentrations exceeding 25 ppm shall be excavated. The volume of soil to be excavated is estimated to be 10,000 cubic yards based on existing information. The extent of excavation shall be further defined during the remedial design and approved by EPA. Excavated soils that are saturated with water shall be stockpiled on-site and

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dewatered by gravity. Accumulated water shall be managed on-site to allow soil and sediment particles to settle and then disposed in accordance with Pennsylvania Hazardous Waste Management Regulations if hazardous, TSCA Regulations if PCB concentration exceeds 50 ppm, or discharged in accordance with State and federal NPDES regulations if not hazardous.

3. Sediments within 100 feet of the Metal Bank property and within four feet of the surface of the river bed shall be excavated. Sediments beyond 100 feet of the Metal Bank property which have PCB concentrations exceeding 1 ppm shall be excavated if EPA determines during remedial design that such removal would be both appropriate and feasible. Excavation of these sediments shall be performed after completion of soil excavation activities in the Southern Portion of the property. The extent of excavation shall be further defined during the remedial design and approved by EPA. Excavated sediments shall be stockpiled on-site and dewatered by gravity. Accumulated water shall be managed on-site to allow soil and sediment particles to settle and disposed in accordance with the Pennsylvania Hazardous Waste Management Regulations if hazardous, TSCA Regulations if PCB concentration exceeds 50 ppm, or discharged in accordance with State and federal NPDES regulations if not hazardous.

4. Prior to excavation of soil or sediment, temporary cofferdams shall be installed at the outer edge of the sediment excavation boundary to dewater the sediment area so excavation can be accomplished. The exact locations and specifications for the cofferdams, the method for sediment removal, and the process for handling water in the excavation and sediment storage areas shall be determined during the remedial design and approved by EPA. Care shall be taken during the dewatering process to protect fish and other aquatic organisms, especially the shortnose sturgeon, which may be present behind the cofferdams. Upon completion of the remedial action, the cofferdams shall also be removed in a manner that minimizes turbidity.

5. All equipment used during excavation of contaminated soil shall be decontaminated before entering uncontaminated areas. The design and specifications for the decontamination facilities shall be approved by EPA as part of the remedial design. Any wastewater generated from Site decontamination activities shall be disposed in accordance with Pennsylvania Hazardous Waste Management Regulations if hazardous, TSCA Regulations if PCB concentration exceeds 50 ppm, or discharged in accordance with State and federal NPDES regulations if not hazardous.

6. Excavated sediment areas and soil areas in the Courtyard shall be backfilled with clean fill. Excavated soil areas in the Southern Portion of the property shall be backfilled with (a) clean fill; and/or (b) excavated sediments or Courtyard soils which have PCB concentrations of less than 25 ppm. Following excavation and backfilling, the Courtyard shall be covered with 12 inches of clean soil and the Southern Portion of the property shall be covered with 24 inches of clean soil. The riverward side of the Southern Portion shall be armored with large riprap or an equivalent system, to prevent

undercutting of the riverbank during flooding. The soil cover shall be graded to promote drainage and vegetated to provide an erosion-resistant surface. Tape markers shall be installed to indicate the boundary between clean soil cover and Site soils.

7. Additional sampling and analysis of soil and sediment shall be performed prior to excavation to further characterize the extent of contamination. Sampling locations and analytical methods shall be determined during the remedial design and approved by EPA. Sampling and analysis shall also be performed after excavation has been completed to confirm that cleanup levels set forth in the performance standards have been achieved. Methods for determining that the cleanup levels have been reached shall be finalized during remedial design and approved by EPA based on EPA 230/02-89-042, Methods for Evaluating the Attainment of Cleanup Standards, Vol I.

8. Excavated soil and sediment shall be temporarily staged on-site in accordance with 25 Pa. Code Chapter 264, Subchapter L (Waste Piles), if material can be staged in an area of existing contamination. If soil and sediment will be staged in a clean area, the waste material and soil shall be temporarily staged in containers in accordance with 25 Pa. Code Chapter 264, Subchapter I (Use and Management of Containers). Any soil and sediment with PCB concentrations exceeding 50 ppm that will be temporarily staged on-site before offsite disposal shall be stored in accordance with the TSCA Regulations at 40 C.F.R. § 761.65 (Storage for Disposal).

B. Soil/Sediment Disposal Performance Standards

1. Excavated soil and sediment shall be tested to determine if the soil and/or sediment is hazardous, as defined in 25 Pa. Code Chapter 261, Subchapter C (hereafter referred to as "hazardous"), and tested as well for asbestos and PCBs. Contaminated soils and sediments that are not hazardous and do not exceed PCB concentrations of 25 ppm shall be used as backfill on the Southern Portion of the property. Contaminated soil and sediment that are not hazardous and have PCB concentration between 25 and 50 ppm shall be disposed of off-site at a permitted RCRA Subtitle D or Pennsylvania Residual Waste landfill.

2. Excavated soil and sediment that are hazardous, but have PCB concentration between 25 and 50 ppm, shall be treated and/or disposed of off-site at a permitted RCRA Subtitle C or Pennsylvania Hazardous Waste facility.

3. Excavated soil and sediment that have PCB concentrations exceeding 50 ppm shall be disposed off-site in a TSCA landfill in compliance with 40 C.F.R. § 761.60.

4. Transportation of soil and sediment from the Site shall be performed in accordance with the general requirements (§ 299.211) of the Pennsylvania Residual Waste Management Regulations at 25 Pa. Code Chapter 299, Subchapter B (Standards for Collecting and Transporting of Residual Waste). If soil and sediment is determined to

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be hazardous, this material shall be transported in accordance with the Pennsylvania Hazardous Waste Management Regulations at 25 Pa. Code Chapter 263, and federal regulations at 49 C.F.R. Parts 107, and 171-179.

5. Oversized materials such as boulders in the Riprap Area and debris from the Southern Portion of the property shall be decontaminated, using steamed cleaning or other equivalent method, in order to reduce PCB concentrations on its surface areas. Any wastewater generated from Site decontamination activities shall be disposed in accordance with Pennsylvania Hazardous Waste Management regulations if hazardous, TSCA Regulations if PCB concentration exceeds 50 ppm, or discharged in accordance with State and federal NPDES regulations if not hazardous.

C. Oil Collection System Performance Standards

1. Prior to excavation of soil from the Southern Portion of the property, a sheet pile wall shall be installed around the southern and western perimeter of the property adjacent to the Delaware River to prevent erosion of fill materials into the river and facilitate installation of the oil collection system.

2. Prior to excavation of soil from the Southern Portion of the property, an oil collection system consisting of interceptor trenches, oil-water separators, and sump pumps, or similar collection devices, shall be installed to collect oil floating on the shallow groundwater at the Site to prevent PCBs in oil from getting into the Delaware River.

3. Collected oil shall be disposed off-site in accordance with Pennsylvania Residual Waste Management regulations if PCB concentrations are less than 50 ppm or in accordance with TSCA regulations if PCB concentrations are 50 ppm or greater. Incidental groundwater collected in the system shall be discharged to the Delaware River if contaminant concentrations are within NPDES discharge limits to be established in consultation with PADEP and DRBC during the remedial design process and approved by EPA. Groundwater exceeding effluent discharge limits shall be treated and/or disposed off-site in accordance with state and federal NPDES or Pennsylvania Residual Waste Management Regulation requirements, as appropriate.

D. Underground Storage Tank Performance Standard

1. Prior to excavation of soil in the Southern Portion of the property, the underground storage tank in this area shall be removed. The tank's contents shall be sampled and analyzed to determine the appropriate method of off-site disposal. If the contents are determined to be hazardous, the material shall be disposed at a facility in compliance with the Pennsylvania Hazardous Waste Management Regulations. If non-hazardous, the contents shall be disposed at a facility in compliance with Pennsylvania Residual Waste Management Regulations. After the contents have been removed, the tank shall be decontaminated and recycled as scrap metal or disposed off-site.

E. Site Access/Use

1. *Fence*: A six-foot fence shall be installed and maintained along the entire property boundary, including the river. The final specifications shall be determined during the remedial design process and approved by EPA. The existing fence can be used if it meets the final design requirements.

2. *Signs*: Signs shall be posted along the property boundary, including the river shoreline, warning individuals not to eat fish caught in the vicinity of the Site. The warning signs shall read:

WARNING...DO NOT EAT FISH
Fish caught in this area contain high levels of PCBs
PCBs may cause cancer

3. *Deed Restrictions*: Deed restrictions shall be placed on the Metal Bank property prohibiting (1) the use of the land for residential and agriculture purposes; (2) the use of on-site groundwater for domestic purposes, including drinking water; and (3) excavation at depths that encounter the water table, contaminated soils and/or sediments beneath the soil cover, or compromise the stability of soil-covered areas along the Delaware River.

F. Additional Investigation

1. *DNAPLs*: Discrete subsurface soil samples shall be collected to determine if PCBs are migrating downward. Soil borings for the DNAPL investigation shall include, but not be limited to, locations where excavation is required in the Southern Portion of the property. Samples shall be collected at various depths down to the top of bedrock or any confining clay layers. The number and frequency of samples shall be determined during the remedial design and approved by EPA.

2. *Stormwater Sewer*: The stormwater sewer adjacent to the Site shall be investigated to determine if Site contamination is entering the river via this conduit. The investigation shall include documenting historical drainage paths from the Site, present Site contours and all Site connections into the City sewer system. The investigation shall also include collecting PCB samples from on-site drains and from the stormwater sewer. Any contamination found in the Site sewer system before it connects into the City's sewer that exceeds 1 ppm PCB shall be disposed in accordance with Section IX.B. above.

G. Monitoring Requirements

1. *Groundwater*: A groundwater monitoring program shall be implemented to evaluate the

effectiveness of the remedy in reducing the concentration of PCBs and other contaminants in groundwater. In addition, a soil monitoring program shall be developed during the Remedial Design to monitor the soil cover for evidence of the upward migration of contaminants in the groundwater cause by flooding conditions that may raise the water table. These programs may include installation of new monitoring wells. The exact locations, frequency and duration of sampling, analytical parameters and methods to be used shall be determined during remedial design and approved by EPA. At a minimum, the groundwater monitoring program shall include analysis of quarterly samples of two existing monitoring wells (MW6, MW7) for metals, pesticides, PCBs, SVOCs, and VOCs. The monitoring programs shall be evaluated after three years to determine if changes are appropriate.

2. *Delaware River*: A monitoring program shall be developed during the remedial design to evaluate the conditions of aquatic species in the Delaware River at the Site before, during and after the remedy has been implemented. This program shall include chemical and biological monitoring and shall be evaluated by EPA after five years to determine if changes are appropriate.

3. *Baxter Water Intake*: The influent at the Baxter Water Intake (both at the main and emergency intakes) shall be sampled quarterly for PCBs during the remedial design and remedial action and for one year following completion of the remedial action at the Site. If drinking water from the influent exceeds the Safe Drinking Water Act Maximum Contaminant Limit for PCBs, a confirmatory sample shall be taken immediately and officials at the Baxter facility shall be notified.

H. Operation & Maintenance

1. *Oil Collection System*: O&M of the oil collection system, including the sheet pile wall, interceptor trenches, oil-water separators, and sump pumps, or other collection devices installed, shall be routinely performed to ensure proper functioning of the system. Details of the required O&M shall be determined during the remedial design and approved by EPA. At a minimum, the permanent sheet pile wall shall be periodically inspected for corrosion. Appropriate measures, including replacement, shall be taken to avoid breach of its structural integrity. O&M of the interceptor trenches shall ensure proper inflow, while O&M for the oil-water separators and sump pumps shall ensure proper removal of contaminated oil/NAPL. Maintenance shall include replacement of components as necessary to ensure proper functioning.

I. Five Year Review

1. Since the selected remedy results in hazardous substances remaining on-site, a five-year review of Site conditions shall be performed by EPA as required by Section 121 (c) of CERCLA.

X. STATUTORY DETERMINATIONS

This remedy satisfies the remedy selection requirements of CERCLA and the NCP. The remedy is expected to be protective of human health and the environment, to comply with ARARs, to be cost-effective, and to utilize permanent solutions and alternative treatment technologies to the maximum extent practicable. Because contaminated materials will be transported off-site for landfilling at permitted facilities, the remedy does not meet the statutory preference for treatment as a principal element of the remedy for soils and sediments. The following is a discussion of how the selected remedial action addresses these statutory requirements:

A. Overall Protection of Human Health and the Environment

The selected remedy (Alternative C-7A) provides protection of human health and the environment by removing contaminated soils that pose an unacceptable risk for industrial/commercial use of the Site. The remedy provides further protection for individuals using the Metal Bank property recreationally by providing a cover of clean soil over the Southern Portion of the property and the Courtyard Area and requiring a vegetative cover to prevent erosion. The remedy also protects human health and the environment by removing contaminated sediments that pose an unacceptable risk to ecological receptors. Removal of the underground storage tank and installation of the oil collection system prevent contaminant migration and ensure overall protection of human health and the environment in the future. Additional investigations and monitoring requirements will ensure that all pathways for PCB migration are addressed by the selected remedy.

B. Compliance with ARARs

The selected remedy shall attain all action-, location-, and chemical-specific applicable or relevant and appropriate requirements for the Site. Section IX (Selected Remedy and Performance Standards) identifies specific ARARs that shall be attained.

C. Cost Effectiveness

EPA has determined that the selected remedy most effectively addresses all contaminated media while minimizing costs. The estimated present worth cost of the selected remedy is $17,273,000. Other alternatives were either less expensive but less effective, or more expensive, but unable to offer a greater degree of protection.

D. Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to the Maximum Extent Practicable

EPA has determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner at the Site. Excavation and off-site disposal of contaminated materials represents a permanent

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solution. Although technologies to treat soils and sediments were considered in several alternatives, these technologies would not achieve greater overall protection and may provide less long-term effectiveness and permanence because of the soil matrix present in the Southern Portion of the Metal Bank property and the location of this property within the 100-year floodplain. Off-site treatment may be required to dispose of oil and contaminated water collected in the oil collection system.

E. Preference for Treatment as a Principal Element

The selected remedy does not employ treatment as a principal element. Containment of contaminated soils and sediments in an off-site landfill provides adequate overall remedial protection. The treatment technologies considered would not have provided any greater overall protection and may provide less long-term effectiveness and permanence because of the soil matrix present in the Southern Portion of the Metal Bank property and the location of this property within the 100-year floodplain. Some treatment may be required in the final disposition of the contaminants from the oil collection system.

XII. SIGNIFICANT CHANGES

The Proposed Plan identified Alternative C-7A as EPA's preferred alternative. EPA reviewed all written and oral comments submitted. Upon review of these comments EPA determined that no significant changes to the remedy were necessary. EPA has included performance standards which detail how the selected remedy will be implemented. Several issues which have been clarified in the ROD in response to comments received during the public comment period are summarized below.

- The actual extent of soil and sediment excavation in various areas of the Site will be determined during the remedial design.

- The cleanup levels for soils and sediments are based on PCBs because PCBs presented the primary risk. However, EPA has determined that all sediments within 100 feet of the Metal Bank property line shall be excavated to a depth of four (4) feet from the river bed surface. Incidental removal of other contaminants, such as PAHs in sediments, along with PCBs will occur within this area, and the cleanup is expected to achieve acceptable overall protection of human health and the environment (*see* Table 12). EPA has also eliminated TPH as a cleanup standard since there are no cleanup criteria for this contaminant and no correlation has been observed between the levels of TPHs and PCBs.

- EPA has included periodical sampling of the Baxter Water Intake to ensure that drinking water supplies for Philadelphia do not exceed acceptable levels for PCBs.

- EPA is requiring that 12 inches of clean soil be placed over the Courtyard Area and 24

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inches of clean soil be placed over the Southern Portion of the property to ensure that incidental use of the Site for recreational purposes will not result in an unacceptable human health risk. A 12-inch cover is required in the Courtyard Area because PCBs concentrations will be reduced to 10 ppm in the top two feet of soil after remediation. An additional 12 inches of cover is required in the Southern Portion of the property because PCB concentrations will only be reduced to 25 ppm following remediation.

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PART III - RESPONSIVENESS SUMMARY

Comments raised during the public comment period on the Proposed Plan and the Administrative Record for the Metal Bank Site are summarized in this Responsiveness Summary. The comment period opened with a notice of availability published in the *Philadelphia Inquirer* on July 20, 1995 and closed, after two requests for extension were granted, on October 18, 1995.

Oral comments were presented at the Proposed Plan Public Meeting held on July 27, 1995. These comments and EPA's responses are presented in Section I of the Responsiveness Summary. A transcript of the public meeting has been included in the Administrative Record (*see* pages AR302311 to AR302375).

EPA received written comments from four entities during the public comment period: the Delaware River Basin Commission ("DRBC"), PADEP, the Site Owner, and the PRP Group. The most extensive comments were received from the Site Owner. These comments are summarized along with EPA's responses in Section II of the Responsiveness Summary. Comments from DRBC, PADEP, and the PRP Group are summarized and answered in Section III of the Responsiveness Summary. Issues raised by the commentors in Section III which have been previously addressed in Section II will not be repeated. All the written comments received have been included in the Administrative Record for the Site.

I. ORAL COMMENTS FROM THE JULY 27, 1995 PUBLIC MEETING

On July 27, 1995, EPA hosted a public meeting to answer questions concerning the Proposed Plan at the Disston Recreation Center, located approximately ½ mile northwest of the Site, on 1511 Disston Street. Attendees included members of the Tacony Civic Association ("TCA"), citizens, local businesses, representatives of the PRP group, and representatives of the Site Owner. Only the TCA, citizens and local businesses asked questions and provided comments during the meeting. The meeting lasted from approximately 7:30 to 9:15 p.m.

1. A TCA member remarked that there are no copies of the Administrative Record at the Northeast ("NE") Philadelphia Library on Cottman Avenue.

   Response: EPA had provided documents to the library to be placed in the Site Administrative Record. Apparently, the NE Library had not yet placed the documents on the shelves at the time of the public meeting. At the TCA's request, EPA placed an additional set of documents at the Tacony Library and the Holmesburg Branch of the Philadelphia Library to increase public availability of the Site Administrative Record. The Administrative Record also remains available at the NE Library and in the EPA

Region III Office in Philadelphia. (Some library branches may be currently closed for renovation.)

2. The president of the TCA remarked that EPA's deed restriction that assumes the Site may only be used for industries is flawed. Since industries are unlikely to move back into the area, agencies such as GreenSpace and the Pennsylvania Environmental Commission, will probably convert areas along the waterfront for public recreation. The Site could realistically be used for residential and condominium development in the future, such as that which has occurred along Delaware Avenue in Center City Philadelphia.

   Response: The ROD requires the establishment of deed restrictions prohibiting residential or agricultural use of the property, as well as use of the groundwater and any intrusive activities into the subsurface soils below the water table in the Southern Portion of the property. The Site and adjacent properties are currently zoned for industrial use. Any deviations must be approved by the Philadelphia Planning Commission. Present laws also require residential structures within a floodplain area, such as the Site, to have its lowest floor and basements elevated to or above the flood water level. A majority of the southern portion of the Site encroaches into the 100-year floodplain.

   If residential development were to be approved in the future, EPA's remedy documented in the ROD would be protective of human health as long as proper measures were taken during construction and subsequent use of the property to prevent contaminants in subsurface soil from being brought to the surface. EPA's remedy requires that 12 inches of clean soil be placed and maintained on the surface of the Site to prevent any direct contact with Site contaminants. Any residential development at the Site would be connected to a public water supply. To ensure the safety of future residents, any use of groundwater at the Site will be prohibited. By taking these precautions, health risks associated with Site contamination should remain within acceptable levels for any future residents. During a 100-year flood, the possibility does exist that residual oil containing PCBs may fluctuate with the water level and contaminate clean surface soils. Although remote, this possibility should be considered in any future plans to rezone the Site for residential use.

3. The TCA indicated there are conceptual plans to put a bike path with a 50-foot right-of-way along the shoreline of the Site. This stretch of potential park property would eventually connect Center City to Pennypack Park.

   Response: EPA's remedy includes placing 12 inches of clean soil in the Courtyard and 24-inches in the Southern Portion of the Site so that recreational use of the Site's surface area would not pose a health risk to people. As an additional precaution, the ROD requires that tape markers be installed to indicate the boundary between the clean soil and the original Site soils to prevent the possibility of recontamination of the clean surface soil during any future construction activities.

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4. A representative of a local business asked when the cleanup would actually occur.

Response: After the ROD is issued, two additional steps are required before actual cleanup at the Site will begin. First, EPA will try to reach an agreement with the potentially responsible parties at the Site for their performance of the cleanup. EPA strives to negotiate and finalize an agreement within 4 months. The next step is completion of a detailed engineering design that the contractor performing the cleanup can follow to ensure the remedy is implemented properly. Preparation of the design usually requires 12-24 months. Therefore, actual construction at the Site could begin in as early as 16 months and should begin within 2½ years of the issuance of the ROD unless unexpected delays are encountered during the negotiations or the design process. EPA has experienced delays in the cleanup process at the Site, the most recent being a delay in issuing the ROD itself. This delay resulted from the large volume of comments EPA received on the Proposed Plan and supporting documents in the Administrative Record. EPA typically issues a ROD within six months of issuance of a Proposed Plan. However, an additional 23 months was required at the Metal Bank Site because EPA wanted to thoroughly review and respond to all public comments.

5. A TCA member stated that he sat in a meeting with the previous EPA project manager about three years ago, when legal proceedings were being initiated to force the responsible parties to put up funding to find out what needed to be done to clean up the Site. Nothing more was heard until this public meeting. From EPA's description of the cleanup timeline, it seems another 2 to 5 years will pass while corporate and government lawyers argue and more expenses will be incurred. Meanwhile the Site is still left unattended.

Response: Although the legal process associated with cleaning up Superfund sites can be time consuming, EPA strives to have those parties who are most closely associated with the contamination problems at a site perform the cleanup, rather than rely on the federal trust fund created through tax dollars. EPA does ensure that any immediate threats posed by Superfund sites are addressed quickly. Fortunately, contamination at the Metal Bank Site does not pose any immediate threat to the community. The measures required in the ROD are necessary to ensure that the potential risks associated with long-term exposure to Site contaminants are addressed.

Although it has taken a longer time than usual from publication of the Proposed Plan to issuance of the ROD at this Site, as discussed previously in Comment #4, from this point, EPA should have more control over the timeframe. Upon issuance of this ROD, EPA will send Special Notice Letters ("SNLs") to all PRPs inviting them to negotiate a Consent Decree in which they agree to clean up the Site and pay EPA's past costs associated with the Site. If EPA receives a good faith offer from any of the PRPs, the PRPs have 120 days from the issuance of the SNLs to negotiate a Consent Decree. If significant progress is not made, EPA may then issue an Order requiring the PRPs to clean up the Site.

6. The TCA remarked that EPA has been aware of oil slicks into the river since 1977 and knew about the leaking underground storage tank ("tank") three years ago. The TCA noted that during the Remedial Investigation, EPA just stopped when a concrete slab obstructed further excavation of the tank, so the tank is still in the ground and continues to release contaminants. The TCA asserts that EPA should remove the tank as its first priority and then build its groundwater collection system.

Response: The purpose of the Remedial Investigation was to characterize the nature and extent of contamination at the Site. EPA does not require that cleanup actions be performed during the investigation process unless contamination is encountered which poses an immediate threat to human health and the environment. According to available records, the tank at the Metal Bank Site was emptied and backfilled in 1986. When a test pit was excavated in the area of the tank during the investigation, a concrete slab was encountered. Since the tank did not pose an immediate threat, EPA did not require that the concrete slab or the tank be removed as part of the investigation. EPA is requiring excavation and off-site disposal of the tank as part of the remedy selected in the ROD. Although EPA agrees that removal of the tank is important, the ROD requires that the leachate collection system be installed first as a precautionary measure. If the tank is not empty and ruptures during excavation, the leachate collection system will ensure that the released material is captured before it leaves the Site.

7. A TCA member remarked that the intake for the Baxter Water Treatment Plant, which supplies the city's drinking water, is less than a quarter of a mile from the Site and may be at risk. The TCA member expressed concern that PCBs may pose a threat to residents who drink the water.

Response: In general, PCBs do not readily dissolve in water and tend to bind to soil and sediment particles. The Remedial Investigation did not directly evaluate whether PCBs from the Site could pose a threat to the Baxter public water supply because the Baxter water intake is located 2.2 miles upstream from the Site. An emergency water intake is located approximately 1.9 miles upstream from the Site. The Remedial Investigation does provide information which supports the conclusion that PCBs from the Site do not pose a health risk to public water supply users. As part of the Aquatic Ecological Risk Assessment, the discharge of PCBs in groundwater from the Site into the Delaware River was conservatively estimated to result in surface water PCB concentrations of between 1.3 and 2.0 nanograms per liter ("ng/l"). These concentrations are well below the Safe Drinking Water Act Maximum Contaminant Level of 500 ng/l (or 0.5 μg/l). Therefore, if river water at the Site does not pose a human health threat, any site-related PCB contamination two miles upstream at the Baxter water supply intake would not be expected to pose a threat to public water supply users.

Because the Philadelphia Water Department is not required to analyze for PCBs

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as part of its routine water testing program, the ROD requires sampling the Baxter water intakes for PCBs as a precautionary measure to ensure that levels are within the Safe Drinking Water Act Maximum Contaminant Limit.

8. A TCA member inquired if EPA tested for asbestos since a scrap metal yard immediately north of the Site (Northern Metal) extensively removed asbestos from dismantled ships. The member also indicated most of the PCBs brought to the Site originated from Northern Metal.

Response: The Remedial Investigation did not analyze for asbestos as a potential contaminant of concern at the Site. Asbestos could be present at the Site from the removal activities at the adjacent scrap metal yard. EPA also has documentation (*see* AR304076) that the Metal Bank State Road facility had directed asbestos wastes to the Site. While no additional information concerning the fate of this waste is available, the quantity of asbestos wastes does not appear to be large. Additional sampling will be required as the cleanup is implemented to determine the disposal location for excavated soil. Asbestos will be included as part of the analysis to ensure that proper disposal occurs.

EPA does not have documentation to support the commentor's allegation that Northern Metal was a source of the PCBs found at the Site. If information to support this allegation becomes available, EPA will consider Northern Metal as potentially liable for cleanup costs at the Site.

9. A local resident of Tacony and a member the TCA remarked that children are fishing near the Site because there are no signs warning that fish in the Delaware River are contaminated.

Response: The ROD requires that signs be posted and maintained along the Metal Bank property warning individuals not to eat fish caught in this portion of the Delaware River because of PCB contamination. PADEP currently has a public health advisory in effect warning people not to eat channel catfish, American eels, white perch, and blue crabs in the portion of the Delaware River adjacent to Philadelphia and flowing downstream to the Pennsylvania/Delaware state line. These species were found to contain levels of PCBs and chlordane in excess of federal guidelines.

10. A representative of Morris Iron & Steel inquired about hazards posed to his employees during EPA's cleanup.

Response: The ROD requires that measures to control dust be implemented during the excavation activities. Air monitoring is also required to ensure that no unacceptable releases of Site contaminants occur. The control measures and air monitoring will ensure that individuals in the vicinity of the Site are not exposed to any hazards during the Site cleanup.

11. The TCA inquired if EPA drilled through the contaminated river bed layer and tested the groundwater aquifer underneath. The TCA requested confirmation that the PCBs are only mobile through the oil.

Response: Contamination at the Site originated primarily from spills and/or storage of PCB-bearing oil recovered from electrical transformers. A PCB-contaminated oil layer floating on the water table at the Site was the focus of a prior cleanup action by Metal Bank of America, Inc. Therefore, the groundwater investigation conducted during the Remedial Investigation was concerned with characterizing contamination present in the upper portion of the shallow unconsolidated aquifer at the Site. Monitoring wells were generally drilled to a depth of 15 - 20 feet with a 10-foot screened interval across the water table. No wells were drilled into the underlying bedrock aquifer.

While PCBs bound to transformer oil (*i.e.,* LNAPL) float on the water table, PCBs themselves are denser than water (*i.e.*, DNAPL) and, if not associated with oil, would continue to move down through the aquifer until a confining layer (*e.g.,* clay or bedrock) is reached. Therefore, a possibility exists that PCBs could be present in lower portions of the shallow unconsolidated aquifer or in the bedrock aquifer beneath the Site. The ROD requires further groundwater investigation during the remedial design process to determine the full extent of PCB contamination. If PCBs are found to be present as DNAPLs at the Site, additional actions could be required to address this concern. Depending on the nature and scope of these additional actions, EPA would either issue an Explanation of Significant Differences to this ROD or issue a Proposed Plan for public comment to amend the ROD.

12. The TCA requested clarification on the sequence of how the remedy will be installed.

Response: The elements of the remedy selected in the ROD will be performed in the following sequence: (1) installation of the temporary sheet pile cofferdam; (2) installation of the leachate collection system; (3) removal of the underground storage tank and contaminated soil; and (4) removal of sediments. Section IX (Selected Remedy and Performance Standards) provides details on the required elements of the cleanup.

II. WRITTEN COMMENTS FROM THE SITE OWNER

The Site Owner submitted extensive comments on the documents in the Administrative Record supporting the Proposed Plan, as well as comments on the Proposed Plan itself. These comments were presented in 22 volumes and have been included in the Administrative Record. EPA has summarized in this section the substantive issues raised by the Site Owner concerning information which served as the basis for EPA's decision. Comments by the Site Owner that were editorial in nature (*i.e.,* suggestions for including additional information in various reports or drawing different interpretations of the information presented) are addressed only to the extent that they raise a question concerning EPA's basis for making its decision. Comments from the Site Owner have been grouped into six categories: Human Health Risk Assessment, Aquatic Ecological Risk Assessment, Terrestrial Ecological Risk Assessment, Non-Aqueous Phase Liquids ("NAPL"), Remedial Alternatives, and Legal/ Factual Issues.

A. Human Health Risk Assessment

Unless otherwise specified, all PCB cancer risk calculations are based on the original PCB slope factor of 7.7 kg·d/mg rather than the revised PCB slope factor of 2.0 kg·d/mg. However, for all scenarios that posed an unacceptable risk previously, the corrected risk levels based on the revised slope factor, have been included in brackets ("{}"). Section VI.A of the ROD and Comment #23 in this Section provide the final cancer risk values.

1. The Site Owner contends that EPA's revised Baseline Human Health Risk Assessment dated April 28, 1995 ("1995 Risk Assessment"), is invalid because EPA does not explain what data was used to generate the exposure point concentration or how contaminants of concern were selected.

   Response: Upon review of the data used to generate the exposure point concentrations for the Baseline Human Health Risk Assessment dated January 27, 1994 ("1994 Risk Assessment"), EPA identified several instances where data collected at the Site had not been included (*e.g.*, PCB surface soil data from Courtyard, dioxin data from subsurface soil and sediments) . EPA asked the PRP Group to review the dataset to ensure all data were included and to recalculate the exposure point concentrations. EPA's toxicologist for the Site reviewed the dataset resubmitted by the PRP Group along with the new exposure point concentrations and then recalculated the risk at the Site in the 1995 Risk Assessment.

   In response to concerns raised by the Site Owner, EPA again verified that the dataset used in the 1995 Risk Assessment was complete by searching EPA records and recalculating the exposure point concentrations for several key exposure pathways. These include exposure to PCBs in the Courtyard surface soil, to oil or LNAPL in monitoring well MW-6, and to catfish fillets. This review demonstrated that the exposure point concentrations used in the 1995 Risk Assessment were correct. The results of this review are presented in the Weston/SATA Technical Review of Risk Assessment ("Technical Review") dated June 4, 1997, which has been included in the Administrative Record (*see* AR304100). The raw data used to calculate the exposure point concentrations for these pathways are presented in Appendix D of the Verification Report (*see* AR304121). The detection limits for data used in the 1995 Risk Assessment are verified in Attachment B of the report (*see* AR304112).

   In general, the following procedures were followed during data handling. When samples had field or laboratory duplicates, the original result was used. For media such as soil and sediment where the duplicates are not homogeneous samples, a duplicate result may be used if contamination is present at greater levels in the duplicate than in the original sample. If a contaminant of concern was detected above the analytical quantitation limit, the result was used in the dataset, even if some question about the analytical quality of the result existed. When the result was below the analytical quantitation limit, the result was considered to be half the value of the quantitation limit and used in the dataset. The exposure point concentrations were based on the log of the upper 95% confidence limit ("UCL") of the dataset rather than the normal UCL because the data matched the log normal distribution when screened using the Shapiro-Wilks Test for Normality[1]. This screening was verified for the selected pathways in Attachment C of the Technical Review (*see* AR304116). If a log UCL could not be calculated because of the nature of the dataset, the normal UCL was used. The above procedures are consistent with EPA's standard protocols for handling data collected for risk assessment purposes. EPA uses a conservative approach to ensure that the risk assessment does not underestimate the risks associated with contamination at a site.

EPA determined the contaminants of concern at the Site by following the EPA Region III guidance, *Selecting Exposure Routes and Contaminants of Concern by Risk-Based Screening* (EPA/903/R-93-001, January 1993) (*see* Appendix 4 of the 1995 Risk Assessment; AR301688). The 1995 Risk Assessment used the version of the Risk-Based Concentration ("RBC") table referenced in the above guidance which was current at the time of the assessment. This RBC table was dated February 9, 1995 and is included as Attachment E of the Technical Review (*see* AR304174). The slope factors presented in Table 1 of the 1995 Risk Assessment (*see* AR301575) matched this RBC table.

2. The Site Owner contends that EPA used inappropriate data to generate the PCB exposure point concentration used to calculate risk to industrial workers from ingestion of the Courtyard soils (*see* AR301578).

Response: The exposure point concentration for PCBs was calculated by adding either the log UCL of the dataset, or the maximum observed concentration, whichever was less, for the PCB aroclors that were detected in the soil samples collected at the Site. The values added include 140.0 ppm, which is the maximum concentration observed for Aroclor 1248, and 5.4 and 5.7 ppm, which are the log UCLs for Aroclors 1254 and 1260, respectively (*see* AR301619). The sum of these values is 151.1 ppm, which is the reasonable maximum exposure ("RME") concentration used in the risk calculation. This value was verified in Table A-3 of the Technical Review (*see* AR304108). The RME is defined as the highest exposure that could reasonably be expected to occur for a given exposure pathway at a site.

The data used to calculate the log UCLs for Aroclors 1254 and 1260 were the

1 *See* Supplemental Guidance to *Risk Assessment Guidance for Superfund*: Calculating the Concentration Term; US EPA - OSWER; Publication 9285.7-081; May 1992.

laboratory results for the surface soil samples collected in the Courtyard (*see* AR301660). The detection limits for some samples were elevated because of the dilution required to measure the PCBs present in the sample (*e.g.*, Sample CY-136-0-C required a 200-fold dilution to measure the concentration of Aroclor 1248; this raised the detection limit of the other Aroclors in that sample by 200). However, the RME for the Courtyard surface soils results primarily from the observed PCB concentration of 140 ppm, not from manipulation of data below analytical quantitation limits.

3. The Site Owner contends that the exposure assumptions used to estimate risk in the Courtyard soil were not realistic since contamination is only found in a small area of the Courtyard soil. The Site Owner asserts that EPA assumed that a worker would be employed full time in the Courtyard and that the entire Courtyard soil area is contaminated.

Response: In calculating the risk to industrial workers in the Courtyard soil area, EPA assumed that a worker could be exposed to the Courtyard surface soil for 250 days per year for a period of 25 years (*see* AR301578). EPA also assumed that the average amount of soil that could be ingested daily is approximately 16.7 milligrams. These assumptions would result in a worker ingesting approximately a teaspoon of contaminated soil every 2¼ years. EPA typically uses an ingestion rate of 50 milligrams for industrial workers. A lower rate was used in the risk assessment for this Site because EPA recognized that a worker in this area could reasonably be expected to have less contact with contaminated soil. EPA did not assume that a worker would spend his entire workday in the Courtyard soil, nor did EPA assume that the entire Courtyard soil area was contaminated.

4. The Site Owner contends that there is no basis for taking an action for the Courtyard soil or soil from any other area of the Site. The Site Owner contends that the 10 ppm surface soil cleanup level results from improperly applied Agency policy and is not based on health risk. The Site Owner further states that the Food and Drug Administration ("FDA") allows 10 ppm of PCBs in boxes used to package cereal.

Response: EPA's decision on the need to take action at a site is based on the overall potential for individuals who are exposed to contaminants at the site to experience unacceptable health effects. To determine the overall impact, EPA evaluates the various ways an individual may be exposed to Site contaminants and adds the risk associated with each pathway to calculate the *total* risk to the individual. If the total risk to individuals who could reasonably be exposed to contaminants from the site is less than 1.0E-04 for carcinogenic contaminants, EPA would generally not require action (assuming the human health risks from noncarcinogenic contaminants are acceptable and no adverse environmental impacts are present). At the Metal Bank Site, the Risk Assessment identifies groups of individuals (*i.e.*, future construction workers and recreational boaters) who could be exposed to contaminants from the Site and potentially experience a total risk above 1.0E-04. (However, based on the revised PCB slope factor, the risk to recreational boaters no longer exceeds 1.0E-04.) In addition, the Aquatic Ecological Risk Assessment identifies potential adverse impacts to aquatic organisms from the Site. Therefore, EPA's decision to take action at this Site is warranted.

When action is warranted, Section 300.430(e)(2)(i)(*2*) of the NCP states that a 1.0E-06 cancer risk level shall be the point of departure for determining remediation goals when other applicable or relevant and appropriate requirements are not available. Although Pennsylvania's Land Recycling and Environmental Remediation Standards Act (Act 2) provides standards for PCBs in soil, EPA has established the soil standards based on more stringent risk-based EPA guidance. EPA has estimated the carcinogenic risk to industrial workers from the surface soil in the Courtyard soil to be 6.77E-05 which does not achieve the 1.0E-06 remediation goal. The Superfund program has adopted an approach to clean up PCBs that relies heavily on the PCB Spill Cleanup Policy published in 40 C.F.R. 761.120 -761.139 on April 2, 1987. In August 1990, EPA issued OSWER Directive No. 9355.4-01 FS, *A Guide on Remedial Actions at Superfund Sites with PCB Contamination*, which recommends an action level of 10 - 25 ppm for triggering cleanup of PCB spills in industrial areas. Cleanup in areas where access is not restricted must achieve 10 ppm while cleanup in restricted access areas must achieve 25 ppm. Because the PCB contamination in the Courtyard soil area is found in surface soils which individuals could encounter more readily than the contaminated subsurface soil in the southern portion of the Site, the ROD appropriately requires a PCB cleanup level of 10 ppm for the Courtyard soils.

FDA has established a temporary tolerance for residues of PCBs of 10 ppm in paper food-packaging material intended for or used with human food (21 C.F.R. 109.30(a)(9)). FDA has established this tolerance because of concern that PCBs in paper food-packaging material may migrate to the packaged food and then be consumed. EPA's cleanup level, on the other hand, protects against direct consumption of PCBs through inadvertent ingestion of soil. A direct comparison of EPA's cleanup level to FDA's tolerance level can only be made if FDA's tolerance level is concerned with direct consumption of PCBs through inadvertent ingestion of the paper food-packaging material. Since individuals are probably less likely to inadvertently eat paper food-packaging material than they are to place hands or other objects which have contaminated soil on them in their mouths, FDA's tolerance levels could be considered more conservative. Because these two action levels have been developed for very different purposes, EPA considers any comparison of the two to be speculative and not a reasonable basis for establishing a cleanup level at a Superfund site.

5. The Site Owner contends that arsenic, beryllium, cadmium, and chromium should have been excluded from the risk assessment for exposure to soil because the Remedial Investigation indicates that the concentrations detected were within background ranges. The Site Owner further asserts that dioxin contamination found at the Site should have been excluded because the two rip-rap sediment samples show only one 2,3,7,8-containing furan congener and the octachloro furan and probably represent background

contamination.

Response: In general, a remedial investigation will attempt to determine the concentrations of inorganic contaminants naturally occurring near a site and, if possible, anthropogenic (*i.e.*, manmade) concentrations from nearby point and nonpoint sources. Because both natural and anthropogenic concentrations are difficult to determine in an urban, industrialized setting, the Remedial Investigation for the Metal Bank Site did not attempt to quantify this information.

In the absence of site-specific natural background concentrations, EPA recommends the use of literature values to approximate natural conditions. The Remedial Investigation correctly states that the levels of most inorganic contaminants found at the Site were within the background ranges found in research literature. This is not, however, a sufficient basis for eliminating these contaminants from the risk assessment. The range of values found in the literature varies widely. To avoid underestimating the potential site-related risk, EPA required that the inorganic contaminants be included in the risk assessment. EPA acknowledges the uncertainty associated with possible background concentrations in the Risk Assessment (*see* AR301571). This approach is consistent with Section 5.7 of EPA's *Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A)* (EPA/540/1-89/002, December 1989). This guidance does not mandate that contaminants present within background ranges be eliminated from the risk assessment.

Similarly, EPA does not recommend excluding contaminants such as dioxin which are present at a site from the risk assessment unless site-specific information is available to conclusively show that the contaminants are from specific anthropogenic sources. Providing conclusive information of this nature would have been difficult, if not impossible, at the Metal Bank Site and was not required. Therefore, EPA included the dioxin data in the risk assessment process to avoid underestimating the potential site-related risk. Again, this approach is consistent with EPA risk assessment guidance.

If the chemicals mentioned by the Site Owner had been eliminated from the risk assessment, the overall health risks posed by the Site would not have changed significantly. Therefore, the inclusion of these substances in the risk assessment did not impact EPA's final remedy selection decision.

6. The Site Owner contends that the estimated risk to future industrial workers from ingestion of surface soil outside the Courtyard is invalid because the exposure point concentration for PCBs cannot be verified.

Response: EPA used the same method to calculate the PCB exposure point concentration for surface soils outside the Courtyard (*i.e.*, those in the southern portion of the Site) as it did for surface soils in the Courtyard (*see* responses to comments #2 and #3 above). The values used are 0.290 ppm, which is the maximum concentration of Aroclor

1248 detected, and 0.995 and 0.982 ppm, which are the log UCLs for Aroclors 1254 and 1260, respectively (*see* AR301622). The sum of these values is 2.27 ppm, which is the RME concentration used in the risk calculation.

PCBs found in the surface soils outside the Courtyard contribute approximately one percent of the total potential health risk to future industrial workers posed by the Site (*i.e.*, a cancer risk of 1.02E-06 out of total risk of 7.46E-05 {2.45E-05}; *see* AR301579, AR301598) and, therefore, did not impact EPA's final remedy selection decision.

7. The Site Owner contends that risk to construction workers from exposure to subsurface soils outside the Courtyard has been overestimated because of discrepancies in the calculation of the exposure point concentrations for PCBs, benzo(a)pyrene, and dibenz(a,h)anthracene.

Response: As previously indicated, exposure point concentrations were calculated by using the log UCL of the dataset for the chemical or the maximum observed concentration, whichever is less. In the case of PCBs, the appropriate values for each aroclor detected were added to determine the RME concentration used in the risk calculation. Specifically, the following log UCL values were used to determine the RME concentration for PCBs: 1.24 ppm for Aroclor 1221; 1.35 ppm for Aroclor 1242; 1.43 ppm for Aroclor 1248; 2.38 ppm for Aroclor 1254; and 4.0 ppm for Aroclor 1260 (*see* AR301624). The maximum concentration detected for Aroclor 1232 (0.89 ppm) was used because it was less than the log UCL. Aroclor 1016 was not included because it was not detected in any subsurface soil sample. The total of the aroclor values is 11.3 ppm, which is the RME concentration used in the risk assessment. The RME concentrations used for benzo(a)pyrene and dibenz(a,h)anthracene are 54.0 ppm and 8.2 ppm, respectively, which represent the log UCL of each data set.

The combined risk from PCBs, benzo(a)pyrene, and dibenz(a,h)anthracene in subsurface soils outside the Courtyard represents less than one tenth of one percent of the total potential health risk posed by the Site to future construction workers (*i.e.*, a cancer risk of 6.08E-07 for PCBs, 2.75 E-06 for benzo(a)pyrene, and 4.18E-07 for dibenz(a,h)-anthracene out of a total risk of 6.01E-03 {1.58E-03}; *see* AR301582, AR301598). Therefore, these contaminants did not impact EPA's final remedy selection decision.

8. The Site Owner contends that EPA did not explain why it changed the exposure point concentration for dioxin in subsurface soils from 4.35 ppm in the 1994 Risk Assessment to 4.35 ppb in the 1995 Risk Assessment. The Site Owner noted similar changes in the exposure point concentration for dioxin in dust and sediments.

Response: When EPA verified selected exposure point concentrations prior to conducting the 1994 Risk Assessment, the Agency determined that the appropriate value for dioxin was 4.35 ppb (*see* AR301686). However, when EPA used this value in the 1994 Risk Assessment, incorrect units were used (*i.e.*, ppm were used rather than ppb).

The PRP Group detected this error during its review of EPA's 1994 Risk Assessment (*see* AR301266), including the exposure point verification in Appendix 3. When EPA prepared the revised risk assessment in 1995, EPA used the ppb units for the dioxin exposure point concentration in all appropriate calculations. (Note: Additional problems identified with the dioxin dataset for the rip-rap sediments and the resulting exposure point concentration are discussed in the response to Comment #18 below.)

9. The Site Owner contends that EPA overestimated the risk to future construction workers breathing dust from the Site because EPA evaluated chromium as the more toxic chromium VI form even though chromium VI quickly reverts to the less toxic chromium III form in the environment.

   Response: In the absence of analysis for hexavalent (VI) chromium, EPA assumed both hexavalent and trivalent (III) chromium are present at the concentration of the total chromium detected. This assumption is highly conservative and, therefore, the most protective of human health and the environment. The potential presence of hexavalent chromium in the dust at the Site represents less than one tenth of one percent of the total potential health risk posed by the Site to future construction workers (*i.e.,* a cancer risk of 1.53E-06 out of a total risk of 6.01E-03 {1.58E-03}; *see* AR301583, AR301598). Therefore, this contaminant did not impact EPA's final remedy selection decision.

10. The Site Owner contends that EPA's exposure assumptions relating to a future construction worker's dermal contact with groundwater is unrealistic. EPA assumes that 10 percent of a construction worker's body could be exposed to groundwater at the Site for an average of one hour a day for 25 days over a one-year period.

    Response: EPA's exposure assumptions are intended to be conservative and reflect the reasonable maximum exposure that could be encountered at the Site to ensure that the potential health risks from contaminants are not underestimated. EPA assumes that a construction worker could be exposed to groundwater at the Site for a total of 25 hours. Although the risk assessment assumes this total exposure results from contact with the groundwater for one hour a day on 25 different days within one year, the total exposure could also result from longer daily exposures for fewer days (*e.g.,* exposure for five hours on five days). Exposure to groundwater would most likely occur if future activities such as excavation or drilling are performed to construct a foundation or some other subsurface structure at the Site. The water table was encountered at depths of 8 - 15 feet below the ground surface in the 15 monitoring wells installed at the Site with moist soil encountered at somewhat shallower depths.

    Using EPA's assumptions, risk from dermal contact with groundwater only contributed one tenth of one percent of the total risk to future construction workers at the Site (*i.e.,* a cancer risk of 6.37E-06 out of a total risk of 6.01E-03 {1.58E-03}; *see* AR301584, AR301598). Therefore, risk from this exposure pathway did not impact EPA's final remedy selection decision.

11. The Site Owner contends that EPA overestimated the risk to future construction workers from dermal contact with Site groundwater by including aroclors that were not detected in the exposure point concentrations for PCBs. The Site Owner further contends that EPA failed to explain discrepancies in the groundwater data summary in Table 4-12 of Appendix 2 to the 1994 Risk Assessment (*see* AR300704) or verify that appropriate data were used to calculate the PCB exposure point concentration.

Response: The only groundwater exposure pathway considered in the risk assessment for the Site is dermal contact by future construction workers. As stated in the previous response, this pathway only contributes one tenth of one percent of the total potential risk posed by the Site to future construction workers. Therefore, when EPA revised the risk assessment in 1995, EPA did not revise the risk calculations associated with the groundwater exposure pathway. The Site Owner is correct that when the risk was calculated in the 1994 Risk Assessment, the exposure point concentration was based upon data for all aroclors, including those that were not detected in any groundwater samples at the Site. This resulted in a highly conservative exposure point concentration. However, even with this conservative value, the potential risk associated with exposure to groundwater was minimal.

The Site Owner is also correct that some discrepancies exist in the data summarized in Table 4-12 in Appendix 2 to the 1994 Risk Assessment. The table presents two sets of data for PCB aroclors. The log UCLs for the second set were used to calculate the exposure point concentration. These values were based upon 24 groundwater samples collected during 1991 and 1992 at the Site. However, the data presented in the RI indicates that a total of 30 groundwater samples were analyzed for PCBs (*see* AR300493 and AR300569). In response to the Site Owner's concern, EPA recalculated the exposure point concentrations using the complete dataset and only those aroclors that were detected in at least one groundwater sample (*i.e.*, Aroclors 1242 and 1260). The revised concentration is 2.08E-03 mg/l, rather than 9.42E-03 mg/l used in both the 1994 and 1995 Risk Assessments, and the revised lifetime cancer risk associated with the revised PCB concentration is 2.87E-07, rather than 1.30E-06. This reduces the potential risk associated with the groundwater exposure pathway from 6.37E-06 to 5.07E-06 which results in a 2/100ths of one percent reduction in the total potential risk to future construction workers from Site contaminants.

12. The Site Owner contends that PCBs should not be included as a groundwater contaminant of concern because only monitoring well MW-6 routinely shows PCBs.

Response: The risk assessment for a site includes any site-related contaminant that has been detected in groundwater monitoring wells designed to characterize the site. To exclude a contaminant actually detected at a site could result in the underestimation of the risk associated with the site. PCBs were detected in groundwater at the Metal Bank Site in monitoring well MW-6 in samples collected both in 1991 and 1992 and in MW-7 in the 1992 sample. The dataset used to calculate the groundwater exposure point concentration for the risk assessment included these detected values along with values equal to one-half the analytical quantitation limit when PCBs were not detected above this level. This standard approach provides a conservative estimate of potential risk from Site groundwater. As indicated in the previous two responses, the potential human health risk calculated using this approach indicates that dermal contact with groundwater does not pose a significant risk to future construction workers at the Site.

13. The Site Owner contends that the concentrations of benzo(a)pyrene and dibenz(a,h)anthracene used to calculate risk to future construction workers from dermal contact with Site groundwater cannot be verified because the data summarized in Table 4-12 of the 1994 Risk Assessment (*see* AR300706) is not consistent with the data summarized in Table 4-26 of the Remedial Investigation Report (*see* AR300228).

Response: The Site Owner is correct in noting that discrepancies exist between the data summary tables in the 1994 Risk Assessment and the Remedial Investigation Report. As indicated in the response to Comment #11 above, EPA did not revise the risk calculations for the groundwater exposure pathway in the 1995 Risk Assessment because the overall risk from this pathway was not significant. However, since the Site Owner questioned several of the risk calculations, EPA has reviewed the data and recalculated these values. The exposure point concentrations and the lifetime cancer risks for future construction workers exposed to benzo(a)pyrene and dibenz(a,h)anthracene in groundwater at the Site are presented in the table below. Both the values used in the 1994 Risk Assessment and the revised values are included for comparison.

Contaminant	**Exposure Point Concentration (μg/l)**		**Lifetime Cancer Risk**	
	1994 value	**Revised**	**1994 value**	**Revised**
Benzo(a) pyrene	7.19	28.4	1.58E-06	6.2E-06
Dibenz(a,h)anthracene	6.51	12	3.23E-06	6.0E-06

These revised values, along with the revised PCB values noted in Comment #11 above, actually increase the potential risk associated with the groundwater exposure pathway from 6.37E-06 to 1.28E-05. Therefore, the net result of recalculating the risk values for the contaminants questioned by Site Owner is an increase in the total potential risk to future construction workers from 6.01E-03 to 6.02E-03.

14. The Site Owner points out that both the 1994 and 1995 Risk Assessments incorrectly state, in the next to last sentence on page 5, that construction workers would contact the "floating free product" found at monitoring well 5 at the Site.

Response: The Site Owner is correct. This sentence actually refers to the floating free product that was found at monitoring well 6. Table 11 in both the 1994 and 1995 Risk Assessments correctly indicate that the LNAPL was found in MW-6.

15. The Site Owner contends that the estimated risk to future construction workers from dermal contact to LNAPL at monitoring well MW-6 is invalid because the exposure point concentration used cannot be verified and is not representative of current Site conditions. The Site Owner asserts that data from the 1992 sampling should have been used rather than data from the 1991 sampling.

Response: Table 4-29 of the Remedial Investigation Report summarizes PCB data collected in monitoring wells at the Site during the 1991 and 1992 sampling events (*see* AR300243). Samples labeled MW6-P are those that contained floating petroleum product (*i.e.,* LNAPL). During the October 1991 sampling, a discrete LNAPL layer was encountered and sampled. The PCB concentrations contained in this LNAPL sample are 430,000 ppb of Aroclor 1248 and 660,000 ppb of Aroclor 1260. Table 4-29 also reports the results of a second sample labeled as MW6-P seven months later (May 1992) which contained 4 ppb of Aroclor 1232 and 3 ppb of Aroclor 1242. This sample was collected after the monitoring well had been purged and only droplets of LNAPL were observed in the groundwater sample, rather than a discrete LNAPL layer. Although labeled as an LNAPL sample, this sample better represents the groundwater concentrations of PCBs in MW-6, rather than LNAPL concentrations.

In calculating the potential risk associated with dermal contact with LNAPL, EPA used the sum of the aroclor values observed in the 1991 sample as the RME concentration (*i.e.,* 1,090 ppm). The PCB concentrations observed in this sample are consistent with those historically found in the oil layer at the Site. Total PCB concentrations observed in the oil layer at the Site in 1977 and 1989 were 1,539 ppm and 1,540 ppm, respectively. Although the prior cleanup action at the Site removed much of the oil layer that could be recovered through active pumping, an oil layer has still been observed at the Site as reflected by the 1991 sample results[2]. Therefore, the 1991 results more appropriately represent a reasonable maximum concentration to which future construction workers could be exposed and were appropriately used in the risk assessment for the Site. EPA reviewed the analytical data for the 1991 sample and the risk calculations based on this sample to ensure their accuracy. The results are presented in Appendix D of the Technical Review, which is included in the Administrative Record (*see* AR304122).

16. The Site Owner contends that the exposure point concentration for benzo(a)pyrene used to estimate risk to children from ingesting river sediment while recreational boating near

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2 Further discussion of the presence of an oil layer at the Site can be found later in the Responsiveness Summary in the responses to Comment #9 in Section B (Aquatic Ecological Risk Assessment) and Comments #1 - 7 in Section D (NAPL).

the Site cannot be verified.

Response: The RME concentration for benzo(a)pyrene used in this risk calculation was the maximum observed concentration of 17 ppm. This concentration was used because it is lower than the log UCL of the river sediment dataset. The log UCL was calculated using the data presented in Table 4-20 of the Remedial Investigation Report (*see* AR300214). The statistical calculations are summarized in the Appendix 2 to the 1995 Risk Assessment (*see* AR301632).

17. The Site Owner contends that the river sediment sample which has the maximum benzo(a)pyrene concentration (US2) is located upstream of the Site and should not be included in the risk calculations (*see* Figure 2-11 in the Remedial Investigation Report; AR300070). The Site Owner further contends that if this sampling location is included, data from the two samples collected at this location should have been averaged, rather than using the higher of the two results.

Response: River sediment samples US1 and US2 were two discrete samples collected immediately upstream of the Metal Bank property boundary. Although these samples are labeled upstream, they can be used to characterize Site conditions because of the tidal influences of the Delaware River. Benzo(a)pyrene was detected in US1 and US2 at concentrations of 2.8 and 17.0 ppm, respectively. Benzo(a)pyrene was also detected in seven of the eight additional river sediment samples collected downstream of US1 and US2. The river sediment concentrations observed moving downstream from US1/US2 are 12 ppm at TRANS1-HW; 0.93 ppm at TRANS1-LW; 2.8 ppm at TRANS2-HW; 0.33 ppm at TRANS2-LW; 3.3 ppm at MF-119 and 7.9 ppm at MF-138 (*see* AR300214). These data indicate that benzo(a)pyrene is present in river sediments along the Metal Bank property boundary. Although other sources could be contributing to this contamination, benzo(a)pyrene was observed in samples collected from the Site soils and groundwater as well as from the river sediments. Therefore, benzo(a)pyrene concentrations found in all of the river sediment samples collected as part of the Remedial Investigation were appropriate to include in the risk assessment calculations.

Even if the benzo(a)pyrene concentration in US2 sediment sample is not used in the risk assessment, as the Site Owner suggests, the change in the overall potential risk to recreational boaters would be insignificant. The RME for the river sediments would be revised from 17.0 ppm to 12.0 ppm since the latter is the maximum concentration observed in the sediment if US2 is excluded. The reductions that result in the lifetime cancer risk for both adult and child recreational boaters are presented in the table below. No change occurs in the total lifetime cancer risk to adult recreational boaters and the risk to child boaters decreases from 1.60E-04 to 1.59E-04 {4.61E-05}.

Lifetime Cancer Risk to Recreational Boaters	1995 Risk Assessment		Revised Risk (excluding US2)	
	Adult	Child	Adult	Child
Risk from Benzo(a)pyrene in River Sediment	7.49E-07	1.75E-06	5.29E-07	1.23E-06
Total Risk from River Sediments	1.37E-06	3.20E-06	1.15E-06	2.68E-06
Total Risk from All Pathways	2.65E-04 {7.14E-05}	1.60E-04 {4.61E-05}	2.65E-04 {≈7.14E-05}	1.59E-04 {≈4.61E-05}

18. The Site Owner contends that the dioxin exposure point concentration used to estimate risk to children and adults from ingesting sediment from the rip-rap area is incorrect because of improper addition of the data and improper conversion of data units.

Response: The Site Owner is correct in noting errors in the calculation of the exposure point concentration used to estimate risk to recreational boaters who inadvertently place their hands or other objects soiled with contaminated rip-rap sediment in their mouths. However, these errors have no impact on the overall potential risk to recreational boaters. The data summary prepared by the PRP Group for the rip-rap sediment samples and included as Table 4-9 in Appendix 2 of the 1994 Risk Assessment (*see* AR300697) contained several errors. The maximum values identified for each dioxin and furan compound did not match the data presented in the Remedial Investigation Report (*see* AR300523; AR300527). In addition, the summary indicated that the units for the dioxin and furan data were μg/kg when the actual units were ng/kg (nanograms per kilogram).

To calculate the dioxin exposure point concentration for the rip-rap sediment data, EPA converted the maximum value as reported in Table 4-9 for each dioxin and furan compound to its equivalent 2,3,7,8-TCDD value (the most toxic form of dioxin). The sum of these values was used as the RME concentration in the risk assessment. EPA made an additional error in the risk calculation in the 1994 Risk Assessment by inadvertently failing to convert the dioxin RME concentration to units of mg/kg before using it in the risk calculation.

Several of the above errors were identified and corrected in the 1995 Risk Assessment. However, since the potential risk posed by this exposure pathway was not significant, EPA did not completely review and recalculate the exposure point concentration for dioxin in the rip-rap sediments. In response to the Site Owner's concerns, EPA has revisited these calculations. Sediment samples from two locations (RR-3 and RR-4) were analyzed for dioxins and furans during the Remedial

Investigation. A field duplicate sample was also collected and analyzed at RR-3. EPA included the results from the field duplicate sample in the risk assessment because the dioxin and furan concentrations in this sample were significantly higher than those in the other two samples. Because the risk assessment focuses on the reasonable maximum exposure, EPA considers this conservative approach appropriate. The revised data summary for the rip-rap sediment included in the 1995 Risk Assessment (*see* AR3016410) correctly identifies the maximum concentration observed for each dioxin and furan compound.

If, as the Site Owner suggests, the concentrations from the field duplicate had been averaged with the other sample collected at RR-3 or if the RR-3 data had been completely excluded, the results of the risk assessment would be the same. EPA calculated revised dioxin exposure point concentrations using the maximum dioxin and furan concentrations observed in the rip-rap sediment and using the data from only RR-4. The revised values are 1.66E-06 mg/kg and 7.35E-08 mg/kg, respectively. Potential risks to recreational boaters using the dioxin RME from the 1995 Risk Assessment and the two revised dioxin RME concentrations are summarized below. Using the revised RMEs results in no change to the total potential risk to recreational boaters from the Site.

Lifetime Cancer Risk to Recreational Boaters	**Dioxin RME in 1995 Risk Assessment (5.91E-05)**		**Revised Dioxin RME**			
			All data (1.66E-06)		**RR-4 only (7.35E-08)**	
	Adult	**Child**	**Adult**	**Child**	**Adult**	**Child**
Risk from dioxin in Rip-Rap Sediment	1.19E-08	2.78E-08	3.34E-10	7.81E-10	1.48E-11	3.46E-11
Total Risk from Rip-Rap Sediments	7.09E-07	1.65E-06	6.97E-07	1.63E-06	6.97E-07	1.63E-06
Total Risk from All Pathways	2.65E-04 {7.14E-05}	1.60E-04 {4.61E-05}	2.65E-04	1.60E-04	2.65E-04	1.60E-04

19. The Site Owner contends that the PCB concentrations found in fish samples collected near the Site reflect background contamination and cannot be linked to the Site. The Site Owner further contends that the levels of PCBs detected in the edible fish samples (*i.e.*, fillets) are below the allowable level (2 ppm) established by the FDA for public consumption. Lastly, the Site Owner asserts that the exposure assumptions for fish consumption used in the risk assessment are inappropriate because the Pennsylvania Fish and Boat Commission has issued a fish consumption advisory indicating that channel catfish, white perch, and the American eel should not be eaten if caught in the Delaware

River between Yardley and the Pennsylvania/Delaware state line because of PCB contamination.

Response: In characterizing the potential risk to recreational boaters from Site contaminants, EPA acknowledges in the risk assessment that sources other than the Site could have contributed substantially to the PCB levels in the fish fillets used to estimate the risk (*see* AR301571). However, since PCBs are a known Site contaminant and releases to the river have occurred, fish feeding on the PCB-contaminated sediments at the Site are also likely to have accumulated some site-related PCBs in their tissue. EPA's risk assessment process does not require that the Site be the sole source of contamination before an exposure pathway can be included.

EPA's assumptions used to estimate the potential risk to recreational boaters from eating fish from the river are reasonable. To evaluate the reasonable maximum exposure, EPA assumed that boaters would catch fish while boating on the river ten days during the year and eat one meal from the fish caught during each trip. Adults would eat approximately 200 grams (7 ounces) of fish at each meal and children would eat approximately half that amount. The level of PCBs estimated to be in the fish (1.27 ppm) was derived from the levels found in the channel catfish fillet samples collected in the river at the Site. The potential lifetime cancer risk resulting from this exposure is estimated to be 2.62E-04 {6.79E-05} for adults and 1.53E-04 {3.96E-05} for children which is outside the acceptable risk range of 1.0E-04 to 1.0E-06. The fish fillet analytical results, the exposure point concentration, and the risk calculations were verified as being accurate during preparation of this Responsiveness Summary. The results are presented in Appendix A of the Technical Review, which is included in the Administrative Record (*see* AR304106).

FDA's criteria for establishing temporary tolerances for residual PCBs in fish are different than those used by EPA to make site-specific risk management decisions at Superfund sites. EPA has followed its standard procedures for estimating the long-term risk from potential exposure to Site contaminants. Based on reasonable assumptions about the maximum exposure that recreational boaters could experience, EPA has determined that the Site contributes to an unacceptable level of potential risk.

EPA does not consider the presence of a fish consumption advisory on the Delaware River as an adequate basis for not assessing the potential risk to recreational boaters from eating fish containing a site-related contaminant. One of the purposes of addressing contamination from sources such as the Metal Bank Site is to eventually reduce levels of PCB contamination in the Delaware River so that a fish consumption advisory is not necessary. Excluding the potential risk from eating fish because a consumption advisory, which cannot be readily enforced, exists is not appropriate. EPA's assumption that individuals may continue to consume fish caught in the Delaware River is reasonable.

20. The Site Owner questions why exposure point concentrations for surface water used to evaluate recreational exposure were based on values modeled from groundwater data rather than the actual surface water sample. The Site Owner also questions which wells or groundwater data points were used to calculate surface water exposure point concentrations.

Response: The only surface water samples collected during the Remedial Investigation were those from ponded water at two locations in the mud flats. These samples would not be representative of contaminant concentrations in the Delaware River at the Site. No samples of flowing surface water from the river were collected. Therefore, EPA estimated surface water concentrations in the river by applying a dilution factor of 4,300:1 to the contaminant concentrations found in the groundwater at the Site. The basis for this dilution factor is included in Appendix 6 of the 1994 Risk Assessments (*see* AR300798).

The groundwater concentrations used to estimate surface water values are the same as those developed to calculate the potential risk to construction workers from dermal contact with groundwater. The RME concentrations for this exposure pathway are presented in Table 10 of the 1994 Risk Assessment (*see* AR300646) and are based on the groundwater data summary in Table 4-12 of Appendix 2 (*see* AR300704). The exposure point concentrations and risk estimates for recreational boaters exposed to surface water did not change in the 1995 Risk Assessment. As noted in the responses to Comments 11 and 13 above, errors have been identified in Table 4-12. However, using the revised exposure point concentrations to estimate risk to recreational boaters from surface water would not result in any significant change to the overall risk to boaters from Site contaminants.

21. The Site Owner contends that EPA's risk assessment did not adequately explain why particular exposure scenarios were used or rejected or why particular pathways were selected to evaluate each exposure scenario. The Site Owner also contends that EPA did not adequately document the basis for the exposure assumptions used in the risk calculations.

Response: Section 3.3 of the Risk Assessment (*see* AR301566) identifies the four populations evaluated as potentially at risk from site-related contaminants and the pathways by which exposure could occur. Section 3.4.2.1 of the Risk Assessment (*see* AR301567) also explains why several exposure scenarios were not included. The four groups of individuals who reasonably could be exposed to Site contaminants are off-site residents, recreational boaters on the Delaware River, and future industrial and construction workers at the Site. The various exposure pathways by which Site contaminants could reach one or more of these groups include breathing air containing dust from the Site, swallowing soil, surface water or sediments or eating fish contaminated with Site contaminants, and direct skin contact with contaminants in surface water, groundwater or the oil layer present at the Site. While the above referenced sections of the Risk Assessment do not repeat the physical characteristics of the Site and the surrounding areas to explain why these exposure scenarios are appropriate, this information is included in the Remedial Investigation Report, as well as the discussion of local land use provided in Appendix 5 of the Risk Assessment (*see* AR301713). The industrial nature of the Site, the presence of residential areas in the vicinity of the Site, and the presence of the Delaware River immediately adjacent to the Site justify the selection of these exposure scenarios.

22. The Site Owner contends that the uncertainty analysis in the risk assessment is inadequate because it does not discuss the uncertainty associated with data evaluation and exposure assessment issues presented in the above comments.

Response: EPA's uncertainty analysis in the risk assessment focuses primarily on issues that have the greatest potential to result in an over- or underestimation of health risk from Site contaminants. Neither the data evaluation nor exposure assessment issues identified by the Site Owner result in significant changes in the risk assessment conclusions and, therefore, were not discussed in the uncertainty analysis.

23. The Site Owner contends that EPA used outdated toxicological indices for PCBs, arsenic, beryllium, cadmium, and hexavalent chromium in estimated risks at the Site.

Response: The toxicological indices used in the 1995 Risk Assessment were those being used at the time the assessment was completed. Subsequent to that time, only the carcinogenic oral slope factor for PCBs has changed from 7.7 kg·d/mg to 2.0 kg·d/mg. Because PCBs are the primary contaminant of concern at the Site, EPA reevaluated the potential risks for exposure pathways that had lifetime cancer risks greater than 1.0E-05 in the 1995 Risk Assessment. PCBs were the only contaminants contributing to the potential risk in these pathways, which include exposure to PCBs in the Courtyard soils, exposure to PCBs in LNAPL, and exposure to PCBs in fish tissue. The decrease in the lifetime cancer risk for these pathways resulting from the revised PCB slope factor are summarized in the table below. The calculations are presented in Appendix A of the Technical Review, which is included in the Administrative Record (*see* AR304110).

Exposure Pathway	Lifetime Cancer Risk	
	PCB Slope Factor of 7.7 kg·d/mg	**PCB Slope Factor of 2.0 kg·d/mg**
Ingestion of Courtyard surface soil	6.77E-05	1.76E-05
Dermal contact with LNAPL	6.00E-03	1.56E-03

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Ingestion of fish by adult	2.62E-04	6.79E-05
Ingestion of fish by child	1.53E-04	3.96E-05

The revised total lifetime cancer risk for future industrial workers, future construction workers and recreational boaters using the above revised risk values are presented in the following table. While the revision in the PCB slope factor decreases the lifetime cancer risk to these populations, the potential risk to future construction workers remains outside EPA's acceptable risk range of 1.0E-04 to 1.0E-06. In addition to potential risk to human health, the Site also poses potential risk to aquatic organisms. Therefore, the actions required in the Record of Decision remain appropriate.

Exposed Population	**Lifetime Cancer Risk**	
	1995 Risk Assessment	**Revised PCB Slope Factor**
Future Industrial Workers	7.46E-05	2.45E-05
Future Construction Workers	6.01E-03	1.58E-03
Adult Recreational Boaters	2.65E-04	7.14E-05
Child Recreational Boaters	1.60E-04	4.61E-05

24. The Site Owner contends that EPA did not prepare the risk assessment in accordance with EPA's *Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A)* (EPA/540/1-89/002) and did not include a sufficient level of information to explain its conclusions.

Response: EPA has reviewed the risk assessment calculations to ensure that the formulas and exposure assumptions conform with EPA guidance. Although the Site Owner may disagree with many of the assumptions EPA made in conducting the risk assessment, EPA's decisions are consistent with Agency guidance. Similarly, EPA has provided adequate documentation to support the conclusions reached in the risk assessment. While the Site Owner's requests for additional information, clarifications, or other editorial changes would improve the risk assessment if a revised version was being prepared, EPA has determined that the existing document adequately evaluates the risks to human health from the Site and that the additional expenditure of funds to revise this document is not necessary. Comments that raise substantive issues that could alter the findings of the risk assessment or EPA's remedy selection decision have been summarized and addressed above. Editorial comments are not specifically addressed in this Responsiveness Summary, but have been included in the

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Administrative Record for the Site.

25. The Site Owner estimates there would be 15 truck accidents if EPA were to dispose of the contaminated soils off-site (to Model City, New York). No calculations were provided to support this conclusion. Although there were no discussions on fatalities in the Site Owner's original comments, one of the accompanying attachments included a 1990 affidavit in which their consultant stated that "people (1 to 2) would die in traffic accidents" if contaminated soil were to be transported to the nearest disposal facility in Alabama. No calculations were provided to substantiate this statement.

In two (2) documents submitted after the close of the comment period, the Site Owner added that truck accidents will result in 2.7 deaths per 100 million miles traveled by large trucks. Using two different estimates for the volume of soil to be disposed (approximately 9,000 yd^3 according to EPA and approximately 31,000 yd^3 according to the PRP Group), the resulting number of deaths due to truck accidents ranged from 0.010476 to 0.036726 deaths (*see* AR304056). The Site Owner concluded that cleaning up the Site would entail a greater risk (1.0476E-02 and 3.6126E-02, *see* AR304386) than not (6.77E-05 and 6E-03, *see* ROD Table 10).

Response: EPA does not normally respond to comments submitted after the comment period, but since the Site Owner stated, during a briefing for EPA on the significant issues raised in their 22 volumes of comments, that truck accidents would result in deaths, EPA will treat this new comment as if it was part of the original truck accident comment.

EPA believes the Site Owner's comment concerning potential deaths from truck accidents is not relevant because:

(a) It is statistically improper to equate the number of potential deaths due to truck accidents to the predicted risk of cancer from site-related exposures. The risk due to truck accidents is based on statistics from a 1994 National Highway Traffic Safety Administration study which estimated that 2.7 deaths may occur for every 100 million miles traveled by large trucks. The risk calculations appearing in the Baseline Risk Assessment estimate the probability of an individual developing cancer from exposure to site-related chemicals; without remediation, these risks will remain. The Site Owner's estimate of 0.01476 to 0.036726 deaths due to truck accidents indicates that less than one death is anticipated from the activity in question, while EPA's excess cancer risk prediction of 6E-03 indicates that for every 1000 exposed individuals, six may develop cancer as a result of contamination at the Site; and

(b) transportation of the contaminated soil is not restricted to truck traffic. Other options such as railways or waterways may be considered. The choice of a Disposal facility is also not restricted to Model City, New York. Regardless of what the accident, death or injury statistics may be, all workers would be required to diligently follow the protocols of a Health and Safety Plan in order to minimize accidents. ROD Section IX.B.4 specifically requires that all transferral of hazardous wastes will be performed in accordance with RCRA requirements as defined in 40 C.F.R. Parts 262 and 263, and 49 C.F.R. Parts 107, and 171-179. EPA believes notification combined with coordination with all communities affected by the transportation routes will result in an accident free project.

B. Aquatic Ecological Risk Assessment

1. The Site Owner contends that the Aquatic Ecological Risk Assessment ("Aquatic Assessment") does not recognize that degradation of the Delaware River in the vicinity of the Site is attributable to many sources. The Site Owner further contends that the Aquatic Assessment does not demonstrate that site-related contaminants are directly responsible for any degradation. The Site Owner asserts that no evidence is presented which shows conditions of aquatic populations at the Site to be any different from or worse than those at other areas of the Delaware River.

Response: The Aquatic Assessment for the Site does not attempt to evaluate the area as ecologically pristine. The assessment focuses on site-specific contaminants and their potential impact on aquatic receptors in the vicinity of the Site. EPA recognizes that other sources may also contribute to the presence of these contaminants in the river near the Site. However, EPA is not required to demonstrate that the Site is the sole source of contamination contributing to environmental degradation in order to require cleanup actions. As the Aquatic Assessment demonstrates, the Metal Bank property has historically made a substantial contribution to the decline of aquatic habitat in the river at the Site.

The contaminants found at concentrations above the screening levels used to indicate potential concern are summarized in Tables 2, 3, 4, 5, and 9 of the ROD. In comparing the contaminants found in the subsurface soils at the Site with those found in the sediments, elevated concentrations of the following contaminants were found in both media: 4,4'-DDD, 4,4'-DDE, PCBs (Aroclors 1248, 1254, and 1260), 2,4-Dimethylphenol, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, indeno(1,2,3-cd)pyrene, naphthalene, arsenic, cadmium, copper, lead, mercury, nickel, and zinc. Many of the contaminants found in elevated concentrations in the groundwater at the Site were also found in the sediments. The Aquatic Assessment has, therefore, adequately demonstrated the potential link between site-related contaminants and degradation of the aquatic ecosystem.

As to the Site Owner's concern about how the aquatic environment near the Site compares to other areas of the Delaware River, this is not a matter that is of importance in conducting an Aquatic Assessment. The purpose of the Aquatic

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Assessment is to evaluate the potential impact that site-related contaminants may presently be having on the environment. As indicated above, the assessment is not intended to conclusively demonstrate that contaminants from the Site are responsible for degradation; nor is the assessment intended to evaluate the health of the environment in comparison to other non-site-related areas or evaluate the relative health of the environment over time. Whether other areas of the Delaware River are equally or more degraded than the portion at the Site or whether the health of the river in the vicinity of the Site has improved over the last 70 years is not relevant to evaluating the current impact of site-related contamination and would be beyond the scope of any Aquatic Assessment for the Site.

2. The Site Owner contends that the shortnose sturgeon should not have been included in the Aquatic Assessment as a potential receptor because it has never been documented as present in the river near the Site and does not use this portion of the river as a spawning or nursery area. The Site Owner further contends that the exposure pathway for the shortnose sturgeon is incomplete because the foraging habitat of the sturgeon does not overlap with the mudflats adjacent to the Site.

Response: Shortnose sturgeon were captured within about one kilometer both upstream and downstream of the Site during a tagging study conducted between 1983 and 1987. This study concluded that after spawning from late March through April, the shortnose sturgeon travel rapidly downstream into the tidal portion of the river near Philadelphia where they remain through the end of May. Some individuals may remain in the area through the summer and fall.[3] The issue of whether or not shortnose sturgeon actually spawn at the Site is irrelevant. Tables 5-2 and 5-3 of the Aquatic Assessment illustrate that PCBs have been shown in numerous studies to elicit a wide range of toxic effects on a variety of species. Many of these studies have demonstrated that exposure to PCBs can result in reproductive impairment in fish. For example, studies have associated increased tissue concentrations of PCBs in eggs and ovaries of fish with reduced egg hatchability, reduced fry survival, increased larval mortality, and physical abnormalities. Because eggs have high lipid content, PCBs have a tendency to accumulate in the eggs and can be passed on to offspring by the adult females. The actual dose encountered by the offspring will be the result of exposures encountered by the adult females prior to spawning. Therefore, the shortnose sturgeon does not have to spawn at the Site for the offspring to be impacted. As to the shortnose sturgeon's foraging area, the mudflat area at the Site is likely to be a feeding habitat because the shortnose sturgeon prefer shallow areas where they can feed indiscriminately on mollusks, polychaetes, and other benthic organisms. Data from benthic macroinvertebrates sampling conducted in 1991 indicate that prey of the shortnose sturgeon are present in the mudflats adjacent to the Site.

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3 *See* the O'Herron, *et al.*, 1993, reference on page 7-7 of the Aquatic Ecological Risk Assessment

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3. The Site Owner contends that the channel catfish does not serve as an appropriate surrogate for evaluating potential risks to the shortnose sturgeon because the home range of the channel catfish is very small relative to the sturgeon, the channel catfish does not migrate to spawning grounds as do the sturgeon, the catfish have higher lipid content than the shortnose sturgeon, and the catfish feed higher in the food chain than does the shortnose sturgeon.

Response: The receptors of concern used to evaluate risks in the Aquatic Assessment were selected based on the need to evaluate species that (1) represent different trophic levels and food web pathways, (2) are likely to be present near the Site for at least part of the spring-summer-fall feeding period, and (3) have available data. The shortnose sturgeon, a Federal and Commonwealth of Pennsylvania designated endangered species, is a receptor of primary importance because the sturgeon lives its entire life cycle in the Delaware River and is known to be present in the river adjacent to the Site during the summer and after spawning in upstream areas. Channel catfish are also a receptor of concern because they serve as a representative of benthic freshwater fish species that feed on a variety of prey types and are likely to be resident in the river next to the Site for some time. Because only limited data are available to evaluate impacts of site-related contaminants on the shortnose sturgeon, the channel catfish is also used as a surrogate species for the shortnose sturgeon.

The Aquatic Assessment recognizes the uncertainties associated with using the channel catfish as a surrogate for the shortnose sturgeon (*see* page 6-11 of the Aquatic Assessment). However, contrary to the Site Owner's concern that risk to the shortnose sturgeon may be overestimated, several factors would support the opposite conclusion. The shortnose sturgeon may be particularly vulnerable to the accumulation of PCBs due to their benthic feeding habit, their longevity, and relatively late age of maturity. Shortnose sturgeon are known to live as long as 67 years. The fact that female sturgeon may spawn only once every several years may be an additional factor leading to increased accumulation of PCBs, since transfer of PCBs from the females to their eggs is thought to be an important mechanism in reducing the PCB body burden in female fish. When these factors are balanced with those raised by the Site Owner, the channel catfish is considered to be a good candidate overall for use as a surrogate for the shortnose sturgeon.

4. The Site Owner contends that if the shortnose sturgeon is evaluated in the Aquatic Assessment, the actual PCB concentrations observed in six shortnose sturgeon collected 32 kilometers upstream from the Site during a 1982 New Jersey study should be used to estimate risk rather than the higher estimated concentrations based on channel catfish data.

Response: No information is available to indicate whether the six shortnose sturgeon collected in the 1982 study were exposed to contaminants in the vicinity of the Site. Because of the difficulty in accounting for the uncertainty associated with using these

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data, the Aquatic Assessment used the more conservative, but certain, approach of estimating PCB concentrations in the shortnose sturgeon based on a surrogate species, the channel catfish, collected in the vicinity of the Site.

5. The Site Owner contends that the Aquatic Assessment should have used a sediment-dwelling species such as *Corbicula fluminea* (Asiatic clams) to evaluate risk from Site contaminants through the sediment exposure pathway. The Site Owner further contends that the abundance of benthic invertebrates in the mudflats as quantified during the Remedial Investigation demonstrates that the sediments have no adverse effects on benthic invertebrates. The Site Owner asserts that the benthic invertebrate survey data should have been statistically compared to contaminants of concern in the sediment at the same stations and that such an analysis would show that benthic invertebrate populations are not being adversely impacted.

Response: The Aquatic Assessment evaluated benthic invertebrates, which are sediment-dwelling species, as receptors of concern at the Site. This evaluation focused on the importance of these receptors as an exposure pathway to higher trophic-level fish rather than on a quantitative assessment of how toxic site-related contaminants are to these organisms. The limited information available in the literature suggests that benthic invertebrates can accumulate high concentrations of PCBs in their tissue without adverse effects, although invertebrates may experience direct toxicity from exposure to contaminated sediments (*see* page 6-13 of the Aquatic Assessment). Tissue data from *Corbicula* were used to indicate the bioavailability of PCBs at the Site. *Corbicula* serve as an excellent model species for determining the bioavailability of contaminants in surface water and sediments because they accumulate contaminants by the same mechanisms as similar native species.

Although the Aquatic Assessment did not focus on the direct adverse impacts of Site contaminants on benthic invertebrates, the assessment did discuss the results of qualitative and quantitative benthic invertebrates surveys conducted at twelve and six sampling locations, respectively, in the mudflat area. A comparison of total PCB concentrations in the sediments from the May 1991 sampling and the qualitative diversity and density data from the July 1991 survey was conducted and the Aquatic Assessment states that no apparent correlation exists. The Assessment also explains that this result is not surprising since the sediment sampling and benthic survey were conducted at different times, thus raising uncertainty as to whether the locations used in the two events were the same. The data did, however, show a correlation indicating that species diversity increased with greater distance from the western Site boundary. This result suggests that benthic productivity in the mudflat in the immediate vicinity of the Site may be reduced.

6. The Site Owner contends that the Aquatic Assessment does not demonstrate that PCBs in field samples of fish are from the Site. The Site Owner contends that fish tissue data, when analyzed appropriately, demonstrates that PCB levels in fish near the Site

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are among the lowest over the 200 mile length of the Delaware River.

Response: The purpose of the Aquatic Assessment is to characterize potential risk to aquatic organisms by comparing the levels of contamination in sediment and surface water at the Site which the organisms may be exposed to (*i.e.*, exposure point concentrations) with levels considered to cause adverse effects in the organisms (*i.e.*, toxicity reference values). The Aquatic Assessment also compares concentrations of contaminants found directly in the tissue of fish collected at the Site with levels associated with adverse effects to provide an additional basis for evaluating potential risks. The Aquatic Assessment concludes that exposure of aquatic organisms to PCBs, PAHs, phthalates, DDT and its metabolites, and cadmium in the sediment at the Site poses a potential hazard to aquatic organisms (*see* pages 6-4 and 6-5 of the Aquatic Assessment for actual hazard quotients). The assessment further finds that the accumulated levels of PCB in the tissue of silvery minnows and channel catfish collected at the Site could result in adverse impacts. EPA does not assert that all the contaminants found in the sediment and fish come from the Site (*see* response to Comment #1 above). EPA does draw the reasonable inference that when contaminants found in the soil and groundwater on the Metal Bank property are also found in elevated concentrations in sediment and fish collected adjacent to the property, the soil and groundwater are likely sources. The Aquatic Assessment provides ample support for this inference. The purpose of the Aquatic Assessment is not to show that aquatic populations at the Site are different or worse than other areas of the Delaware River.

7. The Site Owner contends that, at a minimum, PCB concentrations in sediment at or adjacent to the Metal Bank property should be compared with concentrations in similar samples upgradient of the Site, and only that amount which is greater than background should be evaluated.

Response: When calculating potential risks at Superfund sites, EPA will generally only eliminate a particular contaminant from the evaluation if that contaminant is shown to occur naturally in the area at levels at or above the concentration detected at the Site. Since organic contaminants are not naturally occurring, they are rarely eliminated from the risk assessment process because of the extreme difficulty in conclusively showing that the contaminant found at the site is from a source other than the Site. This is particularly true at the Metal Bank Site. Because the Delaware River is tidal at the Site, sediment samples upgradient of the Site's influence would be located at a significant distance from the Site. Any PCBs found in sediment samples collected at these upgradient locations would be from unknown sources and determining whether these sources were contributing to the PCB levels found at the Site would be extremely difficult and beyond the scope of the Site investigation. In reality, any relationship between PCB concentrations at a distant upgradient station and the Site would be questionable. Therefore, subtracting the upgradient PCB concentrations from concentrations found at the Site would likely result in a significant underestimation of site-related risk.

8. The Site Owner contends that the trend in the PCB sediment data from the Site discussed in the Aquatic Assessment incorrectly relied upon total PCB concentrations rather than congener-specific data. Even if total values are used, the Site Owner contends that the PCB sediment data does not show a trend of decreasing concentration with greater distance from the Site as indicated in Figure 4-3 of the Aquatic Assessment. The Site Owner points to Figures 4-16 and 4-17 in the Remedial Investigation Report to assert that an opposite trend is observed by simply plotting the data on a site map. The Site Owner also states the EPA's trend is dependent upon one data point (MF-107) which should have been eliminated from the dataset as an outlier and is of questionable validity.

Response: For the most part, the PCB laboratory analyses conducted during the Remedial Investigation measured the concentrations of various PCB Aroclors present in the samples. There are actually 209 different PCB compounds, referred to as congeners, included under the general label of PCBs. Individual congeners having the same number of chlorine atoms are referred to as isomers. Aroclors are mixtures of PCB congeners. For example, Aroclor 1242 is composed mainly of tri- and tetra-chlorinated biphenyls with approximately 42% chlorine by weight, while Aroclor 1254 is composed mainly of penta-, hexa, and hepta-chlorinated biphenyls with approximately 54% chlorine by weight. At the time the investigation for this Site was completed, EPA typically required PCB analyses to measure the concentrations of various Aroclors present in a sample. The concentrations of Aroclors in each sample can then be added to derive a total PCB concentration. This is the approach that was followed.

Aroclor or total PCB data can be used to conduct trend analyses to show a contaminant gradient (*i.e.*, to show that contaminant levels are increasing or decreasing with distance from a site). The data analysis in the Aquatic Assessment is intended only to show that such a gradient appears to exist. The analysis is not intended to conclusively determine that a point source related to the Site is present. EPA agrees that more sophisticated analytical techniques would be needed to trace the potential movement of specific PCB congeners in Site soil and groundwater into the aquatic environment. Analytical methods and quality assurance protocols for congener-specific analyses are still in development. In addition, this type of PCB analysis is more expensive, and the added value in terms of estimating potential risk is unknown. Therefore, this level of analysis is not typically conducted at Superfund sites. Limited congener analysis was conducted during the Remedial Investigation at the Site and similarity in the congener composition between one groundwater sample collected on-site and sediment and Asiatic clam samples collected adjacent to the Metal Bank property was observed. The Site Owner had the opportunity to participate in performance of the investigation, but declined. If the Site Owner had participated and expressed a desire to conduct a more detailed PCB analysis at the Site, EPA would have supported such an effort.

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The regression analysis conducted in the Aquatic Assessment and illustrated in Figure 4-3 used a standard statistical approach. The analysis evaluated whether the total PCB concentrations in sediments in the riprap and mudflat stations along the western property boundary increased towards the river. Only sediment locations with laboratory results which were subject to quality control protocols were used in the analysis. PCB concentrations for the aroclors detected in one or more sample (Aroclors 1248, 1254, and 1260) were added to determine the total PCB concentration. If one of these aroclors was not present at the analytical detection limit, a concentration equal to one-half the detection limit was added in accordance with standard EPA protocol. As the Aquatic Assessment indicates, total PCB concentrations appear to increase gradually along the western property boundary, reaching a maximum concentration at MF-107 near the southern corner, and then drop off rapidly towards the Delaware River. The regression analysis conducted on sediment samples along the western boundary demonstrated a strong correlation between total PCB concentration and distance from MF-107 (R^2 of 0.71). This correlation was even stronger when just the sediment samples immediately adjacent to the Site were used (R^2 of 0.96).

Contrary to the Site Owner's assertions, this correlation is consistent with the presentation of data illustrated in Figures 4-16 and 4-17 of the Remedial Investigation and is not dependent on the inclusion of MF-107 in the analysis. An equally strong correlation would exist if the sediment data had been compared with distance from the sewer outfall. In this case, the analysis would show an increasing trend in sediment concentrations with increasing distance from the sewer outfall. MF-107 is located closer to the more highly contaminated southwestern portion of the Site and would be expected to exhibit higher PCB concentrations. Exclusion of this sampling point from the regression analysis would be clearly inappropriate.

9. The Site Owner contends that prior remediation has removed all recoverable oil (*i.e.,* NAPL) from the Site and that post-remediation sampling confirms that this exposure pathway is no longer complete. Therefore, the Site Owner asserts that evaluation of NAPL exposure should not have been considered in the Aquatic Assessment.

Response: In August 1981, Metal Bank of America, Inc., began operating an oil recovery system consisting of several recovery wells, oil separation units, and 55-gallon drums containing activated carbon which was intended to remove all recoverable oil from the Site. Collection of oil ceased in March 1989. EPA monitoring of on-site monitoring wells in March and August 1989 continued to show the presence of a floating layer of oil at the Site. An oil sample collected from a monitoring well located near the river on the western portion of the Site contained a total PCB concentration of 1,540 ppm (*see* AR304232). No PCB analyses were performed in August 1989, however oil thickness observations indicated that despite eight years of oil recovery at the Site, a floating layer of oil was still present in the subsurface with a thickness of up to 3 inches along the western portion of the Site (*see* AR304241). Numerous oil seeps were also noted during the August 1989 monitoring along the western embankment bordering the mudflat and extending approximately 100 feet upstream along the river adjacent to the property boundary. The heaviest concentration of seeps appeared to be located at the water line during extreme low tide. In 1991, sampling performed as part of the Remedial Investigation again demonstrated an oil layer with a PCB concentration of 1,090 mg/l was present in monitoring well MW-6 located in the southwest portion of the Site. The maximum PCB concentration observed historically in the oil layer at the Site was 1,539 mg/l in 1977 (*see* AR100034). A sample collected from MW-6 in 1992 with a PCB concentration of 25.6 ppb was not representative of the oil layer because of the sampling technique used. Rather, this sample characterized the dissolved concentration of PCBs in the groundwater. (A limited attempt to characterize the impact of the oil layer on surface water during the Remedial Investigation resulted in the detection of PCBs in one groundwater seep sample at a concentration of 3.7 ppb.)

Although the oil recovery system that operated at the Site is likely to have removed much of the NAPL that can be recovered through an active extraction system, this effort could not recover all the NAPL present at the Site. Residual NAPL has been observed and can be expected to slowly continue to release from the soil into the groundwater at the Site. Because of the high concentrations of PCBs associated with the NAPL, even the release of small volumes from the subsurface soil into the groundwater and then into the surface water can pose adverse impacts to aquatic organisms. Therefore, the Aquatic Assessment appropriately included exposure to NAPL as a complete pathway in evaluating ecological risks. The acute toxicity value for PCBs used as the toxicity reference concentration in the Aquatic Assessment is 2.0 μg/l. PCB concentrations observed in the NAPL sample collected in 1991 are over 500,000 times greater than the acute toxicity value. As a result, small discharges of NAPL into surface water at the Site soils can pose a significant threat to aquatic organisms.

10. The Site Owner contends that PCBs were included as contaminants of concern in groundwater in the Aquatic Assessment after they had previously been eliminated using the established screening criteria.

Response: As explained in the Aquatic Assessment, groundwater at the Site becomes a concern when it enters the Delaware River and becomes surface water. Therefore, to determine which contaminants are of concern in the groundwater, the maximum concentration of each contaminant observed in the groundwater was divided by a dilution factor based on the estimated groundwater discharge rate and low-flow conditions in the Delaware River. If the resulting value exceeded the ambient water quality criteria, the contaminant was considered to be of concern. When this screening was performed, all the contaminants were below the ambient criteria values. However, because PCBs are contaminants of major concern at the Site, the Aquatic Assessment included an evaluation of the risk associated with exposure to surface water impacted by Site groundwater. The results of the evaluation indicate that most aquatic species are not at risk from exposure to waterborne PCBs contributed by way of groundwater from the Site. The Aquatic Assessment further concludes that it is highly unlikely that any individual shortnose sturgeon would spend sufficient time in the portion of the river adjacent to the Metal Bank property to be adversely impacted from PCB concentrations in the water resulting from the release of PCBs in the groundwater.

11. The Site Owner contends that the Aquatic Assessment should have used EPA's ambient water quality criteria ("AWQC") of 0.014 μg/l as the toxicity reference concentration for PCBs in surface water rather than using the lowest documented maximum allowable toxicant concentration of 0.1 μg/l and then applying a 100-fold safety factor for the shortnose sturgeon (*see* page 5-2 of the Aquatic Assessment). The Site Owner asserts that if a 100-fold safety factor is applied, it should be used with EPA's acute toxicity value of 2.0 μg/l because the shortnose sturgeon would be expected to be exposed to site-related contaminants for very short periods, if at all.

Response: As the Aquatic Assessment explains, EPA's AWQC for PCBs are based on "Final Residue Values," which were calculated to protect wildlife and human consumption of aquatic organisms contaminated with PCBs *and are not based on toxicity to aquatic organisms.* To determine an appropriate toxicity reference concentration which would be protective of the aquatic organisms themselves, a review was conducted of the published studies used to develop the AWQC which focused on chronic toxicity. The highest concentration of PCBs observed which did not have an unacceptable effect on the aquatic organism being tested was 0.1 μg/l. The Aquatic Assessment further states that although a concentration of 0.1 μg/l may be protective of the majority of biota in the Delaware River in the vicinity of the Site, it may not be protective of sensitive species. Because an endangered species, the shortnose sturgeon, is a potential receptor at the Site, application of an uncertainty factor is warranted. Based on literature research, an uncertainty factor of 100 is recommended when comparing between species within different orders of the same class. Since the fish species used in the study generating the 0.1 μg/l PCB concentration (the fathead minnow) is in the same class as the shortnose sturgeon, but represents a different order, the 100-fold uncertainty factor was used. To apply the 100-fold safety factor to the PCB concentration representing acute toxicity to freshwater aquatic life (*i.e.,* 2.0 μg/l) would result in a reference concentration of 0.02 μg/l. This level is higher than the EPA AWQC for PCBs of 0.014 μg/l and would not represent a conservative estimate of potential risk to the shortnose sturgeon, an endangered species in the Delaware River.

12. The Site Owner contends that extrapolation of the data in Tables 5-2 and 5-3 of the Aquatic Assessment to develop a toxicity reference concentration for PCBs in fish tissue is inappropriate because (1) not all endpoints included are ecologically relevant, (2) data from whole body, fillet and organs cannot be compared, and (3) adverse effects from field studies may be from contaminants or factors other than PCBs. The Site Owner asserts that the Aquatic Assessment overestimates risk by determining the lowest observed adverse effects level from data for all species and then applying an

additional safety factor. The Site Owner contends that the median, rather than the highly conservative 10th percentile of the tissue effects concentration should have been used to calculate the Hazard Quotients for the indicator species.

Response: The Aquatic Assessment used all the field and laboratory studies included in Table 5-2 to establish a toxicity reference concentration for PCBs in fish tissue because of the limited data available for receptor species and the apparent differences in sensitivity between species to exposure to PCBs. The effects reported from the laboratory and field studies were all considered to represent adverse ecological effects. Most of the endpoints represented a measure of reproductive toxicity. A weight of evidence approach was necessary because of the lack of specific information on reproductive toxicity for the target receptor species. The 10th percentile value for the tissue effects concentrations was intended to be highly conservative. Use of the median value would not be protective of sensitive species. EPA recognizes that the approach used to develop the tissue toxicity reference concentration for PCBs is conservative and the uncertainty analysis identifies many issues similar to those noted by the Site Owner.

13. The Site Owner asserts that the Aquatic Assessment misrepresents the PCB fish tissue data collected at the Site and in other portions of the Delaware River by using data from both whole body and fillet samples to give the appearance that fish at the Site have higher levels of PCB contamination. The Site owner further asserts that the Aquatic Assessment ignores naturally occurring factors such as dietary composition and breeding status that impact the fat (*i.e.*, lipid) content of fish and thus cause differences in PCB concentrations unrelated to source concentrations.

Response: The Aquatic Assessment identifies studies known to have generated PCB fish tissue data from various locations on the Delaware River and graphically depicts the concentrations detected in channel catfish on both a wet weight and lipid normalized basis *see* Table 4-10 and Figures 4-5 and 4-6 of the Aquatic Assessment). The purpose of including this information was to provide a general overview of the known tissue data from the Delaware River, including that collected as part of the investigation at the Metal Bank Site. No conclusions were drawn regarding the relative concentrations of PCBs in tissues from fish collected at the Site as compared to other portions of the river. EPA agrees that comparisons of PCB concentrations in whole body and fillet samples such as those presented in Figure 4-5 must be viewed cautiously. Comparisons of data from these two types of samples can be made when the data are normalized based on lipid content as was done in Figure 4-6. However, even in this instance, care must be taken in comparing tissue concentrations from different years and different studies because variations in these concentrations may be due to temporal as opposed to spatial variations in the concentrations of the contaminants in the environment or to variations in analytical methodologies. The naturally occurring factors noted by the Site Owner can also influence the variability in the data. For these reasons, EPA does not recommend using this data to attempt to draw any conclusions concerning the relative concentrations of PCBs in fish at the Site

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in comparison to other portions of the river and the Aquatic Assessment does not do so.

14. The Site Owner contends that the Aquatic Assessment inappropriately manipulated the bioaccumulation factors developed from PCB fish tissue and sediment data at the Site to conclude that silvery minnows are exposed, on average, to sediments containing the mean farfield concentration of PCBs. The Site Owner asserts that any number of factors such as the variability in sediment concentrations at the Site, the use of large feeding ranges, diet or non-equilibrium conditions could produce the resulting bioaccumulation factors.

Response: The Aquatic Assessment calculates bioaccumulation factors by dividing PCB concentrations in fish tissue from silvery minnows and channel catfish collected at the Site by the average sediment concentrations from samples collected within 30 meters of the Metal Bank property (nearfield) and those beyond 30 meters (farfield). These bioaccumulation factors are then compared with values found in research literature in an effort to estimate where the fish which were collected may be feeding. The bioaccumulation factors calculated using the average sediment concentration from the nearfield are lower than the literature values. When the average sediment concentration from the farfield is used in the calculation, the bioaccumulation factor for channel catfish is still below the range found in the literature, but the factor for the silvery minnow is within the literature range. The Aquatic Assessment states that this suggests the silvery minnows collected at the Site, which have a relatively small range of movement, may have been exposed to the farfield sediments. The factors suggested by the Site Owner could also explain the bioaccumulation factors observed, but do not discount the possibility suggested by the Aquatic Assessment.

15. The Site Owner contends that the Aquatic Assessment employs the commonly accepted screening technique of comparing an environmental contaminant concentration to an ecotoxicity benchmark, but does not include a commonly accepted quantitative uncertainty analysis or the probabilities of adverse effects.

Response: A quantitative uncertainty analysis can only be performed if a sufficient database exists to perform such an analysis, which was not the case at the Metal Bank Site. The Aquatic Assessment included qualitative discussions of the factors contributing to uncertainty throughout the evaluation, including the final risk characterization section.

16. The Site Owner contends that the sediment toxicity reference concentrations were developed for marine organisms and, therefore, have questionable application to the Site. The Site Owner asserts that more relevant benchmarks are readily available and should be used. The Site Owner further contends that use of the Effects Range-Low and Effects Range-Medium concentrations for developing the sediment toxicity reference concentrations is inconsistent with the use of equilibrium partitioning

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methods recommended in EPA guidance.

Response: The Aquatic Assessment used sediment benchmarks which were derived from a large number of studies of estuarine and coastal areas since similar information was not available for freshwater systems. The Delaware River at the Site is a tidal estuary, which is comparable to estuarine sites used to establish the sediment benchmarks. As stated in the Aquatic Assessment, studies in the Long and Morgan[4] research included results from synoptically collected sediment chemistry and biological data, spiked sediment bioassays, interim equilibrium partitioning values, and Apparent Effects Threshold values. Using the effects concentrations observed or predicted by these various methods, the lower tenth percentile (Effects Range-Low or ER-L) and the median concentrations (Effects Range-Medium or ER-M) were calculated. The ER-L and ER-M concentrations were proposed as weight-of-evidence based guidelines for determining contaminant-specific sediment concentrations below which adverse biological effects would be unlikely (ER-L) and above which effects would be probable (ER-M). Use of these values in establishing the sediment toxicity reference concentrations is appropriate and consistent with the approach used by EPA at many Superfund sites.

17. The Site Owner contends that toxicity reference concentrations for sediment and water were not consistently normalized to organic carbon content for contaminants such as PCBs which have high octanol-water partitioning coefficients.

Response: The Aquatic Assessment recognizes that environmental factors such as temperature, pH, salinity, water hardness, and organic content of soil or sediment can affect the toxicity of a contaminant in the environment (*see* page 5-10 of the Aquatic Assessment, AR300977). In the case of sediment analyses, not normalizing based on organic content probably underestimates the risk. The median organic carbon content of the riprap sediments, which were the most contaminated, was 0.2%. Since sediment samples included in the database used to derive the sediment toxicity reference concentrations would likely have organic contents of 1-2%, not normalizing the data from the riprap sediments would underestimate the risks.

18. The Site Owner contends that the silvery minnow should not have been selected as a receptor of concern since it is not listed as a "major species" in Table 2-1 of the Aquatic Assessment. The Site Owner further contends that indicator species from a

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4 Long, E.R. and L.G. Morgan. 1991. The potential for biological effects of sediment-sorbed contaminants tested in the National Status and Trends Program. NOAA Technical Memorandum NOS OMA 52. Seattle: United States Department of Commerce, National Oceanic and Atmospheric Administration. 175 pp. + appendices.

Long, E.R. and D.D. MacDonald. 1992. National Status and Trends Program Approach. In: Sediment Classification Methods Compendium. EPA 823-R-92-006.

minimum of three trophic levels should be included.

Response: The intent of the indicator species selection process was to choose species that consumed different types of food, so that movement of contaminants of concern from various environmental media (*i.e.*, sediments and water) to primary consumers, secondary consumers, and so on, could be evaluated. The species selected as receptors of concern were shortnose sturgeon, channel catfish, silvery minnows, white perch, and benthic invertebrates (as represented by Asiatic clams). Shortnose sturgeon and channel catfish can both be considered to be opportunistic feeders, consuming whatever is available to them. White perch tend to consume plankton, oligochaetes, benthic macroinvertebrates, aquatic insects and small fish. Silvery minnows consume bottom ooze and algae, and Asiatic clams are filter feeders. Using the species selected, it was possible to evaluate contaminant migration through the food chain at several trophic levels. The risk assessment process does not require the use of indicator species from a particular number of trophic levels; nor does it require the use of species that have important commercial or recreational value. Theoretically, a single species (representing a single trophic level) could be evaluated in a risk assessment, provided that any observed or predicted contaminant-related impacts to that species were of sufficient ecological significance to be used in the risk management decision-making process.

19. The Site Owner contends that the Aquatic Assessment incorrectly states that the only surface water data available for the Site is from mudflat pools. The Site Owner points to Table 4-5 in Appendix 3 of the 1994 Risk Assessment [for Human Health] (*see* AR300687) and Figure 4-1 of the Aquatic Assessment to indicate that Site-specific surface water data are available. The Site Owner asserts that these data should be used to evaluate risks associated with surface water rather than values estimated from groundwater.

Response: The Aquatic Assessment is correct in stating that the only surface water data available for the Site is from mudflat pools. Figure 4-26 of the Remedial Investigation shows the two locations where samples of standing water found in the mudflat area were collected. Two samples were collected from each location. These locations are also shown on Figure 4-1 of the Aquatic Assessment. The samples are labeled as MFA1, MFA2, MFB1, and MFB2. The statistical summary on Table 4-5 of the 1994 Risk Assessment had incorrectly references these mudflat pool samples as river water data. Figure 4-1 of the Aquatic Assessment also incorrectly identifies samples US1, US2, DR1 and DR2 as surface water samples. These samples are actually sediment samples as shown in Figure 4-18 of the Remedial Investigation (*see* AR300215). Since no surface water samples were collected from the river flowing adjacent to the Site, EPA must rely on values estimated from the groundwater.

20. The Site Owner contends that the Aquatic Assessment overestimated the potential risk from PCB concentrations in the Delaware River estimated from groundwater discharges

from the Site. The Site Owner asserts that a dilution factor based solely on the estimated average groundwater discharge rate (0.45 liters/second (l/s)) and the average river flow for the 15 meter zone of dilution (5,295 l/s) should have been used. The Site Owner notes that these values result in a dilution factor of 11,688, not 5,295, which was the factor used in the Aquatic Assessment. The Site Owner contends that estimating a dilution factor based on low flow in the river is inappropriate. The Site Owner also asserts that site-wide average groundwater PCB concentrations should have been used rather than data from only MW-6 and MW-7 and questions why 15 meters was selected as the dilution zone.

Response: The Aquatic Assessment estimated potential PCB concentrations in the Delaware River resulting from contaminated groundwater discharging from the Site during both average and low flow river conditions. The estimated PCB concentration during low flow provides a conservative estimate of potential risk to aquatic organisms. Even using highly conservative assumptions, the Aquatic Assessment concludes that most aquatic species are not at risk from PCBs in the surface water. While the hazard quotients for the shortnose sturgeon under low flow conditions indicate a slight potential for impacts, the Aquatic Assessment states that it is highly unlikely that any individual sturgeon would spend the extended periods necessary to be chronically exposed to the contaminants in the 15 meters of the river nearest to the Site.

The Site Owner is correct in noting that the dilution factor for average river flow conditions is 11,688, rather than 5,295 which was used. However, the Aquatic Assessment already concluded that aquatic organisms were not at risk from PCBs in surface water under average flow conditions using the lower dilution factor. Similarly, shortnose sturgeon were not at risk using the hazard quotient resulting from the mean PCB concentration and only slightly at risk (hazard quotient of 1.2) using the PCB concentration at the upper confidence limit. By using the higher dilution factor and/or the less conservative assumptions suggested by the Site Owner, the hazard quotients for aquatic organisms and the shortnose sturgeon would all be less than one during average river flow. The decision to use 15 meters as the dilution zone was based on best professional judgment since actual data relating to the dilution rate were not available. The dilution rate of 5,295 that was inadvertently used in the Aquatic Assessment would actually reflect a dilution zone of approximately 7 meters. As shown in the Aquatic Assessment, even using this more conservative assumption, the risk to aquatic organisms from PCBs in surface water is minimal.

Note that this discussion only reflects potential risks to aquatic organisms from exposure to PCB contamination in surface water. Potential risks from exposure to sediment are evaluated separately.

21. The Site Owner contends that the Hazard Quotients resulting from exposure to surface water and sediment should have been calculated for each selected indicator species and that these values should have been adjusted to reflect reasonable exposure durations for

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each species.

Response: Toxicity reference concentrations were not available for each contaminant and species combination. When this occurred, a toxicity reference concentration which was developed to be protective of most aquatic organisms or one derived from a toxicity test using a similar species was used.

Data are not available to establish how long each indicator species may be exposed to contaminants at the Site. The Aquatic Assessment notes when exposure durations may be unrealistically long. For example, the Aquatic Assessment notes that although the hazard quotient for exposure of the shortnose sturgeon to PCBs in surface water slightly exceeds the acceptable level under worst-case conditions, it is highly unlikely that any individual sturgeon would spend extended periods in the river at the Site sufficient to be at risk.

22. The Site Owner makes numerous comments suggesting that the Aquatic Assessment should be revised to include additional information, correct citations, or make other editorial changes.

Response: EPA has considered all the comments provided by the Site Owner. While incorporating additional information or making editorial changes recommended in the Site Owner's comments may improve the Aquatic Assessment if a revised version was being prepared, EPA has determined that the existing document adequately evaluates the risks to the aquatic ecosystem and that the additional expenditure of funds to revise this document is not necessary. Comments that raise substantive issues that could alter the findings of the Aquatic Assessment or EPA's remedy selection decision have been summarized and addressed above. Editorial comments are not specifically addressed in this Responsiveness Summary, but have been included in the Administrative Record for the Site.

C. Terrestrial Ecological Risk Assessment

1. The Site Owner contends that EPA did not use site-specific information, such as that summarized in the appendices of the Terrestrial Ecological Risk Assessment ("Terrestrial Assessment"), to characterize the onsite habitats, populations, and food sources. The Site Owner further contends that EPA failed to use realistic exposure duration given the minimal habitat and food available at the Site.

Response: EPA conducted a screening level ecological risk assessment (referred to as a Tier 1 assessment) at the Metal Bank Site. This approach compares contaminant concentrations found in media (*e.g.*, soil, surface water) to ecological benchmarks to determine if a potential for adverse impacts exists. If a potential for adverse impacts is found, further site-specific characterization may be recommended to assess the likelihood of actual impact. To conduct a site-specific ecological assessment, surveys are performed to determine the receptors present at the site and biological monitoring (*e.g.,* bioassays, tissue analyses) is conducted along with the chemical analyses. Although the screening level ecological risk assessment identified the potential for adverse terrestrial impacts at the Metal Bank Site, further site-specific characterization was not performed, primarily because the aquatic environment is considered to be the more sensitive system impacted by the Site and additional investigation was being performed as part of the Aquatic Assessment. The results of the screening level Terrestrial Assessment are presented in the ROD and used to support findings of the more detailed site-specific Aquatic Assessment. The findings of the Terrestrial Assessment were not used, however, as a basis for the decision to require remedial action at the Site.

2. The Site Owner contends that EPA failed to use terrestrial receptors to evaluate the terrestrial risk, but rather relied inappropriately on aquatic receptors. The Site Owner asserts that terrestrial indicator species should have been selected from the extensive species list provided in the appendices of the Terrestrial Assessment and from the biological data summarized in the Remedial Investigation.

   Response: The species list provided in the appendices of the Terrestrial Assessment is a comprehensive list of species known to be present in the region and does not represent a site-specific survey of receptors likely to be present at the Metal Bank Site. EPA did not require collection of the detailed information needed to conduct a site-specific ecological risk assessment. As discussed above, EPA used a screening level assessment to evaluate potential terrestrial impacts. The soil was evaluated by comparing the soil chemistry data to ecological soil benchmarks. The intent of the Terrestrial Assessment was not to protect individual species, but to ensure that no species would be exposed to an unacceptable amount of contamination. This conservative assessment found that surface soils inside the Courtyard posed no risk and the soils outside the Courtyard indicate a potential for risk from methyl ethyl ketone in subsurface soil. The subsurface soil is not a major pathway to ecological receptors.

3. The Site Owner contends that exposure to surface soil represents the primary exposure pathway for terrestrial organisms at the Site and that the EPA dismisses this pathway as having no relevance rather than acknowledging there are no terrestrial risks because the surface soils are clean.

   Response: EPA does not dismiss the surface soil pathway as having no relevance, but rather finds, as the Site Owner states, that the surface soils inside the Courtyard do not pose a risk to ecological receptors.

4. The Site Owner contends that to consider groundwater seeps as an exposure pathway, EPA should identify the circumstances whereby birds or upland mammals would preferentially drink from seeps along the steep river banks and rip-rap and EPA should know the chemical quality of these seeps. The Site Owner asserts that, even if EPA

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could demonstrate that groundwater was a complete exposure pathway, EPA erred in calculating the associated risk by not accounting for dilution that occurs when groundwater discharges into the Delaware River and by inappropriately using the freshwater quality criteria for aquatic organisms.

Response: In conducting a screening level ecological assessment, conservative assumptions are used to ensure that the potential for adverse impacts is not underestimated. Groundwater seeps at the Metal Bank Site could potentially be exposure pathways for terrestrial receptors. Actual observation of terrestrial receptors using groundwater seeps and chemical data of contaminant concentrations found in seeps would provide the best information for conducting a site-specific ecological assessment. However, this level of information is not required to conduct a screening level assessment as was done at the Metal Bank Site. Use of the groundwater data and freshwater quality criteria to provide a conservative estimate of potential risk to terrestrial receptors is appropriate for a screening level assessment.

5. The Site Owner contends that exposure to subsurface soil and riprap sediments are not valid pathways for the Site and that EPA did not provide any evidence to support its assumption that terrestrial organisms will have direct contact with subsurface soils or rip-rap sediments. The Site Owner asserts that, even if EPA can demonstrate that subsurface soil is a complete exposure pathway, EPA grossly overestimated risk because it compared soil concentrations directly with toxicity benchmarks even though soil concentrations do not represent the dose experienced by an organism.

Response: As stated above, a screening level ecological assessment does not require the level of site-specific information described by the Site Owner. The screening approach makes use of conservative assumptions in order to avoid underestimating potential adverse impacts. Terrestrial receptors have potential to be exposed to subsurface soil at the Site as a result of future Site activities that could bring these soils to the surface. Terrestrial receptors could also be exposed to the riprap sediments during low tide or through the food chain by feeding on other organisms exposed to these sediments.

6. The Site Owner acknowledges that exposure to contaminants in the mudflats appears to be a plausible and complete pathway for wading birds, but contends that EPA inappropriately extrapolated risk to terrestrial receptors from aquatic data. The Site Owner questions how the sediment concentrations used to evaluate risk were derived and asserts that the sediments are not acutely toxic, as the Terrestrial Assessment suggests, because the remedial investigation demonstrated that benthic invertebrates are present in the Site sediments.

Response: As stated in the risk assessment, terrestrial and avian species are exposed to contaminants of concern via direct contact, ingestion, and through the food chain. Terrestrial organisms consume water and sediment in addition to food. All organisms

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from the base of the food chain through the higher trophic levels are subject to exposure. The presence of benthic organisms does not indicate that the Site is not causing adverse effects to ecological receptors since many benthic organisms can tolerate unfavorable conditions.

The expected environmental concentrations used in the Terrestrial Assessment were generally based on the data summary used to prepare the 1994 Baseline Human Health Risk Assessment. As noted previously, this data summary did not provide a complete summary of the data collected at the Site during the 1991 and 1993 sampling events and was subsequently revised after completion of the Terrestrial Assessment. However, the revised data summary did not significantly change the expected environmental concentrations used in the Terrestrial Assessment, so the Terrestrial Assessment was not revised.

7. The Site Owner contends that EPA did not follow its own guidance in selecting contaminants of potential concern at the Site. EPA's *Risk Assessment Guidance for Superfund, Volume II, Environmental Evaluation Manual*, recommends considering factors such as physical/chemical properties, biological and environmental concentrations, toxicity, and potential ARARs as criteria. The Site Owner asserts that EPA did not consider any of these factors.

Response: EPA Region III's draft 1994 guidance for performing ecological assessment was used to conduct the Terrestrial Assessment and is consistent with EPA guidance. Region III's guidance for selecting contaminants of potential concern suggests comparing the contaminants found in each media to appropriate literature values. This is the approach that was used in the screening ecological assessment performed at the Site.

8. The Site Owner contends that EPA used extreme rather than reasonable contaminant concentrations for the environmental exposure concentrations. The Site Owner further contends that EPA failed to fully explain how these concentrations were derived and failed to provide sufficient information to reproduce these concentrations.

Response: EPA used the 95% upper confidence limit of the arithmetic mean of the dataset for each medium to determine the expected environmental concentration. This is the standard approach for establishing concentrations to be used in ecological risk assessments and is consistent with EPA ecological risk assessment guidance.

9. The Site Owner contends that EPA failed to use current toxicity databases and information pertinent to wildlife to assess the toxicity of Site contaminants and, therefore, selected completely inadequate ecotoxicity endpoints to evaluate risks.

Response: EPA Region III has established screening level concentrations to be used in ecological assessments to provide a conservative estimate of potential adverse impacts.

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These concentrations were used in the Terrestrial Assessment performed at the Metal Bank Site and a copy of the draft guidance listing these values has been included in the Administrative Record.

10. The Site Owner contends that the ecotoxicity quotients presented in EPA's terrestrial risk assessment on page 13 cannot be validated because neither the toxicity endpoints nor the exposure concentrations have been presented.

Response: As discussed above, the expected exposure point concentrations are based on the 95% upper confidence limit calculated in the data summary prepared for the 1994 Baseline Human Health Risk Assessment. The toxicity endpoints were based on EPA Region III recommended values for screening potential ecological risk. These values are based on literature research and intended to provide conservative estimates of potential adverse ecological impact.

11. The Site Owner contends that while the Terrestrial Assessment performed by HMM Associates, Inc., for the PRP Group is very conservative and overestimates risk, it conforms with Superfund guidance and concludes that there is a low likelihood of negative effects to terrestrial species at the Site. The Site Owner asserts that this conclusion more accurately characterizes the terrestrial risks and should be used rather than EPA's Terrestrial Assessment.

Response: EPA's Terrestrial Assessment conforms with Superfund guidance for a screening level assessment and provides a conservative estimate of potential risk to terrestrial receptors at the Metal Bank Site. The PRP Group's ecological risk assessment inappropriately uses models in place of actual site-specific information and is not consistent with EPA guidance for conducting ecological risk assessments.

12. The Site Owner contends that EPA failed to include a discussion of the uncertainties associated with the terrestrial risk assessment and, therefore, misleads the reader into having too much confidence in the analysis.

Response: EPA documents the fact that the Terrestrial Assessment uses a conservative screening level approach throughout the document. A list of limitations is also included on page 9 of the Terrestrial Assessment.

13. The Site Owner provides numerous comments on the overall quality of the written document criticizing its organization, thoroughness, and objectivity. The Site Owner asserts that these deficiencies result in inadequate documentation of the conclusions drawn in EPA's terrestrial risk assessment.

Response: EPA prepared the terrestrial risk assessment in-house with Agency personnel experienced in the ecological risk assessment process. In preparing this document, as with any document, the Agency had to balance the time required to revise and improve the quality of the document against the need to move the cleanup process forward. This tradeoff often results in documents that could still be improved upon from a quality standpoint. Fortunately, the review and comment process associated with public documents generated by the Agency effectively resolves any remaining ambiguities. EPA initially provided the terrestrial risk assessment to the PRP Group performing the RI/FS for review and comment. The PRP Groups' comments and EPA's response are included in the Administrative Record to provide additional information on the terrestrial risks associated with the Site. EPA solicited further review and comment through the remedy selection process when it issued the Proposed Plan for public comment. Through the comments raised here and the Agency's responses, the remaining ambiguities in the terrestrial risk assessment have been addressed. Through this iterative process, EPA has effectively completed the risk assessment process and provided adequate documentation to support the actions required by this ROD.

D. Non-Aqueous Phase Liquids (NAPL)

1. The Site Owner contends that since there is no oil floating in the groundwater, there is no reason to remediate oil or PCBs. The Site Owner asserts that EPA's use of Photo #4 of the Proposed Plan, depicting oil in a groundwater sample, is an irresponsible attempt to appeal to the publics' emotions rather than logic.

   Response: EPA has presented analytical data that substantiates the presence of oil and PCBs in the groundwater. Since PCBs cannot be visually observed, a picture (Photo #4) of oil found floating in a groundwater monitoring well is more descriptive.

2. The Site Owner contends that even if EPA can prove there is oil in the groundwater, the measurements taken of the oil layers in monitoring wells historically and during the RI/FS were inaccurate and therefore cannot be relied on to substantiate the presence of oil. The Site Owner asserts that actual oil thicknesses are usually five (5) to ten (10) times less than their measured thickness.

   Response: EPA is proposing to take an action at the Site because the concentrations of PCBs pose a potential risk, not because a certain thickness of oil was detected.

3. The Site Owner contends that even if EPA can prove there is oil, all historical data indicates that no more recoverable oil remains in the groundwater as follows: (a) its interpretation of a 1980 EPA-sponsored study (by Weston) that only 1,500 gallons of oil would be recovered; (b) various technical literature and journals cited oil recovery rates as normally between 10 to 20%; (c) its interpretation of oil recovery logs from 1981 to 1989 (which includes an assumption that protective clothing and rags expended on the job contained a substantial amount of oil) suggests that 8,200 gallons of oil have been recovered from the Site. Therefore, referring to another Weston report which theorized that 16,000 gallons remained on-site, a 20% recovery of that amount would

be 3,200 gallons. Therefore, the Site Owner concludes that the amount recovered (allegedly 8,200 gallons) is actually more than the amount that is theoretically possible (3,200 or 1,500 gallons, as described above). [NOTE: Although the Site Owner did not organize his comments as a unified argument as EPA has done, EPA believes it has captured the essence of the comment and the Site Owner's conclusions.)

Response: In the Proposed Plan, EPA never attempted to estimate how much oil was or could be recovered. Also, EPA is not proposing to install more oil recovery wells on-site. EPA realizes once contaminants such as oil have been released and diluted in the environment, it is impossible to account for every drop. However, despite the Site Owner's assertions concerning recovery rates, Photo #4, as presented in the Proposed Plan, illustrates that oil can still be recovered from certain monitoring wells on-site.

EPA believes that the Site Owner's estimate that 8,200 gallons of oil has been recovered from the Site is speculative because it was obtained by extrapolating measurements from the amount of oil that was diluted in groundwater. As a result, each estimate may vary depending on the interpretations and assumptions used. Again, EPA relies on analytical data to demonstrate current conditions at the Site. The presence of oil has been documented in monitoring well MW6 in 1991. The analytical results indicate that sample contains 1,060 ppm of PCBs.

4. The Site Owner commented that there is no oil left because the oil recovery system installed by the Site Owner in 1981 ceased recovering oil by 1989.

Response: The Site Owner's documentation (see *Volume I, Book 10, Section 9.1.1, page 14*) shows that in 1989, seven gallons of oil had been collected from the Site. However, the level of recovery is not relevant to EPA's decision in this document because EPA agrees that active recovery is no longer appropriate. The selected remedy requires installation of a passive collection system that will allow the oil still remaining in the soil to be captured and effectively disposed of as it is gradually released into the groundwater.

5. The Site Owner contends that there is very little oil remaining in the groundwater because RI Table 4-30 illustrates only low concentrations of TPH were detected in the 1991 groundwater samples. By 1992, only several wells (PW10, MW6 & MW7) had detected TPH.

Response: EPA does not consider TPH a true quantitative measurement of oil in a sample. As the definition box in ROD Section V.E.2 explains, TPH is a misleading terminology because not all petroleum compounds may be detected by the analysis while other non-petroleum compounds may be accidentally included. Nevertheless, EPA does not agree that RI Table 4-30 presents evidence that oil is not present in the groundwater. Table 4-30 only presents TPH results in the groundwater layer; the oil layer was never analyzed for TPH. In addition, two of the 1992 groundwater samples had actually increased in TPH (i.e., MW6 and MW7 increased from 5.36 and 3.54 ppm to 7.3 and 12.3 ppm, respectively). One reason for this increase may have been due to the improper well purging action used (to be later explained in Comment #7) which resulted in diluting petroleum compounds in the oil layer and moving it into the groundwater phase.

6. The Site Owner commented that any oil left within the Site is trapped in impermeable "pockets" and will not be going anywhere. This condition was stable until EPA drilled a well through the oil pockets and mobilized the PCBs. The reason why certain groundwater samples had an oil layer was because when EPA drilled a well through a dry region ("unsaturated zone") which contained oil pockets, the drill pulled the oil down to a wet region ("saturated zone") below the water table. Once in the saturated zone, the oil could move freely with groundwater. Since oil is lighter than water, it will float up towards the surface of the groundwater in the wells. This is where EPA makes its mistake by identifying it as an oil layer in the groundwater. PW10 is a perfect example of where impermeable oil pockets were encountered because it had a very low-yield during the pump tests. (NOTE: The Site Owner's argument concerning MW5 could not be understood).

Response: EPA disagrees that contamination detected was due to trapped pockets of oil. EPA used proper well development and purging in accordance with EPA approved protocols, which would have removed all contaminants that may have been deposited during the installation of the wells.

There were no profiles in the well boring logs, including PW10 (*see* AR300360), which documented the presence of an impermeable layer (such as clay) which trapped the oil in small pockets. On the contrary, the log from PW10 documents petroleum stains and porous fill materials (such as wood and concrete fragments) down from the surface, past the water table at 13.4 feet, to a non-impermeable layer at 18 feet. Nowhere was an impermeable layer documented.

7. The Site Owner commented that monitoring wells, especially MW6, were not correctly purged prior to sampling in 1991. Therefore all 1991 well sampling data, such as the 1,090 ppm PCB in MW6, should be disregarded. The samples taken in 1991 were actually oil left over from the construction of wells due to trapped oil. As proof, the 1992 samples contained very little or no oil because most of the oil had been removed. The proper way to purge or develop a well would have been to aggressively bail, surge, or flush a well with air or water until all stagnant water has been removed. The Site Owner cites an EPA guidance document [EPA, 1987][5] as reference.

Response: EPA has documentation that, during the 1992 sampling event (which the

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5 EPA, 1987. Handbook: Groundwater (EPA/625/6-87/016); March 1987.

Site Owner's representative had also videotaped), the wells were not properly purged, and, therefore, the samples are faulty. EPA has eliminated the 1992 groundwater data from its risk assessment analysis. As discussed below, the absence of oil in the 1992 samples was the result of unacceptable purging techniques used by the PRP's replacement contractor (HMM). The purging technique discussed in the cited reference [EPA, 1987] does not conform to the approved RI workplan [BCM, 1991][6] written by the PRP's original contractor (BCM) and will result in dilution of PCBs in the sample collected. The approved RI workplan, to be discussed later, reflects methodology cited in a more recent EPA guidance document [EPA, 1992][7], which was specifically designed for sampling a floating oil layer (LNAPLs) in groundwater.

The 1992 guidance document specifies (on page 7-9) the use of a low yield pump and tubes held below the water surface for purging wells. The object (as stated on page 7-8) is to ensure that "migration of water in the formation above the well screen does not occur." In effect, if a more turbid method was used, oil and PCBs from the top of the water table would have been drawn down into the wells and resulted in an unrepresentative sample. Furthermore, the guidance states: "When sampling NAPLs, bailers should never be dropped into a well and should be removed from the well in a manner that causes as little agitation of the sample as possible. For example, the bailer should not be removed in a jerky fashion or be allowed to continually bang against the well casing as it is raised..." [EPA, 1992 at page 7-13]

In 1991, the PRP's original contractor (BCM) collected samples of the oil layer in MW6. The PCB concentration in one sample was 1,090 ppm. In 1992, the PRP's replacement contractor (HMM) collected samples that only contained droplets of oil. The PCB concentration was only 7 ppb. EPA's independent analysis of the 1992 split sample was 183 ppb PCB (*see* AR303815). EPA suspects the vast difference between the 1991 and 1992 sample results may have been due to the different methods of purging used by the different contractors. And the difference between the 7 and 183 ppb split samples may also have been due to the different degrees to which PCBs were dissolved in the groundwater.

According to EPA's oversight contractor's (SAIC) notes dated June 3, 1992, HMM collected samples from MW6 (*see* AR301902). Prior to collection, they had to purge the well in accordance with the sampling plan. The original BCM sampling plan required a tube to be lowered through the oil layer into the bottom of the well and pump water out at a low rate (<1 gpm) in order to prevent drawdown of the oil. Each well was required to have 3 to 5 well volumes of water removed. On May 18th, after

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6 BCM, 1991. RI/FS Field Sampling Plan; BCM Engineers; March 1991.

7 EPA, 1992. RCRA Ground-water Monitoring: Draft Technical Guidance (EPA/530-R-93-001); November 1992.

concluding that purging of the wells was too time consuming (at 0.5 gpm for an estimated 3 well volume of 14.5 gallons), HMM verbally requested a deviation by using bailers. This field variance was granted by EPA (*see* AR301876) but was never documented by HMM as a deviation from the approved workplan in the RI/FS. EPA had previously expressed and transcribed to the PRPs that all deviations from BCM's sampling plan must be identified and approved in writing (*see* AR304397). EPA took this position because samples taken using various techniques may result in inconsistencies that would be difficult to interpret later (*see* AR301868). EPA also wanted to maintain consistency between sampling techniques used by two different PRP contractors.

During the purging, SAIC observed that HMM's bailing technique was very aggressive and agitated the samples. For example, the bailer used at MW11 hit the bottom of the well whereby the sediments were stirred up into the water. The purge water drawn up with the bailer was black while previous water drawn up by the pump was light brown. This bailing technique was used for most of the other wells. This technique is unacceptable because the purging may have removed most of the PCBs (along with other contaminants) while diluting the oil layer in the wells. In turn, samples taken after the purging showed little oil and low PCB levels. This bailing technique was applied at MW7 (*see* AR301901), as well as MW6.

8. The Site Owner commented that the presence of oil layers in the subsurface soils as suggested by EPA in Figure 2 of its Proposed Plan and Figure 1-5 [the correct citation should be Figures 2-1 or 3-1] in the Feasibility Study is not supported by the RI data for the following reasons. Based on a map (Figure 2, *see* AR302295) in the Proposed Plan, the area that EPA claims to be saturated with oil (NAPL) is not. Soil can only be considered saturated with oil if it is below the water table and its TPH concentrations are greater than 10,000 ppm. A table presented by the Site Owner (*see Volume I, Book 3, Table ESE-2, page 9*) and several boring locations (B14, 15, 16, 17, 18, 22, and 23) were presented to illustrate that samples below the water table did not exceed 10,000 ppm TPH. Since no soil below the water table exceeds 10,000 ppm TPH, there can be no NAPL.

Response: EPA never suggested that soil in the NAPL Area must be saturated with water and oil. The Proposed Plan states on page 2 that "the NAPL Area is an area thought to contain residual oil" (*see* AR302274). This does not mean an area has to be saturated with oil. The Site Owner failed to mention that most of the samples identified in Table ESE-2 were not tested below the water table. Therefore his statement that there are no "saturated" subsurface soils that exceeded 10,000 ppm TPH is unsubstantiated.

The following table illustrates the locations, depth, and water level for samples that contradict the Site Owner's assertion that 10,000 ppm TPH has not been exceeded in the NAPL Area.

SAMPLE LOCATION	Max TPHs		Water Table (ft)	Table ESE-2 Cited TPHs		Tested Below Water Table?
	Depth	(ppm)		Depth	(ppm)	
B14	3.0	12,400	12.5	12.5	4,080	No
B15	8.5	12,800	11.2	10.5	10,800	Yes
B16	5.5	13,190	13.25	11.5	1,416	No
B17	6.5	17,400	12.5	12.5	4,160	No
B18	14	10,000	14	14	10,000	No
B22	8.0	15,800	14	14	9,770	No
B23	8.5	25,900	12.5	10.5	13,600	No

Shading indicates samples where 10,000 ppm TPH was exceeded. Other locations mentioned by the Site Owner: B16, SB-104, SB-105 were not tested below the Water Table ("WT"). SB-101, SB-102, SB-103 were tested once below WT.

9. The Site Owner commented that EPA's evidence for suggesting DNAPLs are present is not valid and EPA should not propose any DNAPL investigation.

Response: EPA has not unequivocally concluded that DNAPLs are present. EPA stated in the Proposed Plan that "the RI/FS provided evidence that there may also be a DNAPL" and profiles from borings SB-105 and SB-106 "show PCB levels that remain the same or potentially increase with depth below the water table." For that reason, the ROD requires additional sampling during Remedial Design to determine whether DNAPLs are present or absent.

10 The Site Owner commented that borings SB105 & SB106 do not support the possible existence of DNAPLs since they do not exhibit oil stains, petroleum or comparable odors (i.e., "heavy fish odor") below the water table or deeper (an exact depth is not given). The Site Owner asserts that since the profile of SB106 does not contain any stains or odors down to its bottom depth at 16 feet, it should not be considered showing signs of DNAPLs.

Response: EPA did not rely on physical observations or odors as evidence of possible DNAPL. EPA used analytical results from soil collected from these borings which suggested PCBs may be increasing with depth. However, a comparison of the observed TPH and PCB values in subsurface soils (*see* Exhibit 1, attached) illustrates that other borings throughout the RI have documented the presence of oil stains and odors deep below the water table. Many times, these borings (*e.g.,* B23) documented the presence of oil stains or petroleum odors as deep as 8 feet below the water table.

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11. The Site Owner presented an untitled table (*see Volume I, Book 1, Section 5.2.2, page 79* of Site Owner's Comments) to illustrate the deficiencies of borings SB105 & SB106 which EPA cited as evidence of DNAPL in the Proposed Plan. The Site Owner states that: (a) EPA mixed unreliable field screening data with analytical data; (b) EPA failed to cite that SB-106's detection of 10-50 ppm PCB at 12-14' was actually a "field test" rather than a "laboratory test" (the laboratory test did not detect any PCBs with a detection limit of 2.1 ppm Aroclor 1254); and (c) different aroclors were detected in SB105 and SB106 (Aroclors 1260 vs 1254).

Response: (a) The following soil boring profile illustrates that EPA did not rely on field screening data to indicate the potential presence of DNAPLs in SB105 & SB106. The presence of high PCB levels (12 & 15 ppm, as shaded in that table) at the water table with the absence of deeper test data prompted EPA's concern. Other locations such as SB102 and TP-T1, as presented and shaded in Exhibit 1, also illustrate that not enough deeper samples were tested (although some borings, such as SB105, were drilled to as deep as 44 feet) to discount the possibility that its PCB levels may exceed the cleanup level of 25 ppm below the water table.

BORING PROFILE OF POTENTIAL DNAPLs

Location	Depth (feet)	PCB (ppm)	Profile (feet)
SB105	8.0	*(10-50)*	
	10.0	*(10-50)*	stain @ 14-18
	12.0	3.7	water @ 14.0
	14.0	12.0	
	16.0	12.0	(Bottom 44.0)
SB106	6.0	1.8	
	8.0	ND	no stains
	10.0	5.5	
	12.0	ND *(10-50)*	water @ 14.0
	14.0	15.0	(Bottom 16.0)

Reference: Exhibit 1, attached. ND = Not Detected.

(b) Figure 3 of the Proposed Plan depicting sample locations and results for highest and lowest observed PCB contamination (*see* AR 302297) reminds the reader at note #4 to "note that some of the data are screening results (data in italics); these results may not be comparable to analytical data." The field test data in SB106 were also presented in italics. Again, Exhibit 1 illustrates the presence of high PCB level (as shaded) at the water table followed by no tests below that depth. Exhibit 1 (note #5) also cited that problematic detection limits as high as 11 ppm (*see* AR300603) were reported for non-detected PCB samples at the 10 feet depth of SB106.

(c) As discussed in response to Comment #18 below, Aroclors are not an acceptable form of PCB finger printing.

As stated previously, EPA never unequivocally concluded that DNAPLs are present. The investigation during Remedial Design will attempt to determine if PCBs are actually increasing with depth.

12. The Site Owner commented that given the measured concentrations of PCBs and the specific gravity of oil (0.8) found in subsurface soils at the Site, the oil would not be dense enough to form a DNAPL. PCBs must be detected at 570,000 ppm in the subsurface soil for DNAPL conditions to exist, and the PCB levels in SB105 pale in comparison to the 570,000 ppm theoretical values. The 570,000 ppm PCB is derived from an algebraic equation which assumes the sum of the weights of oil and PCBs will be equal to the weight of DNAPL PCBs found on-site: $A\ \gamma_{oil} + B\ \gamma_{PCBs} = (A+B)\ \gamma_{DNAPL}$; where "$\gamma$" is density.

Response: EPA considers this equation to be theoretical and not representative of actual field conditions.

13. The Site Owner presents a series of technical publications that discuss how oil is trapped below the water table (in soil pores) and how it can "smear" against the soil walls. This occurs when tides from the Delaware River fluctuate. EPA has mistaken the residual oil smears that are left in the lower depth for DNAPLs in the groundwater.

Response: EPA reviewed these technical publications. The conclusion that there are trapped oil pockets and that they can smear against previously uncontaminated soils has prompted new concerns for EPA. Since the Site is located in a tidal and flood zone area, the water level fluctuations caused by these movements can liberate and move oil both in a horizontal and vertical direction. The result is that PCBs are mobilized with the oil and may contaminate a clean surface soil cover, as well as being released into the river.

14. The Site Owner commented that EPA is fixated on the buried underground storage tank ("UST") and the belief that the tank is a source of contamination while the evidence supports the opposite conclusion. The Site Owner provides testimony from former Site employees and a former PADEP employee as evidence that the tank has been cleaned. The Site Owner states that the UST location on Figure 2 is wrong.

Response: The testimony provided were general observations from various parties that the tank did not appear to contain oil or that it was filled with concrete. EPA does not rely on testimony alone to conclude whether an area is a source of contamination or not, especially where analytical data has been collected. Samples collected around the tank location (*i.e.,* MW6) have shown high levels of PCBs. The PRPs did not investigate the tank during the RI to determine whether or not the tank is clean. Therefore, the ROD requires that the tank, its contents and its surrounding soil be tested and remediated if its PCB levels exceed 25 ppm, consistent with the rest of the Southern Portion of the property.

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Figure 2 states that "all locations are approximate" and references RI Figure 2-8 as the suspected location of the UST. EPA cannot change Figure 2 because the exact UST location is not known and the comment did not provide a corrected location.

15. The Site Owner provided various publications that stated transformers disposed between 1968 and 1973 generally contained mineral oil rather than PCBs. The mineral oil, in turn, contained trichlorobenzene. Since none or very little trichlorobenzene was detected in the RI environmental samples, this could only mean that no oil from the original transformers had spread into the environment.

Response: There is no documentation, much less actual samples, of the oil contained in historical transformers to determine if trichlorobenzene was a component of the oil. Historical sampling results, however, support EPA's conclusion that transformers drained at the Site contained PCBs because sampling of the oil spills on the ground detected high levels of PCBs.

Furthermore, according to the PCB regulations at 40 C.F.R. § 761.3 (Definitions) published under Section 6(e) of the Toxic Substances Control Act ("TSCA"), 15 U.S.C. Section 2605(e) and effective July 2, 1979, the definition for *PCB-Contaminated Electrical Equipment* includes the statement that "Oil-filled [*i.e.*, mineral oil] electrical equipment . . . must be assumed to be PCB-Contaminated Electrical Equipment. The preamble elaborates on this definition as follows:

> Because of the widespread PCB contamination of transformers that were designed to use PCB-free mineral oil dielectric fluid, all such mineral oil dielectric fluid transformers must be assumed to be PCB-Contaminated Transformers, unless reasons exist to believe that a transformer was filled with greater than 500 ppm PCB fluid (in which case the assumption is that the transformer is a PCB Transformer).

(*See*, Preamble to the final rule for Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions ("preamble"), 44 Fed. Reg. 31514 (May 31, 1979) at p. 31517.) According to the regulations, PCB-Contaminated electrical equipment means any electrical equipment, including transformers, that contains 50 parts per million (ppm) or greater PCB, but less than 500 ppm PCB. A PCB Transformer is any transformer that contains 500 ppm PCB or greater. 40 C.F.R. §761.3. In other words, all transformers, including those designed to be mineral oil transformers will be assumed to contain at least 50 ppm PCB. Additionally, according to the regulations, all transformers are presumed to contain PCBs unless specifically marked and certified otherwise. 40 C.F.R. §761.3.

The trichlorobenzene data in the RI is not useful because only a few samples were analyzed for 1,2,4 trichlorobenzene. Of the typical samples analyzed, the oil phase of MW6P reported that trichlorobenzene was non-detectable at an extremely high

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detection level of 750 ppm (*see* AR300520).

16. The Site Owner commented that even if the Site is a source of PCBs in the groundwater, there is no migration off-site because after the 1981-1989 remediation effort, PCB levels in the groundwater have been lowered to less than the 1983 Stipulation performance standard of 200 ppb (barring the MW6 data). Also by applying several conversion factors, the Site Owner concludes that less than 0.8 lbs of PCBs are released from the Site every year, thereby negating any need for a containment wall to keep the oil and PCBs in.

Response: EPA disagrees that all PCBs within the Site have been contained when the highest level of the most recent PCB sampling (19.6 ppm) was observed immediately on the shorelines (MF107), compared to less than 2 ppm at distances 300 feet into the river (S22). Regardless whether there is an annual theoretical PCB release of 0.8 lbs, the analytical evidence still suggests that PCB contamination in the groundwater has not decreased much since 1977 (1,539 ppm in 1977 vs. 1,090 ppm in 1991).

17. The Site Owner commented that despite EPA's best efforts, no oil seeps could be located during the RI or historically for sampling. The sheen in Photo #2 of the Proposed Plan contains no PCBs. EPA is also confusing residual bank oil sheens with active oil seeps. Where EPA has identified contamination in the sediments, EPA now hypothesizes these occurrences are due to "subtidal seeps" which is impossible because oil (specific gravity of 0.8) is lighter than water (specific gravity of 1.0) and therefore can only be found on the surface layers of the sediments.

Response: In the course of history of the on-site activity at the Site (from the 1970's to 1990's), only a few days were spent looking and sampling for oil seeps in the field (in 1990 and 1991). One reason why oil-oozing seeps could not always be found was because tides from the river would cover the shores daily. As a result, the shorelines would be exposed only for a short period. However, oil sheens were observed on the river each time. Of the times oil sheens were sampled around the Site, the data demonstrate that they contained high levels of PCBs. For example: (a) in 1977, 1,071 ppm was detected in an oil sheen along the shoreline (*see* AR100034); and (b) in 1990, 210 ppb was detected in water that refilled a hole after sediment containing 5.2 ppm was collected (*see* AR301796).

The water sample in Photo #2 of the Proposed Plan was collected because there was not enough oil sheen in the sample for analysis. While these historical data were not included in the RI data set or used to evaluate various risk assessments, they do demonstrate that PCB contamination in oil emanating around the Site is extremely high.

Despite the PRPs' failed efforts to locate actual seeps in order to guide the RI sampling, sediments data demonstrates that PCBs have contaminated both the surface and lower (or subtidal) layers. One reason for this dispersion of PCBs may be because

PCBs in the oil are being dissolved by the constant fluctuation and movement of groundwater caused by the river tides. In any case, the analytical data show that PCB contamination is the highest along the property shorelines (*i.e.*, 19.6 ppm at MF107); and PCB contamination has occurred on the surface as well as the deeper levels of the shoreline sediments (*i.e.*, 6.5, 9.1, and 14 ppm at 0.5, 1, and 1.5 feet, respectively, at RR3).

As to the argument that the seeps may be biological or due to off-site sources, there is no analytical data provided to support either suggestion. The highest off-site PCB contamination in sediments suggested by the Site Owner was only 1.57 ppm (*see* AR303383). In addition to not containing an exact location, this alleged value is also minor compared to the highest PCB (19.6 ppm) found adjacent to the Site's shorelines.

18. The Site Owner commented that PCB Aroclors from the Site did not match those found in the sediments. Therefore oil on-site could not have been migrating into the river. For example, PCBs in most soil samples on the Site contained Aroclor 1260. Only one of the 20 (1/20) sediment samples collected in 1991 around the Mudflat Area contained Aroclor 1260. Meanwhile only one of the 14 (1/14) samples collected in the Delaware River Sediment Area contained Aroclor 1260.

Response: Aroclors cannot be used as a definite form of fingerprinting PCBs to determine the migration of PCBs from a particular source. EPA also notes that the most contaminated region was along the shoreline in the Riprap Area and the detectable PCBs there all contain Aroclor 1260.

The following table is presented to illustrate how Aroclor 1260 was found in the most contaminated subsurface soil on-site (B17, TP-T2) as well as the most contaminated sediment samples off-site (MF107, RR3, DR8).

Highest PCBs levels observed in soils & sediments (ppm)

	TP-T1 (Soils)	B17 (Soils)	MF107 (Mudflat)	RR3C (RipRap)	DR8 (River)
Aroclor 1248	ND (<30)	ND (<5.3)	4.6	ND (<1.9)	4.6
Aroclor 1260	230	42	15	14	2.2
Total PCBs	230	42	19.6	14	6.8

19. The Site Owner commented that the 10,000 ppm TPH cleanup level calculated in Appendix B of the FS is wrong. The FS made an incorrect assumption as to the density of oil, and soil and oil retention values, while more realistic values would have yielded a 20,000 ppm cleanup level. However, using assumptions developed by the Site Owner's consultants, a more reasonable cleanup level of 30,000 to 100,000 ppm

would result. The Site Owner further emphasized that EPA admitted its TPH cleanup level was flawed because there was no correlation between TPH and PCB values.

Response: The wide range of possible TPH cleanup levels was due to the equally diverse scenarios posed by the different consultants. Although most of the assumptions made may hold true under laboratory conditions, they do not represent how PCBs may behave under actual field conditions. The Site Owner, for example, assumes: (a) oil residual saturation between 15 to 20%; (b) soil porosity between 25 to 45%; and (c) soil dry density between 1.5 to 1.9 kg/L to obtain TPH cleanup levels ranging from 15,789 to 42,353 ppm. EPA agrees that the TPH cleanup level developed by the PRPs to clean up PCBs is equally speculative and may be flawed. Therefore, EPA has eliminated it from the ROD (*see* response to PRP's Comment #5) and now requires cleanup of PCBs based on PCB values alone.

20. The Site Owner states that EPA's Proposed Plan erroneously stated that TPH contamination up to 25,000 ppm in the soils was observed. According to Table 4-11, page 4-49 of the RI, the maximum TPH value was only 17,400 ppm.

Response: Table 4-11 in Volume 1 of the RI is incorrect. Backup data contained in Appendix C.I.b of RI Volume 2 (*see* AR300462) shows the highest TPH value to be 25,900 ppm at soil boring B23 (8.5 feet depth). Additional sampling by the PRPs during the public comment period yielded a higher TPH value of 66,100 ppm (*see* AR303891) in testpit sample TP-T2 (5.0 feet depth).

E. Remedial Alternatives

1. The Site Owner commented that soil washing is not technically and economically feasible at an urban fill site such as Metal Bank.

Response: Soil washing is a proven technology that has been used at other Superfund sites to remove PCB contamination from soil. The materials handling issues associated with the nature of the fill material at the Metal Bank Site would be addressed during the remedial design process. A treatability study would be required to ensure that soil washing is feasible given the site-specific conditions. Although the nature of the fill material at the Site may require additional materials handling measures, this concern does not render this technology infeasible for purposes of evaluating alternatives. However, EPA did not choose this technology because of its higher cost ($31.4 million) compared to that of the proposed remedy ($17.2 million).

2. The Site Owner commented that *in-situ* solidification/stabilization is neither technically nor economically feasible at the Metal Bank Site primarily because of the impossibility of the use of the mixer in urban fill material.

Response: As with soil washing, *in-situ* solidification is a proven technology that has

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been used at other Superfund sites to treat contaminated soil. The materials handling issues associated with the urban fill at the Site would be addressed during the remedial design process and is not a sufficient basis for rendering this technology infeasible for purposes of evaluating alternatives. A treatability study would be required to ensure that this treatment process works effectively to stabilize the PCB contamination in the fill matrix at the Site. EPA has reviewed a preliminary treatability study submitted by the PRPs (*see* response to PRP's Comment #20) and concludes this technology would not be technically or economically advantageous based on the available information.

3. The Site Owner commented that concerns associated with installation of the sheet pile wall along the southern and western borders of the Metal Bank property, including cost, time delays, and overall ability to obtain the permits necessary to install the sheet pile wall, dewater behind the pile wall, and discharge dewatering liquid back into the river, are not adequately considered.

   Response: EPA recognizes that installation of the sheet pile wall will require careful design to ensure effective implementation. Use of sheet piling to prevent migration of Site contaminants into the Delaware River and to enable excavation of contaminated sediments is a feasible technology. As to time delays associated with permitting, cleanup actions under Superfund are only required to meet the substantive requirements associated with the permitting process. On-site actions do not require completion of the administrative permitting process.

4. The Site Owner commented that the conceptual design for the LNAPL collection system would not effectively collect floating product.

   Response: The standards and specifications for design of a passive system to collect PCB contaminated oil floating on the surface of the water table will be determined during the remedial design process. The technology to implement a collection system of this nature is readily available and can be tailored to site-specific conditions. The conceptual model presented in the Feasibility Study may be altered during the remedial design process as additional site-specific information is obtained and evaluated. The purpose of the conceptual model is simply to provide a general framework for this component of the remedy.

5. The Site Owner commented that use of an impermeable cap over the Southern Portion of the Metal Bank property is not necessary where excavated sediments are backfilled and maintenance of the existing permeable cap over the remaining area would be adequate.

   Response: EPA agrees that an impermeable cap is not necessary at the Site if soils with elevated PCB concentrations (*i.e.*, > 25 ppm in the Southern Portion of the Site and > 10 ppm in the Courtyard) are removed. The remedy selected in the ROD only requires that a soil cover be placed over the excavated areas.

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6. The Site Owner commented that probable recontamination of sediment in the tidal mudflat by PCBs from other off-site sources makes any remedial measures for the sediment ineffective.

Response: Data collected during the Remedial Investigation indicate that PCB concentrations in sediment decrease with distance from the Site. The mean PCB concentration in the farfield samples (samples > 30 meters from the Metal Bank property) is 0.87 ppm which is below the PCB sediment cleanup level of 1.0 ppm. Therefore, recontamination above the 1.0 ppm cleanup level is not expected.

7. The Site Owner recommends a Limited Further Action Alternative including the following components as an appropriate remedy for the Site: property access restrictions formalizing existing conditions; verification of closure of the existing underground storage tank, formalize the existing institutional controls, maintenance of existing cover material, re-vegetation and maintenance of vegetation along the riprapped side slopes, and monitoring to confirm absence of LNAPL.

Response: The Limited Further Action Alternative proposed by the Site Owner would not be protective of human health and the environment because aquatic organisms would continue to be exposed to contaminated sediments and high levels of PCB found in the oil layer floating on the water table could continue to act as a source of PCB contamination to the aquatic environment. This alternative also relies solely on access restrictions to prevent exposure to PCBs in the Courtyard surface soil. Because this alternative does not meet the threshold criterion of overall protection of human health and the environment, EPA cannot select this alternative as a remedy for the Site.

8. The Site Owner also provides a second alternative which includes the components listed in the previous comment along with the following: additional sampling followed by excavation and off-site disposal, if required, of the contaminated surface soils in the Courtyard Area; and additional sampling of the sediment of the mudflat areas followed by covering mudflat areas shown to require remediation with two feet of clean fill.

Response: While this alternative addresses potential exposure to the Courtyard surface soil, covering the mudflat habitat with two feet of clean fill is not an effective approach to providing overall protection of aquatic receptors. The placement of two additional feet of fill material into the mudflat would itself be an adverse impact to this ecological resource. In addition, the long-term effectiveness of this approach would rely on effective maintenance of this two foot cover. While this alternative would be easier to implement and less costly, EPA's selected remedy requiring excavation of PCB-contaminated sediments provides a more permanent solution as preferred by the NCP.

9. The Site Owner commented that the cost estimates for the alternatives considered are generally not explained, poorly justified, and overly conservative. For example, the Site Owner asserts that the use of disposal costs of $475 per ton is twice the typical

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hazardous waste landfilling cost.

Response: EPA reevaluated the cost estimates for the alternatives based on a more realistic soil excavation volume and, in the case of off-site disposal, a more realistic disposal cost. These revised costs are reflected in the ROD and supporting documentation for these revised estimates is provided in the Administrative Record. (*see* AR304198)

F. Legal and Historical Factual Issues

The Site Owner provided 40 pages of comments and 11 volumes of attachments detailing its view of the history of the Site from the period of transformer recycling through the present. These comments are available for review in the Administrative Record for the Site. The volumes of attachments are available for review upon request from EPA. Because this comment is a continuous narrative, EPA is not responding in this document to every statement, since much of it does not specifically address the remedy presented in the Proposed Plan. EPA has corrected the ROD where specific factual statements were in error as shown by these comments and the references provided. EPA does not generally consider it appropriate to debate points of disagreement with the Site Owner regarding historical events, particularly with regard to negotiations between EPA and the Site Owner, Metal Bank. However, a number of general concerns and issues were gleaned from these comments, to which EPA will respond below.

1. The Site Owner summarizes the ownership history of the Site from October 1962 to the present. (*See* AR303675-303676)

   Response: EPA reviewed this information and has incorporated it into the ROD (Section II.A. Site History), with the exception of one item. The Site Owner stated that, "beginning with its incorporation in 1968, the 'new' Metal Bank leased both the Cottman and the New State Road properties until 1980." (*See* AR303676) EPA has a copy of a lease agreement for the Cottman Avenue Site beginning June 1, 1972 for a period of 10 years between Union Corporation and Irvin G. and John B. Schorsch, the owners of the Site from March 1969 until September 30, 1980. Although Metal Bank operated at the Site during this time period, the ROD reflects the fact that Union Corporation held the lease.

2. The Site Owner provides a narrative of the history of recycling operations from 1968 through July 1973. (*See* AR303676-303679) EPA does not dispute this narrative, generally, but notes as follows:

   (a) The Site Owner states that Metal Bank believed that the transformers contained plain mineral oil and not PCBs, and that this belief was supported by a 1972 study performed by the Franklin Institute and by the fact that the recovered oil could be used as fuel for lead smelting at State Road, which would not be expected if the oil were contaminated with fire-resistant PCBs. (*See* AR303677)

Response: While the 1972 Franklin Institute study concludes that "the composition of dielectric oils collected by Metal Bank from September 1971 through January 1972 was that of hydrocarbon mineral oils," and that "no sulfur, chlorine, or fluorine containing compounds were found," EPA notes that no PCBs were detected in samples of oil collected from Metal Bank by the United States Coast Guard ("USCG") and analyzed during approximately the same time period (1972). However, when EPA retested the samples collected in 1972 by USCG using new procedures in 1977, PCBs at concentrations over 800 ppm were detected. The Site Owner also states that in 1977 Metal Bank realized that the analytical methodology used in 1972 by the Franklin Institute to test for PCBs was outdated and inaccurate. (*See* AR303680)

In addition, even transformers designed to be mineral oil transformers are assumed to contain PCBs according to TSCA regulations. (See discussion of regulations in response to Comment #15 in Section D (NAPL), above.)

(b) The Site Owner noted that the suggestion in the RI that transformers were delivered to the Site by rail and handled in Buildings 2 and 7 is unsubstantiated by any witness testimony or depositions, and the testimony does not indicate that any transformer activity occurred anywhere other than in the vicinity of the pad. (*See* AR303677)

Response: The statement in the RI and ROD that transformers may have been delivered by rail to Buildings 2 and 7 is based on the presence of high levels of PCB contamination in these areas and around the railroad track in Building 7. However, the PCBs in the area may also have come from the railroad transformers.

(c) The Site Owner states that "between 1968 and 1972, copper wire was burned to remove insulation at the Site in 'sputnik' type furnaces which were fired by natural gas." (*See* AR303678) The Site Owner references exhibits accompanying the comments [Vol. II, Bk. 8, Exh. 3(b), (e)].

Response: EPA was unable to locate the attachments as specified, but believes the reference is to two letters from Site Owner's counsel dated May 6, 1987 and July 24, 1987 [Vol. II, Bk. 9, Exh. 3(b), (e)]. In April of 1997, EPA conducted an interview of the former president and vice president of Metal Bank, both of whom had long-standing careers with the company and had worked on-site during the period in question. These gentlemen did not clearly recall any burning of copper wire at the Site. EPA would appreciate any documentary evidence to support Counsel's statements.

3. The Site Owner provides a narrative of the enforcement history at the Site beginning with the U.S. Coast Guard in August 1972 through September 1995. (*See* AR303678-

303714) EPA does not contest the general factual accuracy of this narrative, with a few exceptions, but certain specific issues are discussed below. EPA does not necessarily agree with the Site Owner's characterization of the facts and the opinions and motives imputed to EPA.

(a) The Site Owner's narrative summary of negotiations surrounding the United States' 1980 lawsuit under the Resource Conservation and Recovery Act ("RCRA"), the Toxic Substances Control Act ("TSCA") and the Refuse Act, and the 1983 Stipulation (*see* AR303682-303691) appears to be an effort to demonstrate that Metal Bank has done all that was required under applicable statutes and as a result of these negotiations, and that the EPA is not justified or authorized to require any further action.

Response: The Site Owner has previously petitioned the Court to enforce the "settlement" reached in the 1983 Stipulation. EPA has argued that the Stipulation was not intended to be a settlement of all claims brought in the 1980 lawsuit, since (1) there is no language in the Stipulation stating that it is a settlement of all claims, and (2) the Stipulation itself states that "Plaintiff agrees that the pending action shall be placed in the suspense docket of the District Court." (*See* Volume II, Book 10, Exhibit 1, AR303749A-Y, at AR303749B) The Court denied Defendant's Motion to Enforce Settlement, stating that the effect of the Stipulation was not to remove the case from the Court's suspense docket, and that until the Plaintiff (EPA) attempts to require any further action on the part of the Defendant (Site Owner), the case will remain on the suspense docket.

The current action being taken under the authority of CERCLA is based on sampling data retrieved subsequent to the shutdown of the oil recovery system which was installed as a result of the 1980 litigation. This action is not based on the prior historical evidence but rather on subsequent analytical data. Regardless of whether or not the prior suit under RCRA, TSCA and the Refuse Act was settled, EPA is not precluded from taking action under CERCLA to protect human health and the environment from threatened releases of hazardous substances. The 1983 Stipulation between the United States and Metal Bank and Union Corporation, its parent corporation, required Metal Bank to operate the oil recovery system installed at the Site until all "recoverable oil" was obtained. "Recoverable oil" is defined as oil "which can be recovered through use of oil-water separation technology when brought to the surface" (*see* AR303749D). Even though Metal Bank complied with the requirements of the Stipulation, that does not mean that no more hazardous substances, including oil bearing PCBs, are present at the Site. It only means that using the technology applied (and not even stretching that to the limit, *e.g.*, by drilling alternative wells), Defendants collected as much oil as they could. EPA has the option to consider any other technologies that may work to remove the threat posed by the remaining hazardous substances on the Site.

(b) The Site Owner states that "low level contamination of sediments in the intertidal area had been observed by EPA as early as 1977 and the 1978 Weston Study." (*See* AR303684)

Response: EPA reviewed the results of PCB analyses from samples taken in 1977 as provided in the 1978 Weston Study (*see* AR100034). While the majority of the sediment samples at various depths had PCB concentrations ranging from 4.3 to 22.1 ppm, one sample of mudflat sediments taken 9/21/77 had a PCB concentration of 619 ppm. More recent sampling during the RI/FS showed lower PCB concentrations in the sediments; the highest level of 19.6 ppm was found in the mudflats. Nonetheless, these lower levels still resulted in Hazard Quotients for aquatic receptors far in excess of 1 (the number at which no adverse impacts are expected to occur). Although the numbers appear to be low, the risks associated with exposure in the mudflat and river sediments, which are feeding grounds for many organisms, are great.

(c) The Site Owner recites negotiations history to demonstrate that EPA agreed that the actions prescribed in the Stipulation would adequately clean up the Site and that such actions represented a remedy that was "fully protective of human health and the environment." (*See* AR303689)

Response: These negotiations occurred prior to the sampling performed in the 1990's, which indicated that there was still contamination on the Site at levels of concern.

(d) The Site Owner notes that the 1983 Stipulation established 200 parts per billion ("ppb") PCBs as the standard not to be exceeded in groundwater. (*See* AR303688) The Site Owner states that EPA confirmed that all recoverable oil had been removed and that PCBs in groundwater did not exceed 200 ppb in a letter dated September 16, 1989. (*See* AR303703)

Response: EPA's 9/16/89 letter does not specifically state that the PCBs in groundwater do not exceed 200 ppb; however, it does state that "EPA believes that Metal Bank has performed all of its duties and obligations under the Stipulation, because the system installed in 1981 is not capable of recovering any more oil." (*See* Volume II, Book 2, Exhibit 19, AR303728A)

The highest PCB concentration detected in the "water phase" of the groundwater was 25.6 ppb.[8] The highest PCB concentration in the "oil phase" of the groundwater was 1,090,000 ppb. EPA believes that the 200 ppb standard provided in the Stipulation refers to the PCB concentration in the water phase. However, regardless of whether the 200 ppb standard applies to the water phase or the oil phase,

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8 The Aquatic Risk Assessment did not include a higher split sample result (183 ppb) in its evaluation. The elevated PCB concentration in this sample may have been due to improper purging and was discussed in Comment #7 of Section D: NAPL, above).

EPA is proposing to take an action at the Site because the concentrations of PCBs in off-site sediments (*i.e.*, 19,600 ppb) posed an unacceptable risk to aquatic organisms, not because of the levels of PCBs in groundwater (*see* ROD Section VI.B: Aquatic Ecological Risk Assessment, *Sediment Risks*). EPA is proposing to address the oil phase of the groundwater through an oil interception and collection system, because its high levels are the continuing source of off-site sediment contamination. (*See also* response to Comment #16, Section D: NAPL).

(e) The Site Owner states that, when no comments were received on the Stipulation, the Department of Justice (DOJ) submitted the executed Stipulation "ending the . . . litigation." (*See* AR303689)

Response: See Response to 3A, above. It is EPA's position that the Stipulation did not purport to settle all claims brought by the lawsuit. In any case, subsequent action under CERCLA is not precluded by the previous suit, regardless of whether or not the previous suit is concluded.

(f) The Site Owner states that St. Vincent's is not a permanent residence for "orphans" as stated in the Proposed Plan. According to Tim Paul, Director of Social Services, the institution is actually a temporary (maximum 90 days) shelter for abused children from ages 2 to 12 pending placement.

Response: EPA representatives also spoke with Mr. Paul and were informed that St. Vincent's is a temporary shelter for abused children and a day care center. (The children benefitting from the shelter are "full-time temporary", while the children in the day care are "part-time permanent".) In addition, there are a number permanent residents at the school, including the grounds keepers and their families and ten of the Sisters who care for the children. The ROD has been corrected to reflect this information.

(g) The Site Owner cites a number of instances where it was excluded from meetings, despite its efforts to cooperate with the PRP Group and EPA. The Site Owner states: "Despite Metal Bank's cooperation and its expressed desire to participate in the RI/FS process to the extent consistent with its legal position, its representatives were generally excluded from meetings between the Agency and the PRP Group." (*See* AR303696)

Response: EPA sent Special Notice letters to PRPs at the Site, inviting those parties to negotiate to perform the RI/FS at the Site. Once the Site Owner declined to participate in these negotiations, EPA was not obligated to ensure its inclusion in all discussions with those PRPs who agreed to perform the RI/FS. EPA does not negotiate performance of an RI/FS with any party who has not submitted a good faith offer to undertake or finance the RI/FS pursuant to section 122(e)(2)(B) of CERCLA, 42 U.S.C. § 9622(e)(2)(B). The Site Owner could not expect to influence the RI/FS process and decision-making without having agreed to bear responsibility to perform or finance the RI/FS.

(h) The Site Owner describes difficulties in the access negotiations with the PRP Group and then states that, " EPA began working in concert with the PRP Group to deprive Metal Bank of its bargaining position to provide [Site access and the Versar data, including the resulting endangerment assessment] to the Group on appropriate negotiated terms between private parties." (*See* AR303698; *see also* AR303704)

Response: For purposes of determining the need for response, or choosing or taking a response action, or otherwise enforcing the provisions of CERCLA, EPA has the authority to enter any facility in accordance with Section 104(e) of CERCLA, 42 U.S.C. § 9604(e), and the regulations at 40 C.F.R. § 300.400(d). EPA may, for the purpose of access, designate as its representative one or more PRPs and their contractors. 40 C.F.R. § 300.400(d)(3). If access is not granted, or is conditioned in any manner, EPA may issue an order directing compliance with the request for access. 40 C.F.R. § 300.400(d)(4)(I). EPA typically includes a Paragraph in Consent Agreements to perform work which states that, if the Respondents fail to obtain access to perform the required activity onsite after reasonable efforts, then EPA will obtain such access. In this case, the determination was made prior to execution of the Administrative Order by Consent for the RI/FS that the PRP Group (Respondents) had exercised all reasonable and best efforts to obtain site access without success. EPA negotiated an Access and Use Agreement with the Site Owner to permit EPA and its authorized representatives, the PRP Group, to perform the RI/FS at the Site. It is in the Agency's interest to get all relevant data available on the Site. The EPA was not favoring the PRP Group; it was just attempting to advance the remedial process to protect public health and the environment according to its mandate.

(i) The Site Owner stated that the United States' motion to alter substantive terms of the Stipulation, to enlarge the time for EPA to complete its evaluation [of the oil recovery system], and to enjoin sealing and closure of the wells as required by the Stipulation, was denied by the Court as moot on June 12, 1989. The reason this occurred was that the Site Owner had proposed a form of order allowing for an enlargement of time for EPA to complete its sampling and inspection of the oil recovery system, and extending the time for Metal Bank to close the wells within a specified time thereafter. (*See* AR303701-303702)

Response: EPA has corrected the chronology of Site Enforcement Activities in the ROD, Section II. B., to reflect this sequence of events.

(j) The Site Owner states that implementation of the first Field Sampling Plan under the Work Plan occurred between June 1991 and November 1991, and that the results of these sampling activities confirmed the effectiveness of Metal Bank's oil recovery action. (*See* AR303708)

Response: During the 1991 sampling, levels as high as 1,090 ppm PCB in MW6 were obtained. This result does not confirm the effectiveness of Metal Bank's oil recovery action. (Site Owner commented that this well was not correctly purged prior to this sampling event. See Comment #7 and Response in Section D. (NAPL), above.)

(k) The Site Owner states that EPA denied its requests for an extension to the comment period on the Proposed Plan beyond the 60 days granted, including an initial 30 day period, plus the minimum extension of 30 days. Then, several days prior to the conclusion of the 60 days, EPA extended the comment period for another 30 days when Metal Bank's representatives had already hurriedly prepared comments to meet the deadline. The Site Owner states that this final extension was only posturing to "minimize the consequences of [EPA's] arbitrary decision to deny the request in the first instance," and that it showed that the earlier denial was groundless. (*See* AR303711-303712)

Response: According to the NCP, EPA is only required to provide a single extension of 30 days to the initial 30-day comment period on a proposed plan (*see* 40 C.F.R. § 300.430(f)(3)(C)). Although the NCP leaves open the possibility for longer extensions to the comment period, in the interest of expediting cleanups, Region III very rarely provides more than the minimum 30 day extension except in cases where the proposed remedy is very complex. In this case, the remedy is fairly straight forward, and requires the use of proven technologies.

Both the Site Owner and the PRP Group had initially asked for longer extensions, and both requests had initially been denied. The PRP Group, who had performed the RI/FS, had proposed to perform an additional treatability study on the soil, and when it became apparent that all of the results would not be available prior to the end of the comment period, EPA provided an additional 30 day extension to the comment period (for a total of 90 days) in order to permit the submittal of this new information. The Site Owner had requested an extension commensurate with the approximately 8 months EPA took to review the RI/FS prior to issuance of the Proposed Plan. Such an extension was not necessary or appropriate, since the RI/FS was available to the Site Owner during this same period for review, and most of the Site Owner's comments are with regard to the RI/FS and historical data which had been available to it prior to the release of the proposed plan for comment.

(l) The Site Owner states that it granted Site access to EPA and its representatives with the understanding that Metal Bank would be provided with all information developed during the RI/FS. Despite this understanding, the Site Owner states that it had to make repeated requests for documents/information concerning the Site exchanged between EPA and the PRP Group or its consultants. The Site Owner states that EPA failed to abide by its agreement and its statutory obligations under the Freedom of Information Act ("FOIA"). (*See* AR303712-303713)

Response: Under CERCLA, EPA's right of access to the Site is not conditioned on any agreements to provide documents to the Site Owner (*see* 42 U.S.C. § 9604(e)(2)). While EPA may have agreed as a courtesy to keep Metal Bank informed, this was not a statutory obligation. The Site Owner's representatives have submitted a number of FOIA requests, including at least one request, dated November 30, 1995, to review the entire voluminous Site file, which EPA endeavored to respond to on a schedule negotiated with the Site Owner's representative. At this time, EPA believes that all releasable documents so requested have been provided.

(m) The Site Owner states that it has repeatedly requested that EPA include various documents in the Administrative Record, and that EPA has ignored these requests. The information requested to be placed in the Record would have documented the implementation and completion of the remedy specified in the 1983 Stipulation, the regulatory history of the Site, various investigations performed by the PRP Group and EPA contractors, problems in the planning and implementation of the RI/FS, and the failure of EPA and the PRP Group to provide information to the Site Owner when requested. (*See* AR303713)

Response: EPA does not consider the Administrative Record for a site to be complete until issuance of the ROD. Although EPA considers all information submitted to determine whether it is relevant to the selection of the remedy and should be included in the Administrative Record, EPA is not required to put everything into the Record that the Site Owner, or any other party, requests be included. The NCP requires EPA to include and respond to significant comments received during the comment period and encourages EPA to consider and respond as appropriate to significant comments submitted prior to the public comment period. (*See* 40 C.F.R. § 300.815(b)) The Administrative Record generally should contain all documents containing factual information, data and analysis of the factual information, and data that may form a basis for the selection of a response action. (*See* 40 C.F.R. § 300.810(a))

While the Site Owner may feel that the previous remedy and regulatory history at the Site are relevant to show its cooperation and level of investment, it is not particularly relevant to the determination of the proposed remedy, which is based on sampling subsequent to the remedy performed under the 1983 Stipulation.

4. The Site Owner comments that EPA's contractor (Ecology and Environment, Inc.) incorrectly prepared a hazard ranking system ("HRS") model for the Site on July 21, 1982 which scored the Site at 33.23. A crucial element that prompted the high score was the proximity of the Site to the nearest public water intake (the Baxter Water Intake formerly known as Torresdale), based on the theoretical possibility that PCBs from the Site may reach the intake. The Site owner alleges that due to the use of the erroneous distance of 1.2 miles instead of the actual 2.1 miles (or greater than 2 miles) reported in the RI, EPA incorrectly scored the Site and placed it on the Superfund National Priorities List ("NPL") in 1983. If EPA had correctly scored the Site

originally (at 24.79 HRS, based on the 2.1 mile distance to the intake), or reranked the Site using the new HRS model, the Site would not have made the cutoff score of 28.5 and thus not be listed on the NPL.

Response: EPA has a longstanding policy that a site will not be rescored once it is placed on the NPL, even if the scoring was based on incorrect facts (*see* 49 Fed. Reg. 37080-1 (September 21, 1984)). EPA believes that the listing process – including scoring by EPA or the States, EPA quality assurance review, public comment on the scoring (in which the Site Owner participated), and EPA review of the comments – provides adequate safeguards against incorrect site scores. Furthermore, the purpose of the NPL is primarily informational, to serve as a tool for EPA to identify sites that appear to present a significant risk to public health or the environment, for purposes of deciding which sites to investigate fully and determine what response, if any, is appropriate. EPA believes that it is most consistent with that statutory purpose to cease the costly and time-consuming efforts of site scoring once a site is on the NPL. Once the initial scoring effort is complete, the focus of EPA activity must be on investigating sites in detail and determining the appropriate response. If new information indicates that a site does not present a significant threat to public health or the environment, the site may meet one of the EPA criteria for deletion regardless of the HRS score. EPA does not believe that the Metal Bank Site falls into this category; rather, EPA's evaluation of current information about the Site indicates an unacceptable risk warranting remediation.

Nevertheless, regarding the original HRS score, EPA notes that while the Baxter Plant's main intake is located over 2 miles from the Site, the plant's standby or emergency intake is approximately 1.9 miles (*see* ROD Figure 2). Under the revised HRS model, EPA evaluates standby intakes similarly to regular intakes if they are regularly maintained and used annually (*see* 55 Fed. Reg. 51613-4). Although EPA is not aware of any site scored on the basis of a standby intake using the original model, EPA probably would have used the Baxter Plant's standby intake for scoring purposes using the original model, had EPA been aware of the distance to the standby intake. Thus this Site's original score may still have been above the cutoff value.

In addition, it is likely that the Metal Bank Site would score above the cutoff value if it were to be scored under the revised HRS model. Under the revised HRS, the score for the Drinking Water Threat of the Surface Water Migration Pathway would not depend on the exact distance from the Site to the intake(s); instead, the score would depend only on factors such as the characteristics of the waste (e.g., type, quantity, containment) and contaminants (e.g., toxicity), the likelihood of release, the level of contamination at the intake(s) (e.g., actual versus potential), the dilution weight of the water body (based on flow rate), and the population served by the intake(s) (over 1 million in this case). The revised model also places greater emphasis in the Surface Water Migration Pathway on the threats to human food chain organisms and to other environmental receptors, including wetlands and various "sensitive environments".

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The score for the Human Food Chain Threat would be influenced by the existence of recreational fishing in the Delaware River near the Site, while the score for the Environmental Threat would be influenced by the presence of the mudflat and Delaware River sediment areas adjacent to the Site, which is believed to be habitat used by the shortnose sturgeon, a federally designated endangered species. Thus, while EPA did not formally score the Site under the revised HRS model, the aforementioned factors indicate that the score would very likely be over 28.5.

5. The Site Owner takes issue with EPA's statement in the Proposed Plan, regarding Site enforcement activities, that "due to the concern that PCB oil may have been burned at the Site, EPA conducted dioxin soil sampling at St. Vincent's School." The Site Owner points out that it responded within several months to the Agency's contractor's recommendation to perform soil sampling, whereas it took EPA almost 2 years to collect soil samples, after having received Metal Bank's sampling data. The Site Owner also quotes EPA's toxicologist as having said that it seemed "reasonable to accept [the Site Owner's] assertion that PCBs were not burned at the Site, since we have no other reliable information." (*See* AR303717)

   Response: EPA took soil samples in April of 1989 in order to be assured that no contaminants, including PCBs and dioxin, were present that would present a risk to the residents at St. Vincent's School. Although EPA's sampling occurred subsequent to Metal Bank's, EPA would not have performed such sampling if it had not been concerned that contamination from the Site might be present at St. Vincent's School.

III. OTHER WRITTEN COMMENTS

In addition to the written comments received from the Site Owner, comments were received from the PRP Group, DRBC, and PADEP. These comments and EPA's responses are presented below.

A. PRP Group

The PRP Group submitted approximately 27 pages of comments on the Proposed Plan (*see* AR303757 to 303808), as well as four (4) volumes of a Treatability Study, in support of their comments. These comments and the relevant excerpts from their Treatability Study (*see* AR304273 to 304334) have been included in the Administrative Record. EPA has summarized the substantive issues of a comment if it was more than two (2) paragraphs long, otherwise the comments were cited verbatim. Please refer to the respective Administrative Record pages for the actual text of a comment.

1. The PRP Group outlines the proposed remedy with 11 bullet items. They list their objections to the following aspects of the proposed remedy: (a) cleanup standard of 10,000 ppm TPH, because EPA had underestimated the volume of soils by three (3)

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fold and $9 million; and (b) monitoring of the groundwater, because the risk assessments did not demonstrate an unacceptable risk from groundwater.

The PRP Group then recommends EPA reconsider a remedy similar to what they had previously suggested called *ex-situ* stabilization/solidification ("S/S") because their tests demonstrate the process to be effective. However, the PRP Group states that the S/S remedy should be limited to soils above the groundwater and be pilot-tested during Remedial Design to determine if it is actually cost-effective.

Response: Responses concerning the volume of contaminated soils, the TPH cleanup standard, groundwater monitoring, and the S/S test results are addressed in Comments #4, 5, 18, and 20, respectively.

EPA believes the 11 bullets do not accurately portray the components specified in EPA's proposed plan. The 7th bullet (river sediment removal), for example, attempts to limit the area in the river to be cleaned up to within 100 feet of the shoreline. EPA's proposed plan never specified a distance but rather relied on performance standards; in this case, the requirement is to reduce PCB levels in the river to less than 1 ppm. However, based on the aquatic life risk analysis presented in Table 12 of the ROD, EPA has determined that all the sediments within 100 feet of the shoreline shall be removed, as well as any additional PCB hot spots where the PCB concentration exceeds 1 ppm. This will effectively remove the site-related contaminants of concern, including PCBs, PAHs, Bis(2-ethylhexyl)phthalate, and Di-n-octyl phthalate. The other contaminants in Table 12 with Hazard Quotients exceeding 1, including DDT, DDE, DDD and Cadmium, appear throughout the river area sampled and do not show a strong relationship to the Site. For a summary of the components of EPA's selected remedy, see Part I (Declaration page) of the ROD.

2. The PRP Group reaffirms EPA's assumption that the Site will be limited to industrial use only. Their contractor justified this statement in the RI/FS based on current use and zoning, and the lack of evidence to contrary.

Response: EPA does not believe that, because no evidence exists, there is no possibility that the Site may be zoned for any other purpose. The current zoning for the area is industrial; however, even if this changes, the imposition of deed restrictions should prevent residential use of the Site. Also, EPA has specified in Section IX.A.6 of the ROD that a 24-inch layer of clean soil shall be placed on top of the Southern Portion of the Site so that area can be used for recreational purposes.

3. The Site is a Class III aquifer. The Proposed Plan makes the following statement on page 14 concerning groundwater at the Site:

> Since the aquifer beneath the Site is designated as a Class III aquifer, which is currently not a source of drinking water and will not likely be in the future,

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human health risks cannot be attributed to the groundwater contamination.

For this reason, and due to the expected benefits of "hot spot" removal, "EPA proposes no groundwater remediation." The PRP Group supports EPA's conclusion that the aquifer at the Site should be designated as a Class III aquifer. The aquifer meets the criteria for a Class III aquifer under both EPA guidance and the Pennsylvania Land Recycling and Environmental Remediation Standards Act ("PA Act"). See PA Act § 304(d)(1)(I). Since the areas surrounding the Site are likely to be used for industrial purposes, it is not reasonable to assume that the groundwater could be used as a future source of drinking water.

Response: Although the groundwater immediately beneath the Site is not expected to be a source of drinking water, it discharges into the Delaware River and becomes surface water. The Delaware River serves as a source of drinking water for the City of Philadelphia and Southern New Jersey (through the Baxter and Delran Intakes, respectively). Additionally, a New Jersey municipal well is within 1.8 miles of the Site. For this reason, EPA has detailed its Performance Standards in the ROD to include sampling of the Baxter Intake and the investigation of DNAPL contaminants, which may migrate through the deeper aquifers below the Site into the river.

4. The PRP Group contends EPA had underestimated the cost of the remedy by $11 million because EPA assumed soils that were not sampled were clean and that the contaminated soil underneath clean soils can be "surgically" removed. The PRPs also contend that EPA's assumption of the disposal cost ($188 per ton) was extremely low and the resulting cost of EPA's proposed remedy would be closer to $28 million.

Response: The varying estimates of the cost of the remedy, summarized in the table below, were due to the various volumes that each party assumed would have to be removed, and the different assumptions as to the details of the remedy implementation.[9] The PRP's estimated cost of $28.7 million, provided in their comments to the Proposed Plan, was based on the assumption that all soils overlying the identified hot spots would have to be removed and disposed of as well as the hot spots themselves. EPA believes it is appropriate to assume that contaminated hot spots would be replaced with excavated soils that do not exceed the cleanup level. In addition, the PRP's estimated cost of $28.7 million included costs of removing TPH at concentrations in excess of 10,000 ppm as well as PCBs; EPA has subsequently omitted the TPH cleanup standard[10], and limited its cleanup standard to PCBs alone. The PRPs also provided an

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9 The PRPs had added new assumptions (*i.e.*, adding a "Handling/Screening of Excavated Material" task and applying a 20:80 debris:soil ratio factor) to their original components, which makes a precise comparison impossible (*see* AR304034-035).

10 EPA did not change the proposed cleanup standard because of cost; EPA made the change because PCBs did not have any correlation with TPHs (*see* AR302076).

estimate for volume of soils (10,840 CY) and cost of disposal ($19 million) based on PCBs alone, which was closer to EPA's estimate in the Proposed Plan.

PARTY ESTIMATING	HOT SPOTS	VOLUME (CY)	COSTS ($ MILL)	ADMIN RECORD REFERENCE & DATE	COMMENTS
PRPs for EPA	PCBs, TPH	8,584	$16.0	AR304040 (1/25/96)	assume disposal = $188/ton
PRPs for EPA	PCBs, TPH	8,584	$16.9	AR304039 (1/25/96)	assume disposal = $255/ton
EPA's Proposed Plan	PCBs, TPH	9,942	$17.2	AR3002054-055 (July '95)	using 268,431 CF = 9941.9 CY conversion
EPA's ROD	PCBs	10,000	$17.3	AR304203 (8/19/97)	See below for volume rationale
PRPs' Comments	PCBs	10,840	$19.0	AR303773 & 304019 (10/17/95 & 1/25/96)	No backup calculation for volume or cost
PRPs' Comments	PCBs, TPH	31,500	$28.7	AR303773 & 303806 (10/17/95)	No backup calculation for volume

After receipt of the PRP's comments on the Proposed Plan, EPA required the PRP Group to recalculate and document the volume of contaminated soils, using the assumption that such soils could be surgically removed, in order to determine the known hot spots that are above the proposed cleanup levels (>25 ppm PCB & >10,000 ppm TPH). The PRP Group's contractor obtained a value (8,584 CY, *see* AR304023), which was not much different than EPA's original Proposed Plan volume (9,942 CY). This result illustrates how the PRP's assumptions (31,500 CY) may have included unnecessary removal of the entire Site and may have been overly cautious. The PRP's provided two cost estimates for the recalculated volume: one based on EPA's assumption of the disposal costs ($188 per ton), and one based on the PRP's assumption of the disposal costs ($255 per ton).

EPA has chosen 10,000 CY to represent the estimated volume of contaminated soil that may need to be removed from the Site. EPA considers this estimate to be reasonable because it is between the volumes (8,584 or 9,942 CY) estimated by the PRPs and EPA, respectively, and the volume estimated by the PRPs for removal of PCBs alone (10,840 CY) assuming that soils overlying the PCB hot spots would have to be removed and disposed of as well. EPA believes this volume reflects the known hot spots and contains enough margin for error that in the event any additional PCB contamination has been overlooked, the resulting volume would still be within the estimate. By applying to this volume (10,000 CY) to the same assumptions provided in the original RI/FS (with the exception of the cost of disposal, which the PRPs now estimate to be $255 per ton), EPA estimates the cost of the remedy to be $17,272,567 (*see* AR304203). Therefore the ROD reflects the estimate of $17.3 million as the cost of the remedy.

5. The PRP Group contends that EPA should not select TPH as a cleanup standard because: (a) none of the risk assessments identified TPH as a chemical of concern; (b) there are no federal cleanup standards for TPH; (c) the proposed plan emphasized PCBs, not TPHs, as the chemical of concern; (d) the highest TPH contamination would be removed by the oil-water separator system and/ or by the hot spot excavation; and (e) the cost of removing TPH has been greatly underestimated.

Response: EPA acknowledges that the TPH cleanup level is not appropriate and it has been eliminated. However, EPA believes the estimated cost of removing TPH contamination is still accurate based on information supplied by the PRPs in the RI/FS (see Comment #4).

6. The PRP Group argues that EPA did not follow the law or the terms of its Consent Agreement by failing to reject the PRP's remedy during the RI/FS. If EPA had disapproved of the RI/FS, the PRP Group would have been given a chance to invoke dispute resolution and reach a negotiated settlement with the agency concerning the remedy (*i.e.,* TPH cleanup standard, excavation versus S/S treatment).

Response: CERCLA does not require that EPA must obtain the PRP's concurrence when deciding a remedy for a site. The development of the Proposed Plan and the Record of Decision is an inherent government function. The RI/FS gives the PRP Group a chance to obtain and present data in a manner that supports their conclusion.

Issues concerning the elimination of TPH as a cleanup level have been addressed in the PRP's Summarized Comments #'s 4 & 5. TPH has been eliminated as a cleanup standard. Issues concerning the feasibility of using the S/S technology to remediate the Site are addressed in the PRP's Comment #20. EPA believes the Exhibits provided do not prove the technology will be successful.

7. In the last paragraph on page two [of the Proposed Plan], EPA states that evaluation of the RI/FS provided evidence that DNAPLs exist on-site. The PRP Group does not believe this is correct. No site data provide evidence of DNAPL contamination. The borings referenced by EPA to support its statement (B105 and 106) are in (1) a tidally influenced zone subject to significant groundwater table fluctuations or (2) the area that was subject to hydraulic effects from the implementation of the owner's oil recovery system, which operated from 1983 - 1989. The effects of tidal action and the oil recovery system caused the "smearing" of oils in a manner that EPA appears, incorrectly, to have interpreted as presence of DNAPL. No other evidence of DNAPL contamination exists in the RI/FS.

Response: EPA's Proposed Plan states that "the RI/FS provided evidence that there may also be a DNAPL". EPA never definitively said that there were DNAPLs (*also see* Site Owner's Comments #9, 11, and 13, NAPL). The PRP Group's statement that the appearance of DNAPLs may be due to "smearing" may be valid; however, without

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actual samples (since no samples were analyzed beyond 14 feet), the existence of DNAPLs cannot be confirmed or discounted. Accordingly the ROD requires sampling during RD to determine the presence or absence of DNAPLs.

8. In the fourth paragraph on page five [of the Proposed Plan], the Agency states that, during the RI/FS in 1993, several anomalies were detected with a ground penetrating radar ("GPR"). This sentence gives the misleading impression that the anomalies were not evaluated. In fact, the geophysics investigation conducted by the Group included GPR and electromagnetic ("EM") studies to determine if the Site contained buried drums and/or tanks. Of all the potential anomalies suggested by these studies, only seven were deemed to be of sufficient size/strength to warrant further analysis. The seven anomalies were explored with test pits. It was determined that no buried drums or tanks existed in these locations.

The only anomaly not fully investigated was the potential existence of a UST believed to lie beneath a concrete pad. The PRP Group were not able to confirm by test pits the existence of a tank beneath the pad.

Response: EPA did not use the PRP's GPR data or subsequent investigations (*i.e.*, testpits) to formulate the proposed remedy. However, EPA notes that:

(a) 4 of the areas containing suspicious anomalies were not investigated. These anomalies, as documented by RI Figure 2-8 (*see* AR300060), contain the following suspected sources: #2 (Metallic Object); #3B (Metallic Object); #8 (Drum); and #9 (Metallic Object);

(b) all of the testpit logs contained in Appendix A of the RI (*see* AR300301 to 300311) failed to record the dimensions of the testpits. Photographs taken by EPA's oversight contractors (*see* AR301933 to 302045) show a majority of the pits were approximately 10 by 3 feet (the width of a backhoe shovel). This is an insufficient area of coverage when most of the anomalies were more than 50 feet in diameter; and

(c) both the Site Owner and the general public criticized EPA for not aggressively investigating the suspected underground storage tank. EPA believes the PRP Group should have jack hammered past the concrete slab that blocked the UST or taken samples around its peripheries (especially at TP-1E where a field vapor detection instrument (HNu) peaked at 30 ppm, *see* AR300304).

In summary, the GPR and its subsequent investigation was inconclusive and failed in its intended purpose: to locate potential sources of PCBs. Nevertheless, the issue of the GPR and its merit is moot because EPA does not discuss its results in the ROD.

9. The Proposed Plan states that samples of sediments taken at various depth along the Delaware River show concentrations of up to 19.6 ppm PCBs and 17,000 ppm TPH. The Group believes that this statement is misleading because it implies that contamination is more widespread than the test data indicate. A review of the data shows that the concentrations cited by EPA involve two riprap sampling locations taken at the edge of the site along the mudflats. (19.6 ppm PCBs at MF107; 17,000 ppm TPH at RR-3.) Other sediment data in the river and along the mudflats showed substantially lower concentrations (at least one order of magnitude lower) in almost all other sampling locations. See RI figures 4-16; 4-17 (Exhibit 6).

The Group requests that EPA revise this paragraph to state that PCB concentrations in river sediments are consistently less than 2 ppm, and that the highest values were immediately adjacent to the site.

Response: While the PRP Group's statement may be generally true, EPA notes that PCB concentrations greater than 2 ppm were found in the following areas not immediately adjacent to the Site (S23, MF133, MF127, MF5). EPA believes its statements in the paragraph are more appropriate because:

(a) the purpose of the section of the Proposed Plan was to highlight the highest concentration detected in each media of the Site;

(b) EPA had stated that "distribution and concentration appear to decrease with distance from the Site"; and

(c) EPA also references a map, Figure 3 (which in turn references the PRP's Exhibit 6: RI Figures 4-16 & 4-17), whereby the readers can draw their own conclusions concerning the actual extent of PCB contamination in the river.

10. [Page 6, paragraph 4 of] the Proposed Plan states that EPA's evaluation has identified PCBs as the major contaminant of concern. Further, the Proposed Plan states: "Other contaminants of concern at the Site include metals such as arsenic, beryllium, chromium, copper, lead and mercury; SVOCs such as Methylethyl Ketone and phthalates; DDT-type pesticides; polynuclear aromatic hydrocarbons (PAHs); dioxins and furans." The PRP Group recognizes that these other substances were considered "contaminants of concern" in the development of the risk assessments by the Agency. However, since the risk assessments determined that risks associated with almost all of these chemicals were within acceptable ranges, the PRP Group believes that this statement is misleading to the reader. Further, EPA's own discussion on page 8 goes on to state that risks associated with arsenic, beryllium, chromium (paragraph 5), and dioxin and furans (paragraph 6) were not of concern. The PRP Group accordingly requests that the Agency revise this section to eliminate all references to chemicals for which no remedial goals have been developed.

Response: EPA believes the Proposed Plan should provide a discussion of how certain chemicals were eliminated as "contaminants of concern" through the risk assessment process. EPA considers the identification of all COCs important even though they may not pose serious risks or be driving the remedy; consequently, they have been listed in conjunction with their screening level exceedances in the ROD. Section V.E.5. of the ROD, for example, lists the maximum concentration and screening level of metals in the subsurface soils. This will enable the party implementing the remedy to prepare for any potential problem associated with disposal or treatment of soils contaminated with chemicals other than PCBs (*e.g.,* lead).

11. The PRP Group does not agree with the use of EEQ and EEC values as measurements of acceptable or unacceptable risk [on page 9 of the Proposed Plan]. The PRP Group previously explained its position when it provided EPA with comments on the terrestrial risk assessment. To summarize, the use of such values should be limited to screening chemicals for possible further evaluation. EEQ and EEC values do not provide a quantitative measurement of risk.

Response: Due to the limitation in time and money, the PRP Group did not provide a comprehensive study testing animals and other organisms for actual Site contaminants. As a result, EPA had to use values obtained from various literature sources (or EECs, expected environmental concentrations) to evaluate potential harm to organisms at the Site. The comparison of this literature value to site-specific chemical concentrations resulted in the EEQ (environmental effects quotient). This initial risk assessment process is used to identify which contaminants may pose risk to environmental receptors and may be used to guide the risk assessment process into the next phase (Tier 2 ERA). However, EPA can decide whether or not to remediate a contaminant based on a wide variety of "risk management" factors.

12. The Proposed Plan states that "...the discharge of PCBs in the groundwater into the Delaware River will contribute to PCB contamination in the nearshore food web." The PRP Group does not believe that the data indicate that groundwater contains PCBs at concentrations of concern. The only groundwater sample that contained detectable PCBs (all others were below detectable concentrations) came from a well with standing LNAPL product. This situation easily could bias the sample and result in the artificial detection of PCBs in a groundwater sample that actually measures PCBs associated with free phase oil, not dissolved PCBs.

Response: Although samples were collected from groundwater seeps at two locations (*see* ROD Section V.E.3.) which showed low levels of PCBs (3.7 ppb), the high sediment contamination along the shorelines indicates contaminated groundwater must have been discharged from underneath the Site. In this analysis, it is not appropriate to distinguish between LNAPLs and dissolved PCBs in the water phase since fish and other animals may ingest the LNAPL as well as the groundwater as it seeps from the Site. Therefore, EPA maintains groundwater, as a whole, contributes to the "PCB

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contamination in the nearshore food web."

13. The PRP Group are opposed to the collection of any additional sediment samples during Remedial Design because they believe the extent of contamination in the river was well defined, contrary to EPA's statements. They state that out of the 50 samples that were taken during the RI, the only uncertainty exists at S7 and S9. However, the contamination at S7 and S9 are inconsequential because the PCBs (1.71 to 1.2 ppm) have been seen to be decreasing towards the cleanup level (1 ppm). They also requested EPA to identify which data are lacking so that they may provide the necessary data before EPA selects a remedy.

The PRP Group also disagrees with EPA's statement that data quality problems had rendered most of their results useless. They cite the 1995 resampling effort, where 26 locations were collected and the samples overlapped previous locations, as ideal. The PRP Group again disagreed with EPA's proposal that chemicals, in addition to PCBs and PAHs, should be monitored.

Response: While EPA agrees with the PRP Group that a dramatic decline in PCB contamination has been observed away from the Site's shoreline, EPA does not agree with the PRP Group's statement that the 1 ppm PCB contamination boundary is clearly defined. Of the 50 samples that were collected, most were either: (a) less than 100 feet from the shoreline into the Delaware River; (b) fragmented (DR8, no deeper tests); or (c) mismatched with field screening results (MF107). While the 1995 samples had better detection limits, some deeper samples (S1,S3,S12,S19,S23) were not analyzed, and only one sample (S2) had overlapped the previous river data. Therefore, these data gaps would be more appropriately addressed in the Remedial Design. EPA's determination to remove all sediment within 100 feet of the property line to a depth of 4 feet from the riverbed surface will significantly reduce the amount of sampling during Remedial Design.

14. [Page 13, paragraph 3 of] the Proposed Plan calls for a PCB clean-up level of 10 ppm in surface soils in the courtyard. To be consistent with the goal of 25 ppm for subsurface soils, the Group suggests that EPA define surface soil as soil within the first 10 inches. 40 C.F.R. § 761.125(c)(4)(v) (1994) (PCB Spill Cleanup Policy); EPA, Guidance on Remedial Actions for Superfund Sites with PCB Contamination at 30 (Aug. 1990). After excavation of the first 10 inches, the remediation goal should be the same as for other subsurface soils, *i.e.,* 25 ppm.

Response: EPA has required removal of surface soils to 2 feet below surface because the deepest PCB contamination (70 ppm @ CY136) was observed at 2 feet below surface and this represents a small and manageable area. ROD Section IX.A.1. also requires additional sampling to be performed in order to determine the full extent of contamination because the samples collected during the RI contained several discrepancies (*see* explanation below). In determining the full extent of contamination,

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EPA will consider limiting the depth of confirmatory testing to 10-inches (the dimension suggested by the PRP Group) below the bottom of an excavated layer. Subsurface soils then can be defined as 10-inches below the bottom of an excavated layer and containing less than 25 ppm PCB. Regardless of what the remedial design sampling shall entail, EPA will require all confirmatory samples to be analyzed in the laboratory.

EPA observes that the RI data for the Courtyard (*see* AR300150 to 300153, RI Figures 4-3 to 4-5) was fragmented and not totally reliable for delineating the extent of contamination. For example, two (2) locations were sampled in 1991; both contained PCB contamination above the cleanup level (52 ppm @ TB1S & 140 ppm @ TB2S). In 1993, thirty-eight (38) locations were sampled in a grid pattern, however most samples were analyzed using field screening test kits; only one location (70 ppm @ CY136) that exceeded the cleanup level was laboratory analyzed. Additionally, only six locations (CY119, 120, 132 - 135) were sampled below 2 feet with only one location sent to the laboratory for verification analysis (0.97 ppm @ CY134). In 1993, the areas around the 1991 hotspots (TB1S, TB2S) did not detect any PCB contamination but these locations (CYs-110, 116, 122, 128 and CYs-119, 126) were field screened, not laboratory analyzed. Of the 9 samples collected for laboratory verification, 2 samples (1.1 ppm vs. ">50" @ CY119 and 0.46 ppm vs. '>5-<10" @ CY133) did not match their field screening results. Therefore, EPA concludes while field tests are useful for screening purposes, their results should not be relied upon to determine the exact area or depth of surface soil contamination.

15. [On page 13, paragraph 6 of the Proposed Plan,] the Agency has expressed concern regarding the existence of DNAPL. The Proposed Plan proposes a DNAPL collection system combined with an oil collection trench and oil/water separators. The PRP Group does not believe that oil/water separators are required to collect any residual NAPL that may migrate towards the River after construction of the remedy. Further, the Group does not agree that any treatment system should be developed for DNAPL because no data exist that indicate the presence of DNAPL. Methods can be proposed during the design phase to deal with material that may find its way into and settle to the bottom of the trench.

Response: As explained in Comment #7, the presence of DNAPLs cannot be confirmed or discounted based on the PRP's data. Section IX.F.1 of the ROD allows for an investigation to determine if DNAPLs are present. If DNAPLs are present and do present a risk to human health and the environment, a system that allows the collection of DNAPL in the groundwater can be designed during the remedial design process.

16. [On page 13, (last or) 7th paragraph of the Proposed Plan,] the Agency states that the depth and areal extent of contamination remain unknown and that further sampling will be required to determine the final placement of the temporary wall. The Group

suggests that EPA select a maximum depth of 3-4 feet for any sediment excavation. This is a depth at which, following replacement with clean fill, any residual contamination would not be bioavailable.

The Agency states further that removal would be implemented near the shorelines where land-based excavation equipment can be utilized. The Group agrees with this approach and believes that this would be the least disruptive form of sediment excavation. The data support this because almost all the areas where PCBs exceed 1 ppm lie within 20-30 meters [66-98 feet] of the site. Any other approach to sediment remediation would require evaluation beyond that already undertaken for the RI/FS.

Response: The PRP Group is partially correct in stating that almost all sediment areas where PCBs exceed 1 ppm lie within 30 meters (or 98 feet) from the Site. Based on a statistical evaluation of the samples collected in 1991 and 1993, EPA calculated the "mean" concentration of the samples more than 30 meters from the shoreline to be less than 1 ppm (*see* Table 4-3 of the Aquatic Risk Assessment, AR300951 or ROD Table 11). However, individual concentrations at some locations, including locations of samples taken subsequently in 1995, exceeded the proposed cleanup level of 1 ppm (*e.g.,* 1.2 ppm @ MF11, 1.3 ppm @ S6, and 4.59 ppm @ S20). Nevertheless, EPA has determined that the removal of sediments within 100 feet of the shoreline will probably address the majority of the PCBs in excess of the cleanup standard of 1 ppm. The appropriateness and feasibility of removal of any PCB hot spots beyond 100 feet will be determined by EPA during remedial design. Through the removal of the sediments within 100 feet of the shoreline, the mean concentration of PCBs (3.8 ppm) in the nearfield areas (a distance less than 30 meters (98 feet) from the shoreline) will be reduced to levels equal to or below the mean concentration (0.87 ppm) of the farfield areas (a distance more than 98 feet from the shoreline).

EPA has modified its proposed remedy to require removal of all sediments within 100 feet of the shoreline, regardless of the type of contaminant. As Table 12 of the ROD illustrates, several contaminants (Bis(2-ethylhexyl)phthalate, Di-n-octyl phthalate, PAHs, DDT, DDE, DDD, and Cadmium) in addition to PCBs pose an unacceptable Aquatic risk. Bis(2-ethylhexyl)phthalate, Di-n-octyl phthalate, and PAHs were deemed to be attributable to the Site because their "Hazard Quotient" decreased with distance from the Site. The Hazard Quotients for these contaminants fell to one (1) or less beyond 100 feet of the shoreline, indicating that contaminant levels beyond 100 feet would not contribute to the risk. By contrast, the Hazard Quotients for DDT, DDE, DDD and Cadmium did not decrease with distance from the Site, and EPA determined that these contaminants were not likely to be Site-related. Since EPA has observed that the location of PCBs above 1 ppm may not always correlate with elevated levels of other contaminants that pose a threat (*i.e.,* Total PAHs = 926.5 ppm while PCBs = "non-detect" at RR4A, *see* AR304395 & 300203), EPA has concluded that removal of PCB contamination alone will not result in the removal of other Site-related contaminants that contribute to the risk. Therefore, EPA has determined that removal of all sediments within 100 feet of the shoreline would probably be more cost effective than sampling and determining the exact locations where elevated levels of the individual contaminants require remediation.

EPA has also determined that sediment excavation depth may be limited to within 4 feet.[11] EPA agrees with the PRP's rationale that coverages as deep as 3 to 4 feet are sufficient to prevent contaminated sediments from being "bioavailable" to aquatic creatures feeding in the area.

Finally, the lateral extent of contamination along the shoreline, including the areas near the City's storm water outfall and Morris Iron & Steel (*see* ROD Figure 3, near the northwest and southeast corner of the Southern Portion of the property), has not been defined. This, combined with the possibility that it may not be feasible to excavate sediments in the river beyond 100 feet of the shoreline, has prompted EPA to require additional sampling during the Remedial Design. Since the PRPs did not provide documentation during the RI/FS to substantiate their concerns regarding excavation difficulties, additional engineering measurements (*i.e.,* soil and river current data) will also be required as part of the Remedial Design to determine where the final placement of the temporary wall should be.

17. [Page 14, paragraph 3 of] the Proposed Plan states that, to further delineate hot spots within the southern portion of the site, EPA proposes to re-sample the area in a thorough and methodical grid pattern. The Group believes that, with the addition of data collected from test pits in August of 1995, adequate data exist to limit the methodical grid pattern to currently known and expected areas designated as hot spots. The Group suggests that there is no need comprehensively to re-sample the entire southern portion of the site.

    Response: EPA believes that a methodical grid sampling of the Southern Portion of the Site is necessary to accurately identify hot spot areas that must be removed.

18. [On page 14, last paragraph of the Proposed Plan,] the Agency suggests that a groundwater monitoring program be implemented that would include monitoring of chemicals sampled for in the RI/FS, including PCBs, TAL VOCs/SVOCs, TAL metals and groundwater chemistry parameters. The PRP Group believes that there is no reason to sample groundwater or liquids in the collection system for parameters other than PCBs. The remedy is designed only to limit the migration of PCBs away from the site into the environment. Therefore, sampling for chemicals not part of the remedial goals/action is neither necessary nor reasonable. Furthermore, given that the Site is

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11 EPA acknowledges that some hot spots within 100 feet of the shoreline (*i.e.,* 4.59 ppm @ S20) may not be remediated under this new criteria because the PCB contamination appears below 4 feet from the surface.

located in an industrial area, it is reasonable to assume that groundwater may be affected by off-site sources.

Response: The rationale for sampling of groundwater and liquids in the collection system has been addressed in Comment #12. EPA is requiring the monitoring of chemicals in the groundwater as well as the collection system because:

(a) the Delaware River Basin Commission (DRBC) and Section 3.8 of the Delaware River Basin Compact (compact) require a permit application that records the impact of contaminants, in addition to PCBs, emanating from the Site. (*see* DRBC comments dated 9/27/96.) Although the party performing the remedy will not be required to apply for a permit, the substantive requirements of the law will have to be met, including the analysis of the impacts of contaminants emanating from the Site;

(b) as discussed in ROD Section V.E.2., the PRP Group did not obtain samples of groundwater being discharged into the surface water for the RI/FS. As a result, EPA applied a dilution factor to the groundwater results to obtain a hypothetical surface water concentration for use in the risk assessments. Sampling of the groundwater on-site and in the collection systems compensates for that data gap and provides the necessary information for DRBC's evaluation.

19. [On page 17, last paragraph of the Proposed Plan,] the Agency states that the remedial design must build in safeguards that would prevent a 100-year flood from entering the buildings and mobilizing unremediated PCBs. The Group does not agree that flood waters would mobilize PCBs within the buildings to an extent that would result in unacceptable risks to human health or the environment. EPA has no record evidence that exposure from this pathway would present unacceptable risks.

Response: Although there is no evidence, this issue was not investigated either. The PRPs were required to sample and document all low-lying drainage points where PCBs may have accumulated, as part of the RI/FS. Samples were collected in the Building Areas but no drainage pathways were ever documented. For this reason, ROD Section IX.F.2. requires the sampling and determination of all potential routes by which PCBs may have been discharged from the Site.

Additionally, the PRPs (*see* Comment #7) and the Site Owner have commented that PCBs may have been "smeared" to the surface soil by the fluctuation of groundwater. If this is true, subsurface PCBs may also be "smeared" to the surface during a 100-year flood. The Site Owner (*see* Volume I, Book 3, Section 2.5, page 72 of Site Owner's Comments) has estimated a 100-year flood level will not exceed 10 feet above MSL or the surface of the Site. Therefore EPA will not require physical barriers to safeguard inside the Building Area but will require a monitoring program to assure that there are no historical or potential pathways for PCBs to migrate off-site.

20. [On page 19, paragraph 1 of the Proposed Plan,] the Agency states that alternatives to excavation involving treatment of contaminated soils have not proven successful at other sites. The PRP Group does not agree with this summary statement. S/S recently was shown to be successful in binding TPH and PCB contaminated soils at the Site (PRP Group's Exhibit 2). The attached summary of S/S results (PRP Group's Exhibit 1) also describes numerous examples of successful S/S projects at similar sites.

[The PRPs also referenced the same exhibits as part of Comment #6 (*see* AR303780) in which they claim the technology works because the treated solid mass: (a) does not leak other chemicals (leachability); (b) is strong (compressive strength "> 50 psi"); and (c) does not retain water (hydraulic conductivity "$< 1x10^{-5}$ cm/sec").]

Response: Based on the Exhibits, there is no strong evidence that the treatment (Solidification/Stabilization) is effective in reducing the mobility of PCBs. The evidence provided by the PRPs was inconclusive because:

(a) before any treatment, the highest PCB leachate concentration submitted in Exhibit 1 was "< 0.0004 ppm"; the lowest concentration after treatment was also < 0.0004 ppm.

EPA has also noted that the most contaminated soil used in the test contained only 22 ppm PCB (Wastech, *see* AR304304). This information was found in a subsequent treatment vendors' reports submitted after the comment period. Considering the cleanup level is only 25 ppm, these soil samples were not representative of the hotspots; and

(b) none of the Superfund sites identified in Exhibit 2 provided a before and after comparison of PCB leachate levels. The fundamental question still remains: "What were the leachate levels of PCBs before and after treatment to demonstrate mobility reduction?"

Several of the sites identified (Douglassville, Imperial Oil, and Portable Equipment Salvage Co.) were only field demonstrations and not actual remediations. The most comparable site identified was Pepper's Steel but the groundwater data presented does not show what leachate concentration would have occurred if the waste was not treated.

Furthermore, their hydraulic conductivity result was deficient. EPA's criteria for hydraulic conductivity is generally "$< 1x10^{-6}$ cm/sec" not "$< 1x10^{-5}$ cm/sec."

21. [On page 19, paragraph 2 of the Proposed Plan,] the Agency estimates the cost of its preferred alternative to be $17.1 million. This cost estimate assumes that total PCB-

and TPH-contaminated soil disposal costs would be approximately $2.4 million. Data both contained in the RI and collected this year demonstrate that EPA's estimate is far too low. The Group completed a sampling program during August 1995 designed to provide further data on the extent of PCB and TPH contaminated soil. As discussed earlier in these Comments, these data indicate that EPA has greatly underestimated the volume of soil that would be excavated to achieve the 25 ppm PCBs and 10,000 ppm TPH standards. The Group has recalculated the cost to implement EPA's Proposed Plan and estimates that cost to be approximately $28.7 million.

Response: Issues concerning the cost of the remedy have been addressed in response to Comment #4. EPA has determined $17.3 million is a valid cost estimate for the remedy.

22. [Concerning Table 1 titled "Clean-up Levels", and] as discussed above, the Group recommends that EPA eliminate the TPH remediation goal.

Response: Issues concerning the elimination of TPH as a cleanup level have been addressed in Comment #5. TPH has been eliminated as a cleanup standard.

B. DRBC

The Delaware River Basin Commission (DRBC) submitted two (2) letters (*see* AR302412 and 303752) on separate occasions before the closing of the public comment period. The comments contained in the two letters have been recounted verbatim and combined according to the issues raised.

1. We have reviewed the Proposed Plan for remediating the Metal Bank Superfund Site and have severe reservations about the adequacy of the proposed actions to protect resident fish and aquatic life in the adjacent Delaware River. Currently three states (Delaware, Pennsylvania and New Jersey) have issued advisories on consuming anadromous and resident fish including striped bass, white perch and catfish due to elevated levels of polychlorinated biphenyls (PCBs) in their tissue. The Commission is currently completing Phase I of a program to control toxic pollutants discharged to the tidal Delaware River between Trenton, NJ and Delaware Bay. This phase is focusing on point sources of toxic pollutants, specifically industrial and municipal waste treatment plant discharge. Monitoring conducted under the auspices of this program have **not** revealed these sources to contain detectable levels of PCBs. Additional monitoring is planned for the coming year to determine whether PCBs are present in these discharges at very low levels. Phase II of this program will focus on non-point sources of toxic pollutants including Superfund sites with special emphasis on PCBs, DDT and its metabolites. In view of the current consumption advisories and proximity of the site to the river, this site must be considered a significant source of PCBs. Data collected by the Commission in 1994 indicated that the highest concentration of PCBs

in tissues of white perch and channel [catfish] occurred at the Tacony-Palmyra Bridge station approximately 1 mile from the site.

Response: EPA acknowledges DRBC's comment that, because (1) various studies performed by their office have not revealed PCBs to be present at the discharge point from industrial and municipal wastewater treatment plants in the area, (2) the level of PCB contamination in fish sampled near the Site is high, and (3) the Site is in close proximity to the river, the Site must be a significant source of PCBs.

While EPA agrees that the Site is a significant source, EPA does not agree with DRBC's rationale for deriving this conclusion. First, DRBC did not provide EPA with any analytical data to substantiate the absence of PCB contamination from wastewater treatment plants. Next, as explained in the response to the Site Owner's comment (*see* Aquatic Risk Assessment, Comment #7), it would be extremely difficult to determine the degree of contamination by the Site of upgradient locations and vice versa because of the constant movement of tides in the river. EPA has surmised that the Site is a significant source because high PCB levels (*i.e.,* 19.6 ppm) were observed at the shorelines while PCB levels at approximately 300 feet from the Site decrease to around 1 ppm or less.

2. We are concerned about the lack of sufficient data to characterize the spatial extent of contaminated sediments in the river, the location and PCB concentration in soil "hot spots" in the southern portion of the site near the river, and the extent of non-aqueous phase liquids in the same area. An appropriate remediation plan cannot be selected until the extent of contamination of river sediment is determined and the effectiveness of any treatment system for the non-aqueous phase liquids is established.

We have severe reservations about the adequacy of the proposed actions to protect resident fish and aquatic life in the adjacent Delaware River, and impact the current advisories on consuming anadromous and resident fish, including striped bass, white perch and catfish, which advisories have been issued due to elevated levels of polychlorinated biphenyls (PCBs) in their tissue.

Response: EPA understands that DRBC is concerned that any remedy selection would be premature at this stage because the extent of contamination has not been determined in: (a) the river; (b) the hot spots; or (c) the NAPL area. Without that information, an effective means to treat the NAPL cannot be obtained.

DRBC is correct that the full extent of contamination has not been determined in the aforementioned areas. For this reason, the ROD requires additional extent of contamination and confirmation sampling of the river and the hot spot areas to assure that the cleanup levels are obtained. Any deviation from these requirements would have to be justified, for example, due to the impracticability of engineering a cofferdam very far into the river.

EPA believes the removal of the most contaminated sediments along the shorelines will serve as the first step towards reducing pollution from the Site. Subsequent measures such as the installation of the containment systems are used as backup systems and will eliminate the release of residual contamination if some hot spots are not identified during remedial design. EPA's risk assessments have shown that PCBs in the NAPL, rather than NAPLs, pose a threat. Therefore EPA's remedy is directed towards the removal of PCBs and not the NAPL and its related constituents. EPA has also included the investigation of DNAPLs to ascertain whether PCBs are migrating to the lower depth of the aquifer and whether they pose a threat. If any portion of the remedy requires change based on new information, such as the discovery of DNAPLs, EPA may issue an amended ROD or an Explanation of Significant Differences ("ESD"), depending on the scope of the changes to the remedy.

3. We are concerned that dewatering operations from the proposed installation of a sheet metal cofferdam and dredging in the mudflat and river may mobilize PCBs associated with sediment further exacerbating fish tissue contamination in the Delaware Estuary.

   Response: The dredging of contaminated sediments is anticipated to be performed on a dry surface after the area behind the temporary cofferdam has been dewatered. To further minimize any possibility of disturbing contaminated sediments which may migrate into the river, ROD Section IX.A.4 requires the cofferdams to be installed and removed in a manner that minimizes turbidity. Additionally, the ROD requires care to be taken during the dewatering process to protect fish and other aquatic organisms which may be present behind the cofferdam.

4. We also note no assessment of the potential impact on the City of Philadelphia drinking water intake just 2.5 miles upstream of the site. Past studies have documented upstream excursions of approximately seven miles during twice daily flood tides.

   Response: DRBC is correct that the impact of the Site on the city's drinking water was not investigated. As explained in the response to a Tacony Civic Association member's comment received during the July 1995 Public Meeting (*see* Public Meeting Comment #7), EPA estimates the discharge of PCBs into the Delaware River to be well below the Safe Drinking Water Act standards required for the city water supply. EPA also realizes that all estimates are based on theoretical conditions. Because it would be extremely difficult to determine the actual contribution of contaminants from the Site to distant off-site locations (*see* Aquatic Risk Assessment Comment #7), especially when these locations are affected by river tides, EPA has not required further assessments in the ROD. However, since the city is not required to analyze for PCBs as part of its routine testing program, the ROD (Section IX.G.3) requires sampling for PCBs at the city's intake as a precautionary measure.

5. It should be noted that the Commission is proposing a water quality criterion for the protection of human health from the ingestion of fish and water for total PCBs of

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0.000044 ug/l. The Commonwealth of Pennsylvania's current criterion for total PCBs is also 0.000044 ug/l. Given the lack of data on the contribution of PCBs from the site to the river, and any detailed assessment of the dilution of PCBs entering the river from the site, the selection of a remediation plan is premature.

Response: Since DRBC submitted its comments, the proposed criterion was enacted on October 23, 1996 as part of the DRBC's Administrative Manual Part III ("Water Quality Regulations") and represents the most recent regulation governing the discharge of toxic pollutants into the Delaware River.

The listed criterion (0.000044 ug/l PCB) is not the actual level that discharges from a containment system, such as the oil-water separator, must attain. Rather, it is the value after dilution by the river at which a toxic pollutant may have an acute or chronic impact on aquatic life. Therefore, the allowable contaminant level at the discharge point would be higher than the water quality criterion.

To implement the new procedure, the policy allows for the mathematical modeling of toxic pollutants under various hydrological conditions (such as river flow and tidal stage) to predict its effluent outcome in the river. The Cornell Mixing Zone ("CORMIX") model is one such scenario which evaluates a wastewater effluent mixed in with river flow. The ROD specifies that any party implementing the remedy must acquire the commission's approval on effluent limits prior to actual discharge.

6. The U.S. Environmental Protection Agency Region III and the Delaware River Basin Commission executed a Memorandum of Agreement ("MOA") in October 1991 with respect to Superfund sites located within EPA Region III that are subject to the jurisdiction of the Commission. Our review of the proposed plan indicates that the discharge and withdrawal facilities are covered by the MOA.

   [from September 5, 1995 letter] Further evaluation of the proposed plan indicates that the remedial action at this site will require an application for a docket under Section 3.8 of the Delaware River Basin Compact. Please contact Mr. George Elias, Head, Project Review Branch for information on the application and review process.

   Response: EPA acknowledges that the MOA is an ARAR and will reference that agreement in the ROD. As explained in the previous response, any party implementing the remedy will acquire the Commission's approval on effluent limits prior to actual discharge.

C. PADEP

1. Building Area - As a general statement there needs to be more clarification and commitment to the future use of the property when determining cleanup levels.

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Statements related to the availability and safety of the buildings for use are too vague. Could EPA provide more details regarding the deed restrictions and how that could affect the future use of the property? Contact should be made with the Delaware River Partnership and the City of Philadelphia regarding future use of the property and the possible "greenway" along the river.

Response: The deed restrictions will prohibit residential and agricultural use and use of groundwater underneath the property. EPA cannot make a definite commitment concerning future land use because the future use of a property can change. EPA acknowledges, as a member of the Tacony Civic Association suggested during the Proposed Plan public meeting, that property along the riverfront may eventually be converted to residential use. While residential cleanup levels would be more protective, they would be more costly to implement since they would involve a larger portion of the Site. EPA would be considered impractical if it were to impose a residential cleanup standard when the surrounding areas (with the exception of St. Vincent's School and Quaker City Marina) are industrial. Therefore, EPA has performed a risk assessment based on the scenario that future land use will be industrial.

ROD Section IX.E.3 has identified the details of the deed restriction, which prohibits development of the land for residential or agricultural uses, and use of the groundwater.

As requested, EPA has contacted the primary coordinator for the Delaware River Partnership and City of Philadelphia revitalization effort (Mr. Mark McWiggins of the GreenSpace Alliances). Our recent discussions with him indicate that the proposed bike path is only in the conceptual stages of planning; GreenSpace has undertaken an effort to identify owners of area properties in order to determine if right-of-way acquisitions are feasible. Also Mr. McWiggins has indicated the City has generally bypassed existing obstacles, such as the buildings, when installing its bike paths. Therefore the Building Area on-site may not need to be disturbed.

2. Could the site fence be constructed so that the building could be put into productive use independent of the Southern Portion of the Site?

Response: A site fence can be installed to separate the buildings from the Southern Portion of the Site. These plans can be developed as part of the Remedial Design or even later as part of the Operation and Maintenance of the Site by any party implementing the change.

3. Page 17 of the Proposed Plan discusses the Spill Policy with regard to cleanup levels but goes on to state that the sampling performed was inappropriate for the Spill Policy. EPA should consider using the appropriate sampling techniques in order to determine cleanup levels.

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Response: What EPA meant to say in the Proposed Plan was that the Spill Policy (specifically 40 C.F.R. § 761.123) would have required a less conservative wipe test. The RI indicated that various types of samples (*i.e.,* concrete chips, brick chips, wall paint, dust or debris) were collected in the Building Area. Although the exact type of each sample was not clearly documented (*see* AR300040, 300146, and 300148), EPA treated all the analytical results as resulting from concrete chip samples that were ground up; the highest being 372 ppm PCB. EPA then calculated the risk it posed to industrial workers based on a scenario that on any given day, that worker would accidentally ingest a limited amount of this dust as a result of working inside the buildings. EPA concluded that risk was only 3.86x10-6 (*see* AR301580) and, therefore acceptable. The Spill Policy (specifically § 761.125(c)(3)(ii)), however, suggested PCBs on impervious surfaces should be cleaned to 0.01 ppm. Since the floors in the building are not impervious and absorb PCBs easily, EPA rationalized that highly contaminated samples such as the 372 ppm PCB in the debris would have been absorbed into the concrete chips and would be unlikely to be released. Therefore, EPA concluded the Spill Policy's cleanup level of 0.01 ppm did not apply here because analysis of the dust resulting from the chip sample tests was more conservative and did not yield any unacceptable risks.

4. The fifth paragraph on page 18 [of the Proposed Plan] indicates that there is a concern regarding the mobility of the PCBs if the building material does not remain intact. If the building is eventually demolished, is there a concern as to how the demolition debris would be disposed? Is there any threat to a future construction worker performing the demolition of the building?

Response: If demolition were to occur, the disposal performance standards would be similar to those specified for contaminated sediments and soils. ROD Section IX.B specifies the appropriate waste disposal facilities for the following PCB concentrations: (a) non-hazardous & 25-50 ppm PCB, RCRA Subtitle D landfill; (b) hazardous & 25-50 ppm PCB, RCRA Subtitle C facility; (c) > 50 ppm PCB, TSCA landfill.

The threat to future construction workers performing demolition would be similar to that of future industrial workers ingesting dust imbedded in the concrete of the building floor ($3.86x10^{-7}$). There are no unacceptable human health risks.

5. **River Sediment Areas -** The bottom of page 17 of the Proposed Plan indicates that some portions of the site would be 10 feet underwater during a 100 year flood. Discussions on the permanent sheet pile wall and clean soil cover must address their effectiveness during flood conditions. This should also be addressed in relation to Executive Order 11988 in the ARARs section.

Response: The Site will actually be at water level during a 100-year flood according to the Site Owner's calculations (*see* Volume I, Book 3, Section 2.5, page 72 of Site Owner's Comments). Although the RI/FS did not discuss the potential impacts of flooding conditions, ROD Section VIII.B.3 has cited Executive Order 11988 as a "to be considered" ARAR. EPA will apply criteria specified in this executive order and attempt to minimize the impact of floods on the Site's contaminants and design the remedy in such a way that it does not interfere with the beneficial values of the floodplain in the area.

The estimated degree of flooding should have no impact on the intended purpose of the sheet pile wall and clean cover soil. The permanent sheet pile wall is to keep Site fill from sloughing into the river. If properly designed, flood waters will surround the Site but not overburden the wall from behind. The soil cover is to isolate people from residual contaminants underneath the Site. Since the Site is not expected to be under water, flood water should not be able to wash the soil cover away. EPA is more concerned about the possibility, as suggested by the Site Owner (*see* Comment #13, NAPL) and PRP Group (*see* Comment #19), that flooding will raise the water table and may cause residual contamination to float and "smear" to the clean surface. For that reason, EPA will also require the monitoring of the soil cover as well as the subsurface soil.

6. General Comment - The Proposed Plan contains many indecisive statements which tend to increase confusion about the plan.

Two examples include:

Pg. 13, 3rd paragraph, 1st sentence - *EPA anticipates that some residual contamination* ***may*** *remain after remediation...., should say* ***will*** *remain.*

Pg 18, 4th paragraph -*...effectiveness of the remedy* ***if*** *residual PCBs exist.*

Response: The ROD has eliminated all indecisive statements on whether residual contamination will remain. The components of the remedy (*e.g.,* leachate collection system) aid in the containment of residual contamination left on-site after remediation.

Exhibit 1: Observed TPH, PCB and potential DNAPLs in Subsurface Soils.

Location	Depth (feet)	TPH (ppm)	PCB (ppm)	Profile (feet)
B1	3.0	2,670	1.7	(Bottom 16.5) oil 6.5 - 13
(MW1)	10.5	3,600	28.0	water @ 10.75 ↓
B2	2.0	3,010	0.95	
	6.0	1,320	ND	
	6.0 Dup	1,340	1.13	water @ 11.5
	12.0	754	ND	(Bottom 14.0)
B3	2.5	2,150	0.24	
(MW3)	6.0	359	ND	
	12.0	3,120	ND	water @ 12.5
	14.0	697	ND	(Bottom 18.0)
B4	2.0	NT?	10.2	(Bottom 29.5)
(MW4)	5.5	NT?	2.48	water @ 15.0 ↓
B5	2.0	2,850	5.13	
	5.5	211	0.70	(Bottom 17.5)
	9.5	5,620	4.81	water @ 10.0 ↓
B6	2.5	147	ND	
	6.0	355	0.33	
	12.0	253	ND	water @ 12.0
	12.0 Dup	314	ND	(Bottom 16.0)
B7	3.0	861	1.07	
(MW14)	6.5	1,480	4.65	
	8.5	262	ND	water @ 10.0
	10.5	3,595	ND	
	10.5 Dup	1,117	ND	(Bottom 16.5)
B8	2.5	4,290	4.22	
	6.0	510	ND	
	6.0 Dup	645	ND	water @ 11.8
	12.0	6,310	ND	
	14.0	3,410	ND	
	14.0 Dup	3,010	ND	(Bottom 18.0)
B9	3.0	5,690	ND	
	6.5	4,780	0.39	
	10.5	1,670	ND	No water
	14.5	4,470	6.65	(Bottom 16.5)
B10	6.0	3,970	ND	
(P1)	8.0	4,180	29.0	
	8.0	4,590	15.0	
	10.0	3,880	11.7	(Bottom 18.0)
	14.0	2,140	0.38	water @ 14.0
B11	2.5	148	1.0	stain 2.0- 16.75
(MW11)	6.0	232	0.25	water @ 9.75
	10.0	106	ND	(Bottom 18.0)
B12	1.0	266	3.2	
(MW12)	7.0	ND	ND	
	11.0	ND	ND	(Bottom 18.0)
	11.0 Dup	6,890	ND	water @ 12 ↓
B13	5.5	922	0.6	
	9.0	510	ND	
	11.0	4,740	0.78	(Bottom 16.0)
	11.0 Dup	6,890	ND	water @ 12.5 ↓
B14	3.0	12,400	3.2	
	6.5	863	ND	
	10.5	6,570	7.0	
	10.5 Dup	4,730	18.2	(Bottom 18.5)
	12.5	4,080	9.1	water @ 12.5
B15	3.0	857	ND	stain 2.5 - 12.5
(P2)	8.5	12,800	5.0	
	10.5	10,800	ND	water @ 11.2
	12.5	8,940	ND	
	12.5 Dup	6,650	ND	(Bottom 20.0)
B16	2.0	10,850	ND	oil & stains @
	5.5	13,190	3.85	1.5 - bottom
	11.5	1,416	0.4	(Bottom 17.5)
	11.5 Dup	1,436	ND	water @ 13.25 ↓
B17	3.0	11,500	26.0	stain 4.5 - 16.5
	6.5	17,400	42.0	
	10.5	2,630	ND	(Bottom 26.5)
	12.5	4,160	3.0	water @ 12.5
B18	8.0	6,480	0.14	petro & stains
	10.0	9,130	0.97	@ 10 - 16
	12.0	8,780	3.2	
	14.0	8,090	7.54	water @ 14.0
	14.0 Dup	10,000	7.45	(Bottom 28.0)
B19	3.0	NT?	3.6?	stain 3.5 - 19.5
	6.5	NT?	6.3?	(Bottom 20.0)
	8.5	NT?	ND?	water @ 15.25 ↓
B20	2.0	NT?	ND?	petro & stains
	6.0	NT?	6.1?	@ 4.5 - 20.75
	6.0 Dup	NT?	13.7?	
	8.0	NT?	3.6?	(Bottom 26.0)
	16.0	NT?	0.37?	water @ 16.0
B21	3.0	5,655	25.0	
(MW15)	6.5	1,402	6.5	
	6.5 Dup	1,402	3.6	
	12.5	6,429	ND	water @ 13.25
	14.5	2,369	8.7	(Bottom 20.5)

Exhibit 1: Observed TPH, PCB and potential DNAPLs in Subsurface Soils.

Location	Depth (feet)	TPH (ppm)	PCB (ppm)	Profile (feet)
B22	2.5	10,400	ND	
	6.0	5,600	2.8	
	8.0	15,800	5.2	
	8.0 Dup	15,600	6.6	(Bottom 26.0)
	14.0	9,770	0.34	water @ 14.0
B23	3.0	4,860	7.0	
	6.5	621	ND	stains @ 2.5-21
	6.5 Dup	552	ND	
	8.5?	25,900	7.8	(Bottom 30.5)
	10.5	13,600	4.7	water @ 12.5 ↓
SB101	6.0	NT	*(10-50)*	water @ 7.0
	8.0	3,500	5.3	
	10.0	NT	*(<5)*	(Bottom 12.0)
SB102	6.0	NT	NT	water @ 7.0
	8.0	NT	NT	stain 10 - 24
	10.0	NT	24.6	
	12.0	2,100	NT	(Bottom 37.0)
SB103	8.0	NT	*(10-50)*	
	11.0	NT	*(5-10)*	water @ 14.5
	15.0	870	0.75	(Bottom 34.0)
SB104	10.0	NT	*(10-50)*	oil @ 8 - 18
	12.0	NT	*(10-50)*	(Bottom 18.0)
	14.0	3,100	7.3	water @ 14.0
SB105	8.0	NT	*(10-50)*	
	10.0	NT	*(10-50)*	stain 14 - 18
	12.0	NT	3.7	
	14.0	NT	12.0	water @ 14.0
	16.0	NT	12.0	(Bottom 44.0)
SB106	6.0	NT	1.8	
	8.0	NT	ND[a]	no stains
	10.0	NT	5.5	
	12.0	2,800	ND*(10-50)*[a]	(Bottom 16.0)
	14.0	NT	15.0	water @ 14.0

Location	Depth (feet)	TPH (ppm)	PCB (ppm)	Profile (feet)
SB107	6.0	NT	1.8	
	8.0	NT	1.4	water @ 8.0
	10.0	NT	ND	no stains
	12.0	NT	0.75	
	14.0	NT	1.1	(Bottom 16.0)
SB108	6.0	NT	ND	water @ 7.0
	8.0	NT	ND	
	10.0	NT	ND	no stains
	12.0	NT	ND	
	14.0	NT	ND	(Bottom 16.0)
TP-1	5.0	1,400	<2	Profile
	10.0	7,000	22.0	Not
	12.0	24,000	10.0	Available
TP-4	5.0	52,000	36.0	Profile
	10.0	12,000	45.0	Not
	11.5	28,000	50.0	Available
TP-8	5.0	180	<2	Profile
	10.0	27	<2	Not
	15.0	1,210	2.0	Available
TP-9	5.0	3,040	35.0	Profile
	10.0	630	<2	Not
	13.0	380	<2	Available
TP-12	5.0	1,730	4.4	Profile Not
	10.0	2,190	7.7	Available
TP-T1	5.0	28,900	108.0	Profile
	10.0	13,300	10.5	Not
	15.0	52,800	57.0	Available
TP-T2	5.0	66,100	230.0	Profile
	10.0	51,200	150.0	Not
	12.0	16,000	77.0	Available

TP-7, TP-11, TP-14, TP-16, TP-18, TP-21 & TP-T3 not presented since PCBs are <2 ppm.

SOURCE: RI Vol 1 for Soil Boring ("B","SB") data; PRP (Jordanger) 9/11/95 letter for Testpit ("TP") data.

REFERENCES	TABLE	FIGURE	APPENDIX
Location	2-2 to 2-5	2-5	-
TPH	4-11	-	C.I, C.II
PCB	4-10	-	C.I, C.II
Profile	2-2	-	A (Boring Logs)
"TP" data	2	1 to 6	-

NOTES:
1. ND = Not Detected; NT = Not Tested
2. ? = Data inconsistency. Value in RI Vol 1 but no backup data in RI Vol 2 (Appendix C.I, C.II) or vice-versa.
3. *(10-50) "italics"* indicate field screening values.
4. SHADING indicates possible DNAPL.
5. "superscript"[(a)] indicate high detection limits (low: :high::total). Example: (SB106-8) = 4.2::8.6::33.8 indicates lowest & highest detection limits of individual Aroclors plus total PCBs are 4.2, 8.6, and 33.8 ppm, respectively.

Other Examples: (SB106-10) = 5.2::11::37; (SB106-12) = 2.1::4.2::16.8, (SB106-14) = 4.8::9.8::33.8; (TP-T2-5) = 30::30::410.

6. ↓ = indicates occurance below profile.