

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: *ALLIED PAPER/PORTAGE CREEK/KALAMAZOO RIVER - PROJECT 1 (Bryant Mill Pond)*

SiteID: 05-01

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund. Time-critical removal action. EPA-Lead.

Contaminants of Concern: PCBs (1242/1254/1260)

Overall Status Summary: The Superfund site originally comprised the Allied Paper property, a 3-mile stretch of Portage Creek to its confluence with the Kalamazoo River, and the 35-mile stretch of the Kalamazoo River from its confluence with Portage Creek to Allegan City Dam. The length of river being investigated was subsequently expanded by MDEQ to include the sector of river upstream to Morrow Dam and the sector of river downstream to Lake Michigan. PCBs are the targeted contaminant, originating primarily from the de-inking of carbonless copy paper for recycling. After the Fox River, EPA reports that the Kalamazoo River deposits the highest annual load of PCBs into Lake Michigan.

In December 1990, the state of Michigan entered into an Administrative Order by Consent (AOC) with Allied Paper, Inc. and its parent company, Millennium Holdings, Inc.; Georgia-Pacific Corporation; and Plainwell, Inc. The AOC required that these companies undertake an RI/FS, a process that is ongoing. In addition, Fort James Corporation (now Georgia-Pacific) agreed to participate in the RI/FS.

Five paper waste landfills are specifically targeted because they represent potential PCB sources to the river. The landfills are being addressed as four separate operable units: OU-1: Allied Paper Property/Bryant Mill Pond Area; OU-2: Willow Boulevard/A-Site; OU-3: King Highway Landfill; and OU-4: 12th Street Landfill. In addition, the 3 miles of Portage Creek and the Kalamazoo River are being investigated as a separate operable unit, OU-5.

The Bryant Mill Pond area was identified by the regulatory agencies as the most important upstream source of PCB-contamination to the Kalamazoo River. The area was estimated to have contained more than 20,000 pounds of PCBs and floodplains were found to contain PCB concentrations as high as 1,000 ppm. Bryant Mill Pond was formed years ago by a dam in Portage Creek. With the dam lowered, the 22-acre Bryant Mill Pond area was no longer under water, allowing floodplain soils and residual paper pulp waste to enter Portage Creek through surface water runoff. The removal action targeted removal of approximately 90,000 cy from the dry Bryant Mill Pond area as well as from the creek bed of Portage Creek flowing through the area.

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In 1998, a time-critical removal action was initiated for the removal of PCB-contaminated floodplain soils and residual paper pulp waste from the Bryant Mill Pond area and sediment from Portage Creek. The removal began in October 1998 when 4,000 feet of Portage Creek was temporarily diverted and removal of the targeted contaminated floodplain soils and creek bed sediments by dry and wet excavation began. Removed materials were disposed of in former dewatering lagoons on the Allied Paper property. The removal action was completed in May 1999, and reportedly resulted in the removal of 146,000 cy of streambed sediment and floodplain soils containing an estimated 21,000 pounds of PCBs. The total cost for the removal is reported by EPA at approximately \$7.8 million, of which \$7.5 million was funded through a “cash out” settlement agreement with the PRP.

Key Conditions: dedicated landfill or CDF, floodplains targeted, Great Lakes AOC

Estimated Target Volume: 90,000 cy (Bryant Mill Pond area)

Estimated Calendar Time to Implement Remedy: June 1998 to June 1999

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Site Name: *ALLIED PAPER/PORTAGE CREEK/KALAMAZOO RIVER - PROJECT 2 (Upper River)*

SiteID: 05-25

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund. Final. USEPA-Lead

Contaminants of Concern: PCBs (1242/1254)

Overall Status Summary:

The Superfund site originally comprised the Allied Paper property, a 3-mile stretch of Portage Creek to its confluence with the Kalamazoo River, and the 35-mile stretch of the Kalamazoo River from its confluence with Portage Creek to Allegan City Dam. The length of river being investigated was subsequently expanded by MDEQ to include the sector of river upstream to Morrow Dam and the sector of river downstream to Lake Michigan. After the Fox River, EPA reports that the Kalamazoo River deposits the highest annual load of PCBs into Lake Michigan. In December 1990, the state of Michigan entered into an Administrative Order by Consent (AOC) with Allied Paper, Inc. and its parent company, Millennium Holdings, Inc.; Georgia-Pacific Corporation; and Plainwell, Inc. (collectively known as the Kalamazoo River Study Group [KRSG]). The AOC required that these companies undertake an RI/FS, a process that is ongoing. In addition, Fort James Corporation (now Georgia-Pacific) agreed to participate in the RI/FS.

To better manage the investigation and remedy selection process, the river has been divided at the Allegan Dam into the Upper and Lower River. The Upper and Lower Rivers will be addressed as Phase I and Phase II respectively, as the investigation and remedy selection processes proceed. This report addresses Phase I of the project. The Phase II project which addresses the Lower River is described in MCSS Database Project ID 05-37.

Five paper waste landfills are specifically targeted as sources of PCBs to the river. PCB-contaminated paper-making residuals which were disposed of in the landfills are considered a continuing source of PCBs to the river. Because the five landfills represent potential PCB sources to the river, they are being addressed as four separate operable units for source control purposes prior to addressing in-river sediments. The OUs are: OU-1: Allied Paper Property/Bryant Mill Pond Area; OU-2: Willow Boulevard/A-Site; OU-3: King Highway Landfill; and OU-4: 12th Street Landfill. In addition, the 3 miles of Portage Creek and the Kalamazoo River are being investigated as a separate operable unit, OU-5.

Seven dams are present in the Upper River (upstream to downstream): Plainwell No. 2 Dam; Plainwell Dam; Otsego City Dam; Otsego Dam; Trowbridge Dam;

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Allegan City Dam; and Allegan Dam. Three of the dams are state-owned, having been purchased from Consumers Power in the 1960s. The three state-owned dams, Plainwell, Otsego, and Trowbridge, do not have locks and all have been dismantled down to the sills. Both the Plainwell No. 2 Dam and Otsego City Dam were also partially removed. Consumers Energy owns the Allegan Dam and operates it as an active hydroelectric facility. A single dam exists in Portage Creek within the designated site boundaries. The Allegan City Dam no longer produces hydroelectric power, however, at the request of the City of Allegan the water level has not been significantly lowered to allow for ongoing recreational use of the impoundment.

The remaining portions of the three state-owned dams are being maintained in place due in part to the accumulation of sediments behind them. Additionally, lowering the dams down to their sills reduced the water level in the impoundments, exposing PCB-contaminated bank soils and floodplain soils that historically were under water. MDEQ continues to evaluate whether the dams should be completely removed or remain in-place in their current condition. To further evaluate the impact of dam removal on the river, MDEQ commissioned a study to model the river to evaluate river flow characteristics with and without the dams in-place.

The PRPs, with MDEQ oversight, have continued to investigate the land-based sites and the river since 1993. During that period, remediation was completed for a portion of OU-1 (Bryant Mill Pond – Project ID 05-01). MDEQ is continuing to work on the RI/FS for the remainder of OU-1. For OU-2, USEPA is awaiting approval by MDEQ of the final RI/FS; USEPA plans to issue a proposed plan once the RI/FS is approved. RODs were signed for OU-3 in 1998 and for OU-4 in 2001. Closure and capping of the King Highway landfill (OU-3) is complete; MDEQ will continue to oversee groundwater monitoring and maintenance of the remedy. USEPA is working with PRPs at OU-4 to install a protective cover and groundwater monitoring wells. One contentious issue between the MDEQ, citizen groups, and the PRPs is the disposition of 1,400 core samples collected from the river for physical characterization purposes in 1993. These have been preserved (frozen) since that time; MDEQ was to make a decision by Summer 1999 as to whether these would be analyzed for PCBs. Reportedly, MDEQ requested that further analysis be performed; the analysis has yet to be performed.

In October 2000 the PRPs submitted a draft Phase I (Upper River) RI/FS to MDEQ, which MDEQ rejected in July 2002. The RI/FS preferred remedy for the Upper River included stabilization of bank and floodplain soils that border the three state-owned former impoundments, monitored natural attenuation, and implementing institutional controls.

In July 2001, MDEQ requested of USEPA that the site be redesignated "federal-lead." USEPA took over as the lead agency in early 2002. For the land-based

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sites (OU-1 to -4), MDEQ retained lead agency status which will remain in effect until the completion of any existing, ongoing investigations, studies, or remedial activities. USEPA has taken over lead of OU-5 and eventually issued a draft RI/FS for the Plainwell and Otsego City Impoundments. USEPA also financed an MDEQ-commissioned study by USGS to evaluate the effects of removing the Plainwell, Otsego, and Trowbridge impoundments; the preliminary results of this study have been reviewed by USEPA and it remains unclear if or how the results of this study will be used during future analysis of the river. Release of the results of the study is pending.

The draft RI/FS that USEPA issued for the Plainwell and Otsego City Impoundments recommended initially addressing floodplain soils and bank sediments since they were identified as ongoing sources of PCB contamination to the river. Following issuance of the RI/FS, MDEQ determined that the preferred fate of the three state-owned dams was to remove them completely in an effort to restore the river to a more free-flowing condition. The decision by MDEQ to remove the state-owned dams requires (1) that sediment, both contaminated and uncontaminated, trapped behind the dams, now be addressed as part of the remedy and prior to dam removal and (2) that additional floodplain soils and bank sediment exposed once the impoundments are removed be addressed as part of the remedy, including identifying responsible parties for these areas. Because of these issues, MDEQ has rejected the draft RI/FS for the two impoundments.

The RI/FS also failed to adequately show what the effects of PCB levels in fish would be if the recommended remedy was implemented. To better understand the contribution of floodplain soils and bank sediment on PCB levels in fish, USEPA initiated the development of a detailed hydrodynamic model of the river in June 2004. Model development is to take an estimated nine months to complete, until early Summer 2005. Remedy decisions for the river will follow completion of the modeling. Additionally, MDEQ continues implementing a long-term monitoring plan that includes sampling of sediment, water column, and biota throughout the river.

Key Conditions:

extended (> 1 mile) river, Great Lakes AOC, hydrodynamic modeling

Estimated Target

Volume:

Estimated Calendar Time to Implement Remedy:

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Site Name: *ALLIED PAPER/PORTAGE CREEK/KALAMAZOO RIVER - PROJECT 3 (Lower River)*

SiteID: 05-37

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund. Final. USEPA-Lead

Contaminants of Concern: PCBs (1242/1254)

Overall Status Summary: The Superfund site originally comprised the Allied Paper property, a 3-mile stretch of Portage Creek to its confluence with the Kalamazoo River, and the 35-mile stretch of the Kalamazoo River from its confluence with Portage Creek to Allegan City Dam. The length of river being investigated was subsequently expanded by MDEQ to include the sector of river upstream to Morrow Dam and the sector of river downstream to Lake Michigan. After the Fox River, EPA reports that the Kalamazoo River deposits the highest annual load of PCBs into Lake Michigan. In December 1990, the state of Michigan entered into an Administrative Order by Consent (AOC) with Allied Paper, Inc. and its parent company, Millennium Holdings, Inc.; Georgia-Pacific Corporation; and Plainwell, Inc. (collectively known as the Kalamazoo River Study Group [KRSG]). The AOC required that these companies undertake an RI/FS, a process that is ongoing. In addition, Fort James Corporation (now Georgia-Pacific) agreed to participate in the RI/FS.

To better manage the investigation and remedy selection process, the river has been divided at the Allegan Dam into the Upper and Lower River. The Upper and Lower Rivers will be addressed as Phase I and Phase II, respectively, as the investigation and remedy selection processes proceed. This report addresses the Phase II project, the section of the river below Allegan Dam. The Phase I project which addresses the Upper River is described in MCSS Database Project ID 05-37.

Five paper waste landfills, all located in the Upper River, are specifically targeted as sources of PCBs to the river. PCB-contaminated paper-making residuals which were disposed of in the landfills are considered a continuing source of PCBs to the river. Because the five landfills represent potential PCB sources to the river, they are being addressed as four separate operable units for source control purposes prior to addressing in-river sediments. The OUs are: OU-1: Allied Paper Property/Bryant Mill Pond Area; OU-2: Willow Boulevard/A-Site; OU-3: King Highway Landfill; and OU-4: 12th Street Landfill. In addition, the 3 miles of Portage Creek and the Kalamazoo River are being investigated as a separate operable unit, OU-5.

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Seven dams are present in the Upper River (upstream to downstream): Plainwell No. 2 Dam; Plainwell Dam; Otsego City Dam; Otsego Dam; Trowbridge Dam; Allegan City Dam; and Allegan Dam. Three of the dams are state-owned, having been purchased from Consumers Power in the 1960s. The three state-owned dams, Plainwell, Otsego, and Trowbridge, do not have locks and all have been dismantled down to the sills. Both the Plainwell No. 2 Dam and Otsego City Dam were also partially removed. Consumers Energy owns the Allegan Dam and operates it as an active hydroelectric facility. A single dam exists in Portage Creek within the designated site boundaries. The Allegan City Dam no longer produces hydroelectric power, however, at the request of the City of Allegan the water level has not been significantly lowered to allow for ongoing recreational use of the impoundment.

The remaining portions of the three state-owned dams are being maintained in place due in part to the accumulation of sediments behind them. Additionally, lowering the dams down to their sills reduced the water level in the impoundments, exposing PCB-contaminated bank soils and floodplain soils that historically were under water. MDEQ continues to evaluate whether the dams should be completely removed or remain in-place in their current condition. To further evaluate the impact of dam removal on the river, MDEQ commissioned a study to model the river to evaluate river flow characteristics with and without the dams in-place.

The PRPs, with MDEQ oversight, have continued to investigate the land-based sites and the river since 1993. During that period, remediation was completed for a portion of OU-1 (Bryant Mill Pond – Project ID 05-01). MDEQ is continuing to work on the RI/FS for the remainder of OU-1. For OU-2, USEPA is awaiting approval by MDEQ of the final RI/FS; USEPA plans to issue a proposed plan once the RI/FS is approved. RODs were signed for OU-3 in 1998 and for OU-4 in 2001. Closure and capping of the King Highway landfill (OU-3) is complete; MDEQ will continue to oversee groundwater monitoring and maintenance of the remedy. USEPA is working with PRPs at OU-4 to install a protective cover and groundwater monitoring wells. One contentious issue between the MDEQ, citizen groups, and the PRPs is the disposition of 1,400 core samples collected from the river for physical characterization purposes in 1993. These have been preserved (frozen) since that time; MDEQ was to make a decision by Summer 1999 as to whether these would be analyzed for PCBs. Reportedly, MDEQ requested that further analysis be performed; the analysis has yet to be performed.

See MCSS Database Project ID 05-25 for additional information on the Phase I Upper River project.

Key Conditions:

extended (> 1 mile) river, Great Lakes AOC, hydrodynamic modeling

Estimated Target Volume:

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***Estimated Calendar Time
to Implement Remedy:***

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Site Name: **ASHTABULA RIVER**

SiteID: 05-29

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: A "Partnership Agreement" between US EPA, USACE, Ohio EPA, and local affiliates.

Contaminants of Concern: PCBs and other chlorinated organic compounds; PAHs; heavy metals such as Cd, Pb, Hg, and Zn; other organics, e.g., hexachlorobenzene, hexachlorobutadiene; radionuclides, e.g., uranium, radium, thorium

Overall Status Summary: Remediation of the lower Ashtabula River is being evaluated by the Ashtabula River Partnership with the assistance of the USACE-Buffalo District and targets the removal of 696,000 cy of contaminated sediments (150,000 cy TSCA; 546,000 non-TSCA) from a one and one-half mile section of the lower river. The primary source of contaminants to the river is reportedly the Fields Brook tributary, a designated Superfund site, located one and one-half miles upstream of the river mouth. The Partnership distributed a preliminary draft Comprehensive Management Plan (CMP) and an Environmental Impact Statement (EIS) to the USACE in Fall 1998 for comment; reportedly the USACE returned both documents to the Partnership in February 1999 requesting that additional detail be provided in the CMP regarding the environmental benefits of dredging as they relate to the river. Both documents were revised and then reissued for public comment in January 2001. A Final CMP was issued in June 2001.

The CMP is a "feasibility-level planning document for a one-time cleanup of contaminated sediments in the lower Ashtabula River and Harbor." The CMP estimates the lower Ashtabula River to contain 1,000,000 cy of minor to heavily PCB-contaminated sediments containing an estimated 12 tons of PCBs. The CMP recommends the removal of the targeted sediment volume (696,000 cy) by mechanical dredging and dewatering of the removed sediment before disposal at the former RMI Sodium Plant site (State Road site); this is the same disposal location for sediments and soils removed from Fields Brook (Project ID 05-04). The CMP estimates the dredging will require five years to implement; two years for design and infrastructure construction and three years for dredging. The total estimated cost for dredging as presented in the CMP is \$47.6 million, of which \$15 million is part of a cost share provision for the local community. As part of a negotiated agreement, the Fields Brook PRPs will pay the cost share portion for the local community.

Of the total volume of sediment targeted, an estimated 581,000 cy is upriver of the 5th Street Bridge and is primarily contaminated with PCBs. This volume includes the 150,000 cy of sediment classified as TSCA. The remaining 115,000 cy of

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sediment that is targeted downstream of the 5th Street Bridge is primarily contaminated with PAHs.

The estimated volumes of TSCA and non-TSCA sediment were calculated using the modeling program Groundwater Modeling System. Modeling results showed that an estimated 29,000 cy of sediment existed that contained greater than 50 ppm PCBs. Due to uncertainties in the interpolations methods used by the model, the regulating agencies agreed that 40 ppm PCBs, not 50 ppm PCBs, would be used as the delineation concentration for estimating the volume of TSCA sediment to target. The determination of cutlines considering the practical limitations of the dredging equipment to be used resulted in the final volume of 150,000 cy of sediment that will be removed and disposed of as TSCA material.

Sediment requiring TSCA disposal, i.e., sediment containing 40 or more ppm PCBs, will be disposed in a separate cell from non-TSCA and Fields Brook materials in the former RMI Sodium Plant site landfill. Sediments identified as non-TSCA will be disposed in an existing nearby landfill used for flyash disposal, or, for uncontaminated sediments, open lake disposal may be used.

As described in the CMP, the recommended method of dredging is "Deep Dredge." Dredging is to be performed in a manner that minimizes turbidity and resuspension of sediment. This may include the use of operational controls including limiting the bucket cycle time, prohibiting nighttime dredging operations, and allowing only the partial filling of barges. Silt curtains may also be used if warranted by the project design. Water quality controls are to be used to monitor for the effects of dredging on the water column. Dredged material will be placed in watertight barges for transport to a land based facility for dewatering.

A five to ten acre dewatering facility will be built on property owned by Norfolk Southern and would include a barge mooring area, dredged sediment holding/settling basins, and water treatment and support facilities. Sediment dewatering will take place first on the transport barges, where supernatant will be pumped from the surface of the sediment, and then in impermeable lined earthen settling basins. The supernatant from the settling basins will be collected in a sump from which it will be pumped to a secondary settling basin and allowed to settle. The dewatered sediment will be loaded onto trucks for transport to the landfill. The supernatant will be treated using an onsite modular treatment system comprising flocculation, multi-media filtration, and carbon treatment. State water quality standards will be met for the discharge.

In February 2004, the USACE–Buffalo District issued a Sources Sought Notice for architect and engineering services associated with the project. The scope of the notice covered contaminated sediment dredging, dewatering, water treatment, transportation, and disposal and was intended to collect information from companies

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having the capabilities to perform the work as designated in the CMP.

As of July 2004, design for the dredging was about 75% complete and is being prepared by the USACE; completion of design is dependant on the level of federal funding made available to the project. The USACE anticipates that design will be completed in early 2005, construction of support facilities will begin in late 2005, and dredging will begin in early 2006 and be completed in 2009.

Key Conditions: confined disposal facility, dredging, extended (>1 mile) river, Great Lakes AOC, hydrodynamic modeling

Estimated Target Volume: 150,000 cy TSCA; 546,000 cy non-TSCA

Estimated Calender Time to Implement Remedy: 2005 to 2009

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Site Name: AVTEX FIBERS

SiteID: 03-01

US EPA Region: III

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund.

Contaminants of Concern: PCBs (1242/1248/1260), arsenic, chromium, zinc

Overall Status Summary: Years of litigation as to whether government is responsible for cleanup costs. Site housed a contractor-owned, contractor-operated facility performing Defense Department work. Onsite contaminants include PCBs, carbon disulfide, phenol, and metals. A preliminary ecological risk assessment was performed on the property which indicated that more field work was necessary. Additional samples have been collected of terrestrial animals, river water, sediments, and site soils. Sediment sample results indicate zinc concentrations as high as 120 ppm, one PCB hit at 470 ppb, and acetone being detected. A final ecological risk assessment report is targeted for completion by end of March 1999. Per the EPA RPM, it is not anticipated that a sediment remediation will be needed.

In Summer 1999, FMC Corporation reached an agreement with the US EPA and the Justice Department to perform a \$63 million cleanup at the site over 7 years.

Key Conditions: extended (> 1 mile) river

Estimated Target Volume:

Estimated Calendar Time to Implement Remedy:

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Site Name: **BAIRD & McGUIRE**

SiteID: 01-07

US EPA Region: I

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Superfund. Final. Fund-Lead.

Contaminants of Concern: organics (PAHs, pesticides), metals (arsenic), dioxins

Overall Status Summary: Removal of about 4,700 cy of sediments from a 2,100-foot reach of the Cochato River was completed by wet excavation in 1995, using excavators located on the banks. After removal, organic fill totaling 438 cy was placed in a short sector of the riverbed to act as a filter for migrating groundwater. Contaminants of most concern in sediments were chlordane and DDT. Removed material was incinerated onsite, using the incinerator which was operating for incineration of 248,000 tons of contaminated soil. A large area of the river, as well as associated ponds and wetlands, with an estimated 18,600 cy of contaminated sediments, were selected for "no action" by EPA, based on "more harm than good." Long-term monitoring of sediment and fish will occur in these areas as well as in the river.

The ash from the incineration of soils and sediments was spread on the Baird & McGuire site and was covered with 1-2 feet of loam. About 7.5 acres of wetlands destroyed by remediation at the site were replicated, but with only limited initial success. Current status of the replicated wetlands has not been determined.

Implementation of a thirty-year long-term monitoring plan began in 1996 and requires annual sampling of sediment and bank soils for the first five years, followed by a gradual decrease in sampling intensity for the remaining 25 years. Fish sampling is to be performed every five years.

Based on a 1998 field investigation, it was verified that the river-bottom sediments in the Cochato River were being recontaminated by volatile organics present in a groundwater plume discharging from the Baird & McGuire site (and which was not controlled by the groundwater pumping system in operation). These findings were confirmed in the Five-Year Review report (Reference A-1009)

Key Conditions: habitat/streambank restoration, incineration, more-harm-than-good, natural recovery, post monitoring, wetlands

Estimated Target Volume: 1,500 cy (2,100 feet of river to six inch depth)

Estimated Calendar Time to Implement Remedy:

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Site Name: **BAY ROAD POND**

SiteID: 02-21

US EPA Region: II

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Final

Contaminants of Concern: PCBs

Overall Status Summary: GE agreed to perform the Bay Road Pond Restoration Project work in accordance with the NYSDEC-approved August 1999 Work Plan and the provisions of an October 25, 1999 Consent Order between GE and the NYSDEC. The project was performed between March 1 and October 15, 2000 and included the following primary components:

- Procurement of a USACE permit for work “within the waters of the United States;”
- Site preparation, including placement of perimeter fencing and erosion control measures, construction of access and staging areas, and dewatering of the pond;
- Setup and use of a bypass pumping system to collect water in the inlet channel for discharge downstream of the removal area so that removal activities could be performed “in the dry;”
- Setup and operation of an on-site water treatment system to treat water collected or encountered during the removal, including pond decant water, groundwater filtration, direct precipitation, dewatering liquids, and equipment cleaning fluids;
- Removal of pond- and channel-bottom materials to the proposed horizontal and vertical limits;
- Placement of a geotextile liner and approximately 6 inches of fill throughout the bottom of the pond following removal of the pond-bottom materials;
- Construction of an approximately 400-square foot island in the pond for wildlife use and aesthetic enhancement; erosion of the soil fill material or undermining of the existing stone foundation beneath Fort Amherst Road; and
- Restoration of residential properties affected by the performance of the work.

In total, approximately 3,210 cy of material were removed and transported from the

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site to appropriately permitted disposal facilities. Of this, 3,598 tons were non-TSCA materials, and 1,812 tons were TSCA materials that were both disposed of off-site. These quantities included the depositional materials removed from the pond and channel, stabilizing agent, liner, sand from the bermed water treatment system staging area, and spent carbon from the water treatment system.

Preliminary investigations delineated between areas with greater than or less than 50 ppm PCBs. The maximum pre-excavation PCB concentration was 3,300 ppm. Overall, PCBs were detected in 14 of 46 samples analyzed, and 13 of the 14 detections were from depositional material. As a result, the Work Plan targeted depositional layers only, except for one location with 5.3 ppm PCB at the 2 foot depth interval which was excavated from the underlying native material.

Post-removal samples collected by the NYSDEC following remedy implementation indicated PCB concentrations below 1 ppm, with a maximum concentration of 1.67 ppm reported for one sample analyzed by immunoassay. In addition, the NYSDEC's May 2000 Halfway Creek Report presented the results of fish tissue and sediment sampling performed at and downstream of the site, concluding that no additional fish advisory or remedial measures were required.

GE restored the pond with geotextile and 6" of sand on average, as well as installing gabions, rip rap, and retaining walls where specified. Residential properties were returned to at least their original conditions.

Key Conditions:

commercial landfill, property access issues, solidification/stabilization

Estimated Target Volume:

In-situ total = 2,350 cy; 700 cy TSCA material, and 1,650 cy non-TSCA.

Estimated Calendar Time to Implement Remedy:

January - February 2000

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Site Name: **BAYOU BONFOUCA**

SiteID: 06-01

US EPA Region: VI

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Superfund. Final. Fund-Lead.

Contaminants of Concern: PAHs (creosote)

Overall Status Summary: Dredging completed in July 1995 using a custom-designed backhoe-on-a-barge; 169,000 cy removed; took 21 months overall with 15 months of active dredging; dewatered sediments incinerated onsite; 171 million gallons of water treated; cost \$115 million. Following dredging, the dredged areas were covered by placement of a layer of sand followed by a layer of gravel.

The incineration system consisted of a feed system, a rotary kiln, a secondary combustion chamber, and a gas cleaning system. Enhancements included an oxygen-enriched burner (not subsequently used) and a silencer system for the exhaust stack. The incinerator processed 250,000 tons (169,000 cy of sediments and 10,000 cy of waste piles).

Key Conditions: dredging, specialty dredge, incineration, floating oil, water handling limitations

Estimated Target Volume: On March 31, 1987, a Record of Decision (ROD) was signed for the Bayou Bonfouca site. The selected remedy included:

- Excavation of contaminated bayou sediments and onsite surface waste piles. Excavation of sediments to be performed by driving sheetpiles down the middle of the bayou and dewatering one-half and maintaining flow in the other half.
- Onsite incineration of waste piles and contaminated sediments.
- Placement of an engineered cap over residues from the incinerator and residual surface soils.
- Pump/treatment/reinjection of contaminated ground water.
- Estimated construction cost of approximately \$55 million.

During design in 1988 and 1989, the following new information was obtained:

- The length of contaminated bayou was found to be 4,000 feet, rather than the 2,000 feet indicated in the ROD.

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- The bayou contamination extended to a maximum depth of about 17 feet rather than 5 feet as stated in the ROD.
- The total volume of contaminated sediments is approximately 150,000 cubic yards rather than 46,500 cubic yards as stated in the ROD.
- The contaminated sediments near the creosote plant are in direct contact with the materials of the shallow artesian aquifer.
- The contaminated ground water is found in 3 distinct plumes rather than 1 continuous plume as presented in the ROD.
- ReInjection of treated ground water into the shallow artesian aquifer is not considered effective because of geological properties of the aquifer.
- Revised estimated construction cost of \$100 million (Source Removal \$90 million and Ground Water \$10 million) vs. \$55 million estimated cost in the ROD.

As a result, an Explanation of Significant Differences (ESD) was issued in 1990 which concluded:

- The remedy selected in the 1987 Record of Decision is still the most appropriate means of protecting human health and the environment.
- Dredging of the bayou will require consideration of stable slopes and possibly some bulkheads to maintain existing land surfaces instead of placing sheetpiles in the middle of the bayou. This will necessitate leaving minimal volumes of contaminants after dredging.
- Dredging can best be achieved by (dredging through the water column and) using turbidity curtains around the excavation process with silt curtains and absorbent booms placed along the bayou rather than sheetpiling the middle of the bayou and dewatering half of it during excavation operations.
- All dredged areas will be backfilled with clean materials to minimize the chances of contact with residual contaminants.
- The increased volume of contaminated sediments will require an increase in the height and areal extent of the cap.
- The contaminated ground water plumes will be considered as 3 separate areas instead of 1 continuous plume. The 2 onsite plumes will be remediated as one operable unit.

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- The contaminated ground water plume adjacent to the bayou in the residential area (off-site) will be addressed after dredging of the bayou.

Estimated Calendar Time to Implement Remedy: 5.5 years (removal can be performed all year around).

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: **BLACK RIVER**

SiteID: 05-02

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: 1985 Consent Decree between US EPA and US Steel Corporation, lodged in US District Court - Northern District of Ohio. The Consent Decree was issued to deal with violations of the Clean Air Act, but included several supplementary environmental requirements, one of which was the dredging of the PAH-contaminated sediment.

Contaminants of Concern: metals; PAHs

Overall Status Summary: USX dredged 60,000 cy from two sectors of the river, one 700' and one 2000' long; disposal was into a project - specific landfill on the PRP site. Project had been delayed 5 years pending selection of a disposal site. Project completed in Dec 1990 with difficulties, which included switching between a clamshell and hydraulic cutter (too much debris), cave-in of wall of landfill, and difficulty meeting TDS discharge limit.

Key Conditions: dedicated landfill or CDF, extended (>1 mile) river, dredging, Great Lakes AOC, fish spawning limitations

Estimated Target Volume: 46,500 cy

Estimated Calendar Time to Implement Remedy: Not available. The Consent Decree mandated that the dredging be completed not later than three years after the Consent Decree was lodged (Sep. 5, 1985).

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: **BREMERTON NAVAL COMPLEX**

SiteID: 10-10

US EPA Region: X

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: US Navy-lead. Final

Contaminants of Concern: PCB; PAHs; mercury; arsenic; copper; lead; and zinc.

Overall Status Summary: Investigation by the US Navy of the Bremerton Naval Complex Marine Operable Unit (OU) B began in 1990 under a Comprehensive Long-Term Environmental Action Navy contract with URS Consultants, Inc. The site inspection documented the existence of a variety of inorganic and semivolatile organic chemicals exceeding three-times background (screening criteria) levels and was used to establish marine sediment criteria. Project management plans for performing a Remedial Investigation (RI) in Marine OU B were completed in 1994. Sampling of the sediment and benthic community, and water column and sediment transport studies within Sinclair Inlet, were performed as part of the RI process. PCB concentrations in Marine OU B surface sediments were found to range from 1.6 to 61.7 ppm on an organic carbon (OC) basis, and the surface area-weighted average concentration (SAWAC) of PCBs in Marine OU B sediment was approximately 7.8 ppm OC.

In June 2000, the US Navy, the Washington State Department of Ecology, and USEPA, under an interagency agreement, issued an early action ROD for Marine OU B. The ROD required the removal of 200,000 cy of contaminated sediment from 32 acres of Marine OU B. The ROD was issued under early action status (i.e., issued prior to completion of the RI and Feasibility Study) to combine the project with a proposed navigational dredging project (about 370,000 cy) planned for Marine OU B. Under the ROD, contaminated sediment would be removed to reduce the SAWAC of PCBs within surface sediment from 7.8 to 4.1 ppm OC. Natural recovery is then expected to further reduce the SAWAC of PCBs to 3.0 ppm OC, the sediment quality standard, within 10 years.

Sediments removed as part of both navigational and remedial dredging would be disposed in confined aquatic disposal (CAD) cells totaling approximately 10 acres and located within Marine OU B. Additionally, the remedy requires that approximately 60,000 cy of clean sediment be used for enhanced natural recovery and in-situ capping. Enhanced natural recovery will involve thin-layer capping of areas to produce a nominal thickness of at least 20 cm of clean sediment. This layer is intended to provide a clean layer of sediment for establishment of the benthic community and not as an isolation layer for the more contaminated, deeper sediment. In situ capping requires a nominal thickness of three feet of clean sediment. Habitat restoration will also be performed.

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Construction began June 15, 2000 and the CAD pit was finished mid-August 2000. CERCLA sediment (from Marine OU B) and navigational dredged sediment non-suitable for open-ocean disposal were then dredged from mid-August 2000 until February 15, 2001 when dredging was required to halt for four months due to a fish protection window. Placement of dredged sediment into the CAD pit was completed prior to halting dredging, which allowed time for the material to consolidate prior to installation of the cap. Navigational dredging was completed in October 2001.

Total volume of material dredged for the project was 1,056,000 cy. A further breakdown is as follows:

- CAD pit installation material, suitable for open-ocean disposal: 376,000 cy;
- CERCLA sediment from around docks and berthing areas: 225,000 cy;
- Navigational dredged sediment non-suitable for open-ocean disposal: 174,000 cy; and
- Navigational dredged sediment suitable for open-ocean disposal: 281,000 cy.

Key Conditions:

capping, dredging, fish spawning limitations, habitat/streambank restoration, natural recovery, navigational dredging component, post monitoring, tidal fluctuations.

Estimated Target Volume:

200,000 cy

Estimated Calendar Time to Implement Remedy:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: ***BUFFALO RIVER***

SiteID: 02-02

US EPA Region: II

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: None. Great Lakes priority AOC.

Contaminants of Concern: PCBs; pesticides; metals; PAHs

Overall Status Summary: Extensive studies completed including several dozen water, sediment, and biota monitoring projects, a dredging demonstration project in 1992, modeling, storm event sampling to measure scour, and pilot testing of thermal desorption. No volume estimates, target cleanup levels, or remedy selection as yet. Apparently multiple PRP sites and sources have been identified. The 1992 dredging demonstration (which was part of a larger navigation channel dredging project) removed 10,200 cy from 3 targeted areas totaling 2.8 acres, and deposited the material into an available CDF. Only low contamination levels: PCBs avg. 4-8 ppm; PAHs 240-410 ppm. Three removal methods were tested: open and closed clamshell bucket and cable suspended Toyo submersible pump.

Key Conditions: confined disposal facility, extended (>1 mile) river, Great Lakes AOC, hydrodynamic modeling, pilot/demonstration test

Estimated Target Volume:

Estimated Calendar Time to Implement Remedy:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: CANNELTON INDUSTRIES

SiteID: 05-03

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Superfund. Final.

Contaminants of Concern: metals (Cd, Pb, As, Cr, Hg)

Overall Status Summary: A ROD amendment was issued in September 1996 emphasizing containment (natural or engineered) as opposed to dredging. A 1992 ROD had called for removal of 225,000 cy (including 86,000 cy of sediments) and disposal in an onsite landfill. The 1996 ROD Amendment proposed removal of only 40,500 cy of soil and tannery wastes (no sediment) and no onsite landfill. Higher cleanup standards adopted in Michigan, plus favorable results from sediment toxicity and bioaccumulation studies, led to the ROD amendment. The approach for sediments became containment and natural recovery, supported by future monitoring and migration studies. Design completion was in December 1998. The cleanup was completed in October 1999.

The cleanup, which started in June 1999, targeted five specific areas. The following was accomplished:

- excavation of 33,000 tons of tannery-waste materials and contaminated soils from the Barren Zone, Western Shoreline, and Southern Shoreline of the Tannery Bay, with disposal at two offsite solid waste facilities;
- regrading and landscaping of the western shoreline and backfilling and regrading in the Barren Zone;
- construction of surface drainage improvements and replacement of the shoreline berm to prevent erosion along the Barren Zone;
- construction of a stabilization berm along the southern shoreline of Tannery Bay;
- construction and operation of a water-treatment system to treat 3.2 million gallons of wastewater from the site excavation and dewatering activities, with discharge to the St. Marys River; and
- seeding and mulching to revegetate the Western Shoreline and Barren Zone.

EPA will carry-out long-term groundwater monitoring at the site.

Key Conditions: Great Lakes AOC, hydrodynamic modeling, natural recovery, post monitoring,

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wetlands

***Estimated Target
Volume:***

No sediments (only site soil and tannery wastes targeted, totaling 40,500 cy).

***Estimated Calender Time
to Implement Remedy:***

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: CEDAR CREEK

SiteID: 05-22

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: USEPA - Lead. Superfund.

Contaminants of Concern: PCBs

Overall Status Summary: In late 2002 and early 2003 the USEPA signed AOCs with Mercury Marine and Amcast, respectively, for further investigation of Cedar Creek. Under the agreements, Mercury Marine will perform studies of Cedar Creek water, floodplain soils, and sediment and Amcast will investigate its property and other nearby areas. Mercury Marine issued a draft work plan for performing an RI/FS for the creek in early 2003. The RI portion of the study is to be completed in the first half of 2004. This will be followed by a baseline risk assessment and then a feasibility study (FS). The FS is targeted for completion in early 2005. Following receipt of the FS, USEPA will then decide on a remedy for the site.

Key Conditions: extended (> 1 mile) river, floodplains targeted, hydrodynamic modeling

Estimated Target Volume:

Estimated Calendar Time to Implement Remedy:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: **CHERRY FARM**

SiteID: 02-18

US EPA Region: II

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: NYSDEC Order-on-Consent.

Contaminants of Concern: PCBs (on-site sediments); PAHs and metals (Niagara River sediments)

Overall Status Summary: A Consent Order for a Remedial Investigation/Feasibility Study was signed by the site owner in April 1988. An RI/FS was completed and accepted by NYSDEC during that time period. The RI/FS confirmed the presence of foundry sand slag and two former waste water discharge lagoons on the PRP property, a former waste disposal site for industrial wastes from facilities in the area. The NYSDEC Record of Decision was signed February 15, 1991. Based on the results of the additional investigations and pump tests completed in 1992, the ROD was amended October 1993 to eliminate the requirements for installation of an impermeable barrier as part of the disposal location cover design and a fence around the entire site and to require that collected ground water be pretreated and discharged to a local water treatment plant in lieu of direct discharge to the Niagara River. Due to common site history, former common ownership, similar waste and a similar Remedial Program, this site was combined with the adjacent River Road Site for Remedial Action. The PRP Group developed a comprehensive remedial design for this and the adjoining River Road Site.

A Consent Order for Remedial Design/Remedial Action (RD/RA) was signed on September 27, 1994 requiring the PRP group to investigate the potential contamination of river sediments. A Phase I Sediment Assessment Report was completed in April 1995 and results indicated elevated levels of PAHs and metals in Niagara River sediments. Based on the results, a Phase II Sediment Assessment in the Niagara River was undertaken, with sediment sampling in June and July 1996. A third phase of sampling was completed in May 1997 as part of the pre-design investigation and used to finalize design specifications and dredging requirements.

Remediation activities began in July 1998 to remove nearshore sediments with confirmed elevated levels of PAHs and metals. The extent of sediment removal was to achieve 20 ppm PAHs in shallow (top one foot) sediment (horizontal delineation) and 50 ppm PAHs in deep zone (below one foot) sediments (vertical delineation). Removal of sediment from the river was verified using elevations specified on the final grading plan and was completed by the end of November 1998. An estimated 42,445 cy of sediments were removed using primarily a hydraulic cutterhead dredge and transferring the sediment via a 5,000 ft pipeline directly to a 2-acre sediment disposal pond on the River Road portion of the site. The sediment was allowed to

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consolidate prior to being capped in place. Water from the sediment slurry was treated with a polymer to promote flocculation and settling out of suspended solids, decanted, sampled for turbidity, and released back to the Niagara River. Three 120 ft. x 60 ft. nearshore areas of the river were capped with geotextile fabric and riprap, since slope considerations precluded dredging due to concerns re undercutting. In addition, a riprap shoreline was constructed along the southern half of the site.

Site restoration activities (regrading, seeding, mulching) along with final capping of the dredged spoils were completed in July 1999. An O & M Plan for the entire site was prepared; sampling reports are generated semi-annually and monitoring reports are generated annually. The need for on-going post-dredging bathymetry in the dredged areas (to determine if scour or deposition is occurring) was to be negotiated between the PRPs and the NYSDEC.

Key Conditions:

capping, dedicated landfill or CDF, dredging, Great Lakes AOC, wetlands

Estimated Target

42,000 cy

Volume:

***Estimated Calendar Time
to Implement Remedy:***

1998 construction season (tentatively mid-July to mid-December)

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Site Name: ***CIBA-GEIGY***

SiteID: 02-24

US EPA Region: II

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: NYS RCRA. Final.

Contaminants of Concern: heavy metals

Overall Status As described in Reference D-508:

Summary:

“Manufacturing activities at the site date back to 1901 with the production of wallpaper. In 1907, operations were expanded to include the production of inorganic pigments which eventually became the primary product line at the facility. Hercules Incorporated purchased the site in 1960 and subsequently sold it to Ciba-Geigy in 1979. Ciba-Geigy ceased production of pigments in 1989 and demolished the buildings on the site leaving intact a warehouse and numerous concrete building slabs. Stained or contaminated debris was transported off-site for disposal as hazardous waste.”

“On September 9, 1996, ownership of the main plant site was transferred from Ciba-Geigy Corporation to Ciba Specialty Chemicals Corporation. Hercules and Ciba have entered into a cooperative agreement under which Hercules is managing the corrective measures while Ciba retains ownership of the site.”

Three sediment areas were targeted for remediation, described as follows in Reference D-508:

- “In two off-site ponds owned by the Glens Falls Lehigh Cement company, bottom sediment contaminated with heavy metals from plant erosion will be remediated by insitu covering of the sediment with clean gravel fill. The deposition of clean sediment is expected to naturally restore the ponds.”
- “Approximately 12,000 cubic yards of sediment and debris contaminated with heavy metals will be removed from the Hudson River and the adjacent river bank and deposited in the on-site Corrective Action Management Unit (CAMU). The removal will extend over 3,800 lineal feet of the Hudson River, beginning adjacent to the site and ending shortly downstream of the property’s boundary.” (The CAMU is an approximately 5-acre former lagoon.)
- “Another segment of the RCRA corrective action project will be addressed in a post-closure permit modification. The proposed modification includes plans to remediate a former Hudson River bed channel downstream from the main plant site

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known as the Poned Backwater Area. The 11-acre area containing two ponds is contaminated with heavy metals. The proposal calls for removing 15,000 cubic yards of contaminated soil, restoring the excavated area with clean fill and vegetation and extending the wetland area.”

The first bulleted item (above) was accomplished in 2003. The sediment removal activities (second and third bulleted items, above) were accomplished during the period 2000-2001. Sediment and river bank removal was by a combination of wet and dry excavation, using long-reach excavators situated on existing land or on make-shift roads built into the river using ballast materials. Confirmation of removal of targeted material was by visual observation and by probing.

A total of 27,000 cy of material was removed and was disposed in the onsite CAMU.

Key Conditions:

capping; dedicated landfill or CDF; wetlands

Estimated Target

Volume:

***Estimated Calender Time
to Implement Remedy:***

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Site Name: **CLARK FORK RIVER**

SiteID: 08-03

US EPA Region: VIII

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund. Final.

Contaminants of Concern: heavy metals (arsenic, cadmium, copper, lead, zinc)

Overall Status Summary: The Clark Fork River is addressed as one of the three operable units (OU #3) of the Milltown Reservoir/Clark Fork River Superfund Site. Addressed is 120 river miles of the Clark Fork River in Montana. The Clark Fork River is immediately downstream of Silver Bow Creek (Project ID 08-01) and extends to the maximum Milltown Reservoir pool. Heavy metals (arsenic, cadmium, copper, lead, zinc) from upstream historical mining operations are the contaminants of concern.

According to the ROD:

“Copper contamination is emphasized in the Selected Remedy because it is present in significant concentrations within the mining and smelting wastes, it has a large and consistent data set, it is the most toxic of the metals to aquatic life in this river system, it can be toxic to plants in the floodplain, and it is used as an indicator for other contaminants. In addition, specific soil cleanup levels for arsenic, the major contaminant affecting human health and a potential contributor to risks to aquatic life, are set forth.”

The Clark Fork River has been divided into three reaches to facilitate investigation and determine remedial actions. As described in the ROD, Reach A is the first 43 river miles and is characterized by “extensive exposed tailings and unstable streambanks, as well as stressed vegetation;” Reach B is the next 31 river miles wherein “the floodplain is more narrow and the gradient higher than Reach A, and exposed tailings are far less extensive;” and Reach C is the final 47 river miles with no exposed tailings and through which “the floodplain is constrained by a narrow valley, roads, and railroad grades and the flow is augmented by several tributaries.”

The ROD was issued in April 2004. The Selected Remedy designates remediation of Class I streambanks as the top priority. The Selected Remedy is a combination of remedial actions which include:

1. Stabilizing eroding streambanks and providing an approximately 50-foot wide protective riparian corridor on both sides of the river. This will be accomplished along virtually all of Reach A and in small, localized areas of Reach B. Of the 86.2 miles of streambank in Reach A (counting both sides), 67 miles (78%) would

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receive some type of stabilization treatment along with 472 contiguous acres of riparian buffer zone.

2. Removal of exposed tailings to a central disposal area and replacement with clean soils. The central disposal area is Anaconda's Opportunity Ponds, an existing 5 square mile disposal area.
3. In-situ treatment of areas of impacted soils and vegetation.
4. Necessary revegetation of the riparian corridor and other treated removal areas.

The work is estimated to take ten years and cost \$117.5 million.

Riverbed sediments are not targeted as part of the ROD remedy. As explained in the Ecological Risk Assessment (ERA):

“... some sediments may pose risk to benthic species, but most sediments pose only low or minimal hazard. Total metals concentrations in the sediments have a relatively low bioavailability and sediment pore water dissolved metals concentrations are not above the risk-based levels identified in the ERA. Direct toxicity testing of the sediments evaluated in the ERA concluded no effects from sediment exposure. Evaluation of the lines of evidence using the sediment quality triad or EPA's ESGs leads to the clear conclusion that sediments do not pose a significant risk to the aquatic biota of the CFR under current conditions. Therefore bed sediments are not included in the problem definition from an aquatic risk standpoint.”

USEPA screened out such remedial actions as active treatment of groundwater or surface water, or removal of streambed sediments because of its preference to address the source of contamination and because of implementability concerns (Reference B-1125).

Key Conditions:

dedicated landfill or CDF, extended (>1 mile) river, floodplains targeted, habitat/streambank restoration, more-harm-than-good, post monitoring, property access issues, wetlands

Estimated Target

Volume:

Estimated Calendar Time to Implement Remedy:

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Site Name: *COEUR d'ALENE RIVER BASIN*

SiteID: 10-12

US EPA Region: X

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Natural resource damages (NRD) settlement between the mining companies and State of Idaho 1986; NRD lawsuit brought by the U.S. Government and the Coeur d'Alene Indian Tribe in 1996; EPA fund-lead RI/FS investigation pursuant to CERCLA (the NPL facility was expanded, by court decision in 2000, to include the entire Coeur d'Alene Basin impacted by mining contamination and not just the 21 square mile Bunker Hill "box.")

Contaminants of Concern: heavy metals, primarily lead, cadmium, and zinc

Overall Status Summary: As described in the Health Exposure Assessment, Reference A-816: "The Coeur d'Alene River Basin is a 3,700 square mile hydrologic drainage network, located in Shoshone and Kootenai Counties in northern Idaho. The headwaters of the river are in the Bitterroot Mountains on the Idaho/Montana border. The South Fork of the Coeur d'Alene River flows generally west through the Basin to Enaville, Idaho, just east of Cataldo. At Enaville, the North Fork of the Coeur d'Alene River joins the South Fork, forming the main stem of the Coeur d'Alene River which continues to flow west for a total of 53 miles into Lake Coeur d'Alene. Most streams in the Basin are deeply entrenched in narrow, steep-walled canyons. The Coeur d'Alene River Valley is the main exception. West of Cataldo Mission the valley becomes a broad floodplain with a maximum width of about 1.5 miles."

"In the past, mining was the principal source of employment in the Basin. Significant deposits of gold, silver, and lead were first reported in the Coeur d'Alene Mining District in 1882 . . . By 1900, numerous mines were producing ore in the Upper Basin. The Coeur d'Alene Mining District became one of the largest and most productive lead-, silver-, and zinc-producing areas in the United States, earning the nickname, Silver Valley. In the 1980s, however, the designation of (the) Bunker Hill (Mine Complex) as a Superfund site and the concomitant decline of mining in the Silver Valley led to the end of an era and a transition to other economic activities."

"Much of the environmental contamination present in the Coeur d'Alene River Basin today is attributed to past mining and smelting activities in the area. Previously, there were few controls on atmospheric emissions, solid waste disposal, and wastewater treatment at mining and smelting sites. Initially, most of the mines in the Coeur d'Alene Mining District as well as the Bunker Hill smelter discharged all liquid and solid waste directly into the South Fork of the Coeur d'Alene River and its tributaries. In 1928, a 160-acre central impoundment area (CIA) was

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constructed on the alluvium of the Coeur d'Alene River floodplain and acted as the Bunker Hill Complex's main disposal area for solid and slurried mine wastes. The impoundment area has been identified in many investigations as a source of heavy metal contamination in the Coeur d'Alene River Basin."

And as described in EPA's current Proposed Plan, Reference A-820, and ROD, Reference A-895: "Until 1968, most tailings were discharged directly into the South Fork or its tributaries. Since 1968, tailings have been impounded or placed back in the mines, and current mining practices contribute relatively little to the Coeur d'Alene River system compared to existing contamination resulting from pre-1968 practices. An estimated 62 million tons of tailings were discharged to streams prior to 1968. These tailings contained an estimated 880,000 tons of lead and more than 720,000 tons of zinc. Most of the tailings were transported downstream, particularly during high-flow events, and deposited as lenses of tailings or as tailings and sediment mixtures in the bed, banks, floodplains, and lateral lakes of the Upper and Lower Basins and in Coeur d'Alene Lake. Some fine-grained material washed through the lake and was deposited as sediment within the Spokane River flood channel. The estimated total mass and extent of contaminated material (primarily sediments) exceeds 100 million tons dispersed over thousands of acres."

Areas of concern potentially affected by the heavy metals contamination include the South Fork and main stem of the Coeur d'Alene River from near the town of Mullan on the east to Coeur d'Alene Lake on the west, about 68 river miles; at least three primary tributaries (Canyon Creek, Ninemile Creek, and Pine Creek); floodplains; eleven lateral lakes ranging in area from <100 acres to >600 acres; about 7,000 acres of wetlands; Coeur d'Alene Lake with a dam-controlled surface area of about 32,000 acres; and the 20-25 river miles of the Spokane River, running between Coeur d'Alene Lake and Long Lake.

A 21 square mile area in the vicinity of the confluence of the North and South Forks, in Shoshone County, the Bunker Hill Mining and Metallurgical Complex, was placed on the NPL in 1983. Since that time a Superfund ROD (1992), a ROD Amendment (1997), and a ROD ESD (1998) have been issued; areas of concern have been identified; and a substantial portion of the selected remedies have been implemented. Areas of concern within the 21 square mile "Bunker Hill Box" included 3,200 acres of contaminated, eroding hillsides; the contaminated Smelerville Flats area (with contaminant migration to surface and ground water); a 160-acre Central Impoundment Area (CIA) which was 60 to 70 feet high; a 70-acre former tailings disposal area called Page Pond; and a defunct lead smelter and surrounding Smelter Complex and Mine Operations Area.

The legal and remedial initiatives along the Coeur d'Alene River have been considerable over the most recent 10 to 15 years. As described in the EPA's Proposed Plan, Reference A-820: "Many cleanup actions have been conducted at

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source areas and at depositional areas throughout the Basin. These actions have occurred from 1989 to the present and have been conducted by the mining companies, Union Pacific Railroad, various state and federal agencies, and the Coeur d'Alene Indian tribe. The mining companies and government agencies have worked in concert on many of these actions. For example, cleanup activities have been conducted by the Silver Valley Natural Resource Trustees, a cooperative effort of the IDEQ and the mining companies. Many of the cleanup actions have taken place in the Bunker Hill Box, the site of some of the highest levels of contamination in the Basin.”

Some examples of these actions follow. Legal actions have included a Natural Resource Damages (NRD) settlement between the mining companies and the State of Idaho in 1986, a suit brought by the Coeur d'Alene Indian tribe in 1990 for NRD and a suit brought by the tribe against the State of Idaho regarding ownership of Coeur d'Alene Lake. Extensive remediation was accomplished by the mining companies over the most recent 5 to 7 years in both Canyon Creek (as a non-time critical removal) and Ninemile Creek (as a time-critical removal). Starting in 1991, and continuing for the next six years, a Natural Resource Damages Assessment Plan for the Coeur d'Alene Basin was prepared by three of the natural resource trustees, the Coeur d'Alene Indian tribe, the US Dept. of the Interior, and the US Dept. of Agriculture.

In March 1996, the US Dept. of Justice (and the Coeur d'Alene Indian tribe) filed a natural resource damages suit in US District Court in Idaho against eight mining companies, demanding payment for environmental damages to the Coeur d'Alene Basin. The eight defendants included ASARCO, Hecla Mining, Sunshine Mining, Coeur d'Alene Mines, and four affiliated firms. The trial began in January 2001. The majority of the defendant firms have negotiated cash settlements with the plaintiffs.

In January 2002, a lawsuit was filed in Idaho, against six mining companies and Union Pacific Railroad, by eight current or former area residents seeking class-action status and claiming health problems from lead and other heavy metals.

In 1998, EPA designated the Coeur d'Alene Basin as a “facility” under CERCLA and began an RI/FS. In 2000, the Circuit Court of Appeals confirmed that the NPL facility includes all areas of the Coeur d'Alene Basin with mining contamination, and not just the 21 square mile Bunker Hill “box” (addressed by OUs 1 and 2). The RI/FS process resulted in a Proposed Plan, released for public comment on October 29, 2001. The comment period closed on February 26, 2002, after two extensions. A ROD was issued on September 12, 2002.

The remedy proposed in the Proposed Plan and documented in the ROD is described as a Final Human Health remedy and an interim action Ecological remedy

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and includes (a) all actions for protection of human health in the communities and residential areas in the Basin and (b) a first increment of actions on a priority basis designed to achieve interim benchmarks for environmental protection. The Coeur d'Alene Lake is not included in the interim action. The individual components of the proposed remedy would be sequenced over a 20-30 year period. The proposed remedial actions are as follows:

- Reduce soil lead concentrations at residential properties by removal at levels above 1,000 ppm or capping/stabilizing at levels above 700 ppm. Cleanup lead contaminated dust at an estimated 252 residences. Also, implement institutional controls and alternative drinking water sources.
- At 15 mill sites and 31 recreational areas remediate lead in soil and dust to the same levels described above.
- Stabilize stream beds, stream banks, and waste piles in Canyon, Ninemile, and Pine Creeks, and in the South Fork Coeur d'Alene River. Construct improvements to sewer and storm drains to reduce contaminated groundwater infiltration to the South Fork.
- In Canyon Creek, treat creek water near the mouth of the creek to reduce the metals loading discharging to the South Fork, and stabilize stream banks and waste piles.
- In Ninemile Creek, implement a series of remedies to allow natural reestablishment of the fishery and reduce the metals loadings to downstream areas, including (a) removing or capping contaminated sediments; (b) removing waste rock and consolidating it above the floodplain; (c) treating water from seeps and mine adits; (d) stabilizing stream banks; and (e) establishing hydraulic controls.
- In Pine Creek, improve fishery conditions and mitigate mine impacts on riparian receptors by hot spot removals, bank and bed stabilization, riparian zone revegetation, regrading of stream reaches, and treatment of tributary water to reduce the metals load to Pine Creek.
- In South Fork Coeur d'Alene River, upstream of the Bunker Hill "Box," remove tailings hot spots in the upper floodplain and stabilize and bioengineer stream channels and banks to protect riverine and riparian receptors.
- For Lower Basin stream banks and beds, remove contaminated bank wedges from highly erosive streambank areas; stabilize banks and revegetate removal areas; construct and operate sediment traps in selected areas where the river overflows its banks; and periodically remove river bed sediments in natural depositional areas (to be identified). For the stream banks requiring aggressive remedial actions, EPA's

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cost estimate is based on 33.4 miles, 30-foot wide, at 2.3 cubic yards removed or remedied per linear foot (405,700 cubic yards). For the periodic removal of river bed sediments, EPA's cost estimate is based on 500,000 cubic yards removed during initial dredging and 200,000 cubic yards removed at 5, 10, 15, and 20 years (1.3 million cubic yards total). (Note: The ROD doubled these proposed removal volumes to one million cy during initial dredging and 400,000 cy for the five-year intervals, for a total of 2.6 million cy.)

- For the Lower Basin floodplain, reduce waterfowl exposure to lead and reduce human health concerns in wetlands (seven areas totaling 1,169 acres) and five lateral lakes by implementing a combination of removal, capping, and soil amendments.
- In the Spokane River, downstream of Coeur d'Alene Lake, reduce human health and ecological exposures at selected shoreline sediment depositional areas by implementing a combination of capping, removal, and performance monitoring, and remove contaminated sediments trapped behind the first downriver dam.
- Establish and implement a basin-wide monitoring program.

The total estimated cost for the remedial actions in the ROD is in the \$384 to 417 million range.

In August 2002, EPA committed the federal government to participate in a cross-governmental partnership with the purpose of implementing the ROD remedy. The partnership is called the Basin Environmental Project Improvement Commission and is made up of representatives from the State of Idaho, the State of Washington, the Coeur d'Alene Tribe, the federal government, and three Idaho counties.

In late 2002, the House Appropriations Committee approved \$850,000 for a two year National Academy of Sciences study to independently evaluate the Coeur d'Alene Basin Superfund site with regard to EPA's (1) scientific and technical practices in Superfund site definition, (2) human and ecological assessment, (3) remedial planning, and (4) decision making. EPA indicated no intention to delay cleanup work while the study is undertaken.

In a September 2003 U.S. District Court decision, two firms, Asarco, Inc. and Hecla Mining Co., were found liable for the costs incurred by the federal government in cleaning up mining wastes in Coeur d'Alene River Basin as well as being liable for natural resource damages. Asarco and Hecla had been owners and operators of mines, mills, and related facilities. A second trial is scheduled for the 2004-2005 time frame to determine the damages and response costs for which the two firms are liable.

Key Conditions:

dedicated landfill or CDF, dredging, extended (>1 mile) river, floodplains targeted, habitat/streambank restoration, more-harm-than-good, natural recovery, property

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access issues, wetlands

Estimated Target

Volume:

***Estimated Calendar Time
to Implement Remedy:***

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Site Name: *COMMENCEMENT BAY - PROJECT 1 (Hylebos Waterway)*

SiteID: 10-01

US EPA Region: X

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund. Final.

Contaminants of Concern: PCBs (1254, 1260); metals; PAHs

Overall Status Summary: The Commencement Bay Nearshore/Tideflats (CB/NT) site was placed on the NPL in 1983 and an RI/FS at the site was completed in 1988. The RI/FS identified types and levels of chemicals of concern in sediments and developed priority areas based on the potential impact of these chemicals on humans and wildlife. In 1989, EPA issued a ROD that designated two OUs: source control (OU-5) to focus efforts on controlling upland sources and discharges to the Bay and sediment remediation (OU-1) to focus on cleanup of contaminated sediments at the CB/NT. The Washington Department of Ecology is the lead agency for source control and EPA is the lead agency for sediment remediation.

In addition, the ROD selected the remedial actions to be used at eight of the nine contaminated sediment problem areas identified as being the most contaminated. These problem areas include: 1) Mouth of Hylebos Waterway, 2) Head of Hylebos Waterway, 3) Sitcum Waterway, 4) St. Paul Waterway, 5) Middle Waterway, 6) Mouth of Thea Foss Waterway, 7) Head of Thea Foss Waterway, and 8) Wheeler-Osgood Waterway. The ninth problem area, an area offshore from the Asarco Smelter, is to be addressed by a separate ROD. Problem areas (1) and (2) are this project, 10-01. Problem area (3) is in this Database as Project ID 10-05; problem area (5) is in this Database as Project ID 10-11; problem areas (6), (7), and (8) are Project ID 10-08; and the ninth problem area is Project ID 10-15.

EPA's 1989 ROD for the Site established cleanup levels, called Sediment Quality Objectives (SQOs), for several problem chemicals found to be causing adverse effects to human health and the environment. The SQO for PCBs was set at 150 parts per billion. The ROD required that the SQOs be met within ten years after completion of sediment remedial action. The ROD predicted that if sediments with PCB concentrations greater than a Sediment Remedial Action Level (SRAL) of 240-300 ppb PCBs were removed, the 150 ppb PCB SQO would be met in ten years through natural recovery processes.

During pre-design sampling, new data were collected from the Hylebos Waterway showing that approximately twice the amount of sediment originally estimated in the ROD would require cleanup. Further, EPA lowered the toxicity factor used to assess human cancer risks associated with PCBs. In response to concerns about

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these issues, EPA decided to reevaluate the PCB sediment cleanup level for the entire Site. The result is an ESD issued in 1997 in which EPA modified the PCB cleanup level for the entire Site to 450 ppb, to be achieved during cleanup, and 300 ppb, to be achieved within ten years after cleanup through natural recovery processes. (On March 17, 1999, environmental groups filed suit in U.S. District Court against EPA opposing this cleanup level modification; the lawsuit was withdrawn shortly after it was filed.)

Cleanup to 450 ppb is expected to result in a post-cleanup average PCB concentration of less than 150 ppb in all waterways at the Site. EPA estimates that the post-cleanup average PCB sediment concentration after cleanup to 450 ppb will be 75 ppb for the entire Site, 124 ppb for the Hylebos Waterway, and 108 ppb for the Thea Foss Waterway. PCB sediment concentrations are expected to be further reduced over time due to natural recovery processes to approximately 63 ppb for the entire Site, 80 ppb for the Hylebos Waterway, and 81 ppb for the Thea Foss Waterway.

In the 1997 ESD, EPA stated that the volume of sediments requiring remediation in problem areas at the Site is relatively insensitive to the PCB cleanup level, except in the Hylebos Waterway. Using the 1989 ROD SRAL of 300 ppb PCBs and an updated cost estimate, EPA had calculated a removal program for the Hylebos Waterway (with either confined aquatic or nearshore disposal) of 891,000 cy and \$31 million. Subsequently, with the ESD level of 450 ppb PCBs after cleanup and 300 ppb in ten years, the target for the Hylebos Waterway became 508,000 cy and \$18 million. The 508,000 cy were estimated to be made up of 247,000 cy of PCB-contaminated sediment and 261,000 cy of sediment contaminated with non-PCB contaminants.

As a result of ongoing pre-remedial design studies of the remaining waterways requiring remedial action (Hylebos, Middle, Thea Foss, and Wheeler-Osgood), USEPA, in November 1999, issued the draft of a second ESD. In general, this draft ESD contains changes to the remedial actions specified in the 1989 ROD regarding: 1) the size of the problem areas, estimated volume of sediments to be removed, and subsequent revised project costs, 2) institutional controls related to contaminated sediments contained onsite, 3) inclusion of enhanced natural recovery as a remedy option, and 4) additional specificity regarding the remedial actions for the Hylebos, Thea Foss, and Wheeler-Osgood Waterways.

Based on the pre-design studies, the proposed remediation of the Hylebos Waterway contemplates dredging 845,000 cy from 85.5 acres, capping 11.6 acres (representing 95,000 cy), and allowing natural recovery to remediate 20.7 acres (1999 ESD and 2000 ESD). Areas dredged will be dredged deep enough to expose clean sediments. Proposed removal thicknesses range from 2 to 20 feet, with an average of 6 feet. Disposal of about 640,000 cy of dredged material would

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be into one newly constructed nearshore confined disposal facility, Blair Slip 1, located at the mouth of the Blair Waterway, and the remainder would be at the Upland Regional Landfill. The cost of this remedy was estimated at \$39.1 million (1999 ESD) and now \$46.1 million (2000 ESD).

EPA also worked with the U.S. Army Corps of Engineers to determine whether the Superfund cleanup could be combined with maintenance dredging of the Hylebos Waterway navigation channel. This would obviously increase the volume of sediments needing dredging and increase the required disposal capacity. As explained by EPA in the 2000 ESD . . . "To pursue any Corps dredging project would require resolution of a number of issues that cannot be fully addressed at this time, including level of interest by private parties. For example, any navigation dredging would need to be initiated by a local sponsor and would require private parties to coordinate with the Corps to determine the precise dredging volume and subsequent cost sharing arrangements required for dredging and disposal. EPA encourages parties with an interest in additional dredging to work together to resolve these issues."

In addition to the pre-design investigations and cleanup planning, source control work has been ongoing. Twenty-nine active industrial facilities on the Hylebos Waterway have been required to take source control actions; all source control work was completed by the end of Summer of 2000.

Pre-design studies pursuant to an AOC, ongoing since 1993, determined that two areas of the Hylebos Waterway should be addressed separately because the materials present are different than the rest of the waterway sediments. In one area, a group of wood products companies (known as the "Wood Debris Group") are investigating the extent of wood debris in the turning basin at the head of Hylebos Waterway and are evaluating options for remediation of the wood debris. A Cleanup Plan was issued; this cleanup work is under state oversight.

In the second area, Occidental Chemical Corporation worked with EPA under a separate AOC to investigate the extent of and cleanup options for sludge-like material and a contaminated intertidal area at the mouth of the Hylebos Waterway. This area is referred to as the "Area 5106 and Embankment Study Area." Area 5106 comprises subtidal sediments contaminated with high levels of organics and is an area which extends about 100 feet into the waterway at low tide. The Embankment area which contains the sludge-like material extends from the waterway inland about 100 feet. Area 5106 will be removed, treated, and disposed of with other Hylebos sediments. The dredged sediments would be treated with slurry aeration before disposal. The treatment plant will be on property owned by Occidental. The treated material is intended to be trucked to the Blair Slip 1 confined disposal facility for disposal. For the embankment area, a trial cap (and later final cap) will be placed on the bank of the former Occidental facility

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(now Pioneer) and the adjacent former PRI property (now owned by Occidental). Once placed, the trial cap will be monitored for one year. It has been decided that placement of a final cap must wait for removal of both Area 5106 materials and the adjacent Hylebos remedial action for sediments.

Two PRPs, General Metals and Atofina Chemicals, agreed to conduct a pilot project at the head of the waterway to collect information on how best to implement the upland disposal option selected in the 2000 ESD. Field work was performed over a one week period in December 2001. The one week effort involved dredging a total of 450 cy from three locations to test the logistics of dredging, off-loading, and transporting sediment to an upland landfill.

Dredging of Area 5106 took place between October 2002 and March 2003. A total of 36,000 cy was hydraulically dredged and piped to a new treatment plant on Occidental property. Primary contaminants were VOCs and SVOCs. The sediments were treated by slurry aeration and then dewatered; dewatered sediment was hauled by truck to the Blair Slip 1 confined disposal facility for disposal. Some heavily contaminated native sediment remained undredged in the waterway, as revealed by post-dredging sampling. As a result, Occidental is evaluating additional remedial measures.

In a separate remedial measure, Occidental plans to install a test cap along 200 feet of shoreline and monitor it for one year. Construction is expected sometime between August 2003 and February 2004. If the test cap proves acceptable, the cap will be extended along 1,700 feet of embankment. The cap is needed because steep slopes, docks, and utility lines make removing and replacing sediments impractical.

In 2002, EPA issued a UAO under CERCLA to General Metals and Atofina Chemicals to perform the cleanup at the Head of Hylebos Waterway. Dredged material will be off-loaded at the Atofina property and will be transported by rail to the Roosevelt Regional Landfill, a permitted Subtitle D solid waste landfill. About 200,000 cy are targeted for removal. In preparation for the dredging, General Metals and Atofina completed cleanup of an intertidal area at the Head of Hylebos. This effort included shoreline cleanup (done during low tides using shore-based equipment) and in-water demolition.

Also in 2002, EPA issued a UAO under CERCLA to the Port of Tacoma and Occidental Chemical to perform the cleanup at the Mouth of Hylebos Waterway. Several areas have been targeted, to be dredged in sequence. To prepare the first area for dredging, north of the 11th Street Bridge, the Port of Tacoma and Occidental accomplished the following:

- Removed two piers, including 3,500 piles taken either to a landfill or a recycling

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facility;

- Placed clean fill material behind a berm in Blair Silo 5 to prepare the area for new habitat to offset loss of habitat caused by filling Blair Slip 1; and
- Built a berm at the opening of Blair Slip 1 to receive contaminated sediments in 2003, by removing 63,900 cy of sediment from the opening of Blair Slip 1 and replacing it with clean gravel and sand.

The dredging north of the 11th Street Bridge (Mouth of Hylebos) commenced in 2003. The total sediment to be removed is estimated at 489,000 cy. Dredged sediments are being disposed in the Blair Slip 1 confined disposal facility.

Dredging southeast of the 11th Street Bridge (Head of Hybelos) is scheduled to begin in mid-2004. About 400,000 cy of sediment at an estimated cost of \$37 million are targeted for removal and 2,000 linear feet of bank will be capped. Removed sediment is expected to be disposed in Roosevelt Regional Landfill. Completion is anticipated by February 2005.

Key Conditions:

capping, confined disposal facility, dredging, natural recovery, navigational dredging component, pilot/demonstration test, rail transport for disposal, tidal fluctuations

Estimated Target Volume:

Removal : 845,000 cy (85 acres); removal or capping 95,000 cy (11 acres); natural recovery for 20 acres.

Estimated Calendar Time to Implement Remedy:

undefined; start in year 2001, earliest

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Site Name: *COMMENCEMENT BAY - PROJECT 2 (Sitcum Waterway)*

SiteID: 10-05

US EPA Region: X

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Superfund. Final.

Contaminants of Concern: Metals, PAHs

Overall Status Summary: The Commencement Bay Nearshore/Tideflats (CB/NT) was placed on the NPL in 1983 and an RI/FS at the site was completed in 1988. The RI/FS identified types and levels of chemicals of concern in sediments and developed priority areas based on the potential impact of these chemicals on humans and wildlife. In 1989, EPA issued a ROD that designated two OUs: source control (OU-5) to focus efforts on controlling upland sources and discharges to the Bay and sediment remediation (OU-1) to focus on cleanup of contaminated sediments at the CB/NT.

In addition, the ROD selected the remedial actions to be used at eight of the nine contaminated sediment problem areas identified as being the most contaminated. These problem areas include: 1) Mouth of Hylebos Waterway, 2) Head of Hylebos Waterway, 3) Sitcum Waterway, 4) St. Paul Waterway, 5) Middle Waterway, 6) Mouth of Thea Foss Waterway, 7) Head of Thea Foss Waterway, and 8) Wheeler-Osgood Waterway. The ninth problem area, an area offshore from the Asarco Smelter, is to be addressed by a separate ROD.

The Sitcum Waterway is located between the Blair Waterway and the Milwaukee Waterway, in the Commencement Bay Superfund Site. In 1990, the Port of Tacoma developed long-discussed plans to partially fill and pave over the Milwaukee Waterway to expand marine container terminal facilities. EPA suggested the Port combine the Sitcum cleanup and Milwaukee development in order to expedite and increase the overall cost-effectiveness of both projects, and to address the limited availability of disposal sites. An AOC between EPA and the Port of Tacoma became effective in 1991, providing for the Port to evaluate remedial options. A Consent Decree was agreed to in 1993 settling major elements of the Sitcum Waterway cleanup and providing for implementation of the cleanup and payment, by the Port of Tacoma, of \$12 million for natural resource damage claims.

The combined navigational and cleanup dredging project was implemented from Oct. 1993 through Sep. 1994. A total of 2.83 million cy were dredged and moved to the abandoned Milwaukee Waterway. The total included 2.4 million cy of clean sediments from the Blair Waterway and 425,000 cy of potentially contaminated sediments from the Sitcum Waterway. Only about 30% of the sediments from the

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Sitcum Waterway proved to be contaminated. The Milwaukee Waterway was bermed at its mouth, with a weir and overflow pipe (to the Bay) installed. After placement of the dredged material, and a multi-year period of settling, the filled waterway was paved over.

Key Conditions:

confined disposal facility, dredging, fish spawning limitations, navigational dredging component, tidal fluctuations

Estimated Target

366,000 cy of sediments from Sitcum Waterway

Volume:

***Estimated Calendar Time
to Implement Remedy:***

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Site Name: *COMMENCEMENT BAY - PROJECT 3 (Thea Foss Waterway)*

SiteID: 10-08

US EPA Region: X

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund. Final

Contaminants of Concern: PAHs; bis (2-ethylhexyl) phthalate (BEP)

Overall Status Summary: The Commencement Bay Nearshore/Tideflats (CB/NT) site was placed on the NPL in 1983 and an RI/FS at the site was completed in 1988. The RI/FS identified types and levels of chemicals of concern in sediments and developed priority areas based on the potential impact of these chemicals on humans and wildlife. In 1989, EPA issued a ROD that designated two OUs: source control (OU-5) to focus efforts on controlling upland sources and discharges to the Bay and sediment remediation (OU-1) to focus on cleanup of contaminated sediments at the CB/NT. The Washington Department of Ecology is the lead agency for source control and EPA is the lead agency for sediment remediation.

In addition, the ROD selected the remedial actions to be used at eight of the nine contaminated sediment problem areas identified as being the most contaminated. These problem areas include: 1) Mouth of Hylebos Waterway, 2) Head of Hylebos Waterway, 3) Sitcum Waterway, 4) St. Paul Waterway, 5) Middle Waterway, 6) Mouth of Thea Foss Waterway, 7) Head of Thea Foss Waterway, and 8) Wheeler-Osgood Waterway. The ninth problem area, an area offshore from the Asarco Smelter, is to be addressed by a separate ROD. Problem areas (6), (7), and (8) are this project, 10-08. Problem areas (1) and (2) are in this Database as Project ID 10-01; problem area (3) is in this Database as Project ID 10-05; problem area (5) is Project ID 10-11; and the ninth problem area is Project ID 10-15.

EPA's 1989 ROD for the Site established cleanup levels, called Sediment Quality Objectives (SQOs), for several problem chemicals found to be causing adverse effects to human health and the environment. The SQO for PCBs was set at 150 parts per billion. The ROD required that the SQOs be met within ten years after completion of sediment remedial action. The ROD predicted that if sediments with PCB concentrations greater than a Sediment Remedial Action Level (SRAL) of 240-300 ppb were removed, the 150 ppb PCB SQO would be met in ten years through natural recovery processes. In the 1989 ROD, the volume targeted for remediation in the Thea Foss and Wheeler-Osgood Waterways was 437,000 cy at an estimated cost of \$9.1 million. During pre-design sampling, new data were collected from the Hylebos Waterway showing that approximately twice the amount of sediment originally estimated in the 1989 ROD would require cleanup. Further, EPA lowered the toxicity factor used to assess human cancer risks associated with

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PCBs. In response to concerns about these issues, EPA decided to reevaluate the PCB sediment cleanup level for the entire Commencement Bay Site. The result is an ESD issued in 1997 in which EPA modified the PCB cleanup level for the entire Site to 450 ppb, to be achieved during cleanup, and 300 ppb, to be achieved within ten years after cleanup through natural recovery processes. (On March 17, 1999, environmental groups filed suit in U.S. District Court against EPA opposing this cleanup level modification; the lawsuit was withdrawn shortly after it was filed). In the 1997 ESD, EPA stated that the volume of sediments requiring remediation in problem areas at the Site are relatively insensitive to the PCB cleanup level, except in the Hylebos Waterway.

Cleanup to 450 ppb is expected to result in a post-cleanup average PCB concentration of less than 150 ppb in all waterways at the Site. EPA estimates that the post-cleanup average PCB sediment concentration after cleanup to 450 ppb will be 74 ppb for the entire Site, 124 ppb for the Hylebos Waterway, and 108 ppb for the Thea Foss Waterway. PCB sediment concentrations are expected to be further reduced over time due to natural recovery processes to approximately 63 ppb for the entire Site, 80 ppb for the Hylebos Waterway, and 81 ppb for the Thea Foss Waterway.

As a result of ongoing pre-remedial design studies of the remaining waterways requiring remedial action (Hylebos, Middle, Thea Foss, and Wheeler-Osgood), USEPA, in November 1999, issued the draft of a second ESD. In general, this draft ESD contains changes to the remedial actions specified in the 1989 ROD regarding: 1) the size of the problem areas, estimated volume of sediments to be removed, and subsequent revised project costs, 2) institutional controls related to contaminated sediments contained onsite, 3) inclusion of enhanced natural recovery as a remedy option, and 4) additional specificity regarding the remedial actions for the Hylebos, Thea Foss, and Wheeler-Osgood Waterways.

In March 1994, the City of Tacoma entered into an Administrative Order on Consent with EPA to carry-out the design of the remedial action for the Thea Foss and the Wheeler-Osgood waterways. The City subsequently analyzed previous data, conducted additional studies regarding the nature and extent of contamination in the waterways, and prepared a pre-design evaluation. The studies and evaluations included three rounds of sampling, a feasibility study to evaluate cleanup actions for NAPL seeps located at the head of the Thea Foss Waterway, an evaluation of potential disposal sites for dredged contaminated sediments, and an evaluation of the potential for sediment recontamination after cleanup. As a result of this work, areas within the Thea Foss and Wheeler-Osgood Waterways requiring remediation were identified, and designated by seven Superfund Sediment Management Areas (SSMAs).

The proposed remediation of the seven SSMAs would result in a dredging volume

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of about 620,000 cy and capping volumes in the range of 255,000 to 257,000 cy (1999 ESD). Cap thickness would be a minimum of three feet. The remedial action would result in the complete dredging of approximately 24 acres; dredging and/or capping of approximately 33 acres; natural recovery (including enhanced natural recovery for 4 acres) of approximately 25 acres; and no action for 37 acres. Complete removal of contaminated sediments will occur in a substantial portion of the navigation channel. The cost of this remedy, including disposal of contaminated sediments at the St. Paul Nearshore Fill (to be built as part of the remedy), was estimated at \$35 million (1999 ESD).

In May 2002, the design contractor submitted the final design for remediation to the City of Tacoma Dept. of Public Works and the USEPA, for approval. The quantities in the final design changed (from those proposed in the Explanation of Significant Differences) and included dredging of about 525,000 cy of contaminated sediments, capping about 20 acres of sediments in place, constructing new slopes and erosion protections along 10,000 feet of shoreline, and installing 400 feet of permanent sheetpile bulkhead.

Source control at the Thea Foss Waterway has been difficult since it has three segments, each with its own unique aspects. Source control was completed first for two of the three segments, the Mouth of Thea Foss Waterway (in 1997) and the Wheeler-Osgood Waterway (in 2000). Controlling contaminant sources to the third segment, the Head of the Thea Foss Waterway, proved especially difficult because it is a fairly small area which receives stormwater drainage from a large upland area, and many are older industrial sources. Oil seeps had been found in sediments at the Head of Thea Foss Waterway. In order to control these seeps, they were covered with an absorbent material as part of the clean material cap. In addition, a metal sheetpile wall will be placed at the head of the waterway across its entire width to contain the oil and eliminate its migration to the remainder of the waterway.

In 2003, two consent decrees were lodged in federal district court prescribing performance of the cleanup work by the City of Tacoma, Puget Sound Energy, Advance Ross Sub Company, and Pacificorp, while designating 77 other parties that would pay money to help fund the work. Under the consent decree, the City of Tacoma will clean up 80 percent of the waterway, starting near the SR 509 Bridge down to the mouth of the waterway and including the Wheeler-Osgood Waterway. Puget Sound Energy, Advance Ross Sub Company, and Pacificorp will clean up the other 20 percent of the waterway, an area extending south of the SR 509 Bridge to the head of the waterway.

In early 2003, the City of Tacoma completed six initial projects in preparation for the dredging project -- work that had to be completed by February 15 to avoid the "fish window" for salmon and other migratory fish. The six projects included (1)

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pulling and disposing of 460 pilings; (2) stabilizing shoreline with steel sheetpile; (3) removing slag piles and debris from two wharf areas, and capping with sand and rocks; (4) removing two sunken boats and debris from the waterway banks; (5) excavating debris from along a bank and placement of a cap and grout blanket; and (6) capping another sloped bank along the waterway.

For the remainder of the 2003 construction season, the City of Tacoma has implemented other preparatory projects including removal and disposal of additional pilings; dismantling a marina; and building a new marina to hold boats moved temporarily during dredging. Contractors for the City of Tacoma are also preparing the disposal site in the St. Paul Waterway, where the dredged sediments will be confined. Clean sediments that will be removed from the St. Paul Waterway will be placed on the Puyallup Delta to build up the Delta as a benefit to salmon.

The City of Tacoma portion of the project is expected to include dredging of 525,000 cy, placement of about 210,000 tons of capping material, and habitat mitigation at multiple locations. Dredging is expected to start in 2004 and be completed in 2006. Estimated cost is \$88 million. Dredged material will be disposed into the St. Paul Waterway CDF.

At the Head of the Thea Foss Waterway, Puget Sound Energy, Advance Ross Sub Company, and Pacificorp completed plans to dredge about 7,500 cy of sediments near outfalls, cap the head of the waterway area, and build a submerged barrier wall across the waterway just north of the SR 509 Bridge. Demolition and debris removal preceded dredging and capping. Dredging and capping began in September and completion is expected in February 2004. Habitat restoration along the banks will be placed over an oily seep area near the SR 509 Bridge. The cap for one underwater area will be made of thick plastic, with a 3-to-6-foot sand cap; the cap for the remainder of the area will be a continuous clean layer of soil.

Key Conditions:

capping; confined disposal facility; dredging; fish spawning limitations; floating oil; natural recovery; navigational dredging component; tidal fluctuations

Estimated Target Volume:

Removal: 620,000 cy (24 acres); capping 256,000 cy (33 acres); enhanced natural recovery (thin-cap) for 4 acres; natural recovery for 21 acres.

Estimated Calendar Time to Implement Remedy:

Not identified

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Site Name: *COMMENCEMENT BAY - PROJECT 4 (Middle Waterway)*

SiteID: 10-11

US EPA Region: X

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund. Final

Contaminants of Concern: metals (mercury, copper); PAHs

Overall Status Summary: The Commencement Bay Nearshore/Tideflats (CB/NT) site was placed on the NPL in 1983 and an RI/FS at the site was completed in 1988. The RI/FS identified types and levels of chemicals of concern in sediments and developed priority areas based on the potential impact of these chemicals on humans and wildlife. In 1989, EPA issued a ROD that designated two OUs; source control (OU-5) to focus efforts on controlling upland sources and discharges to the Bay and sediment remediation (OU-1) to focus on cleanup of contaminated sediments at the CB/NT. The Washington Dept. of Ecology is the lead agency for source control and EPA is the lead agency for sediment remediation.

In addition, the ROD selected the remedial actions to be used at eight of the nine contaminated sediment problem areas identified as being the most contaminated. These problem areas include: 1) Mouth of Hylebos Waterway, 2) Head of Hylebos Waterway, 3) Sitcum Waterway, 4) St. Paul Waterway, 5) Middle Waterway, 6) Mouth of Thea Foss Waterway, 7) Head of Thea Foss Waterway, and 8) Wheeler-Osgood Waterway. The ninth problem area, an area offshore from the Asarco Smelter, is to be addressed by a separate ROD. Problem area (5) is this project, 10-11. Problem areas (1) and (2) are in this Database as Project ID 10-01; problem area (3) is in this Database as Project ID 10-05; problem areas (6), (7), and (8) are Project ID 10-08; and the ninth problem area is Project ID 10-15.

In EPA's August 2000 ESD, EPA selected Blair Slip 1, the St. Paul Nearshore Fill, and disposal at an existing upland regional landfill as approved disposal sites to contain contaminated sediments dredged from Hylebos, Thea Foss, Wheeler-Osgood, and Middle Waterways. Subsequently, the Middle Waterway Action Committee signed an agreement with the Port of Tacoma to use the Blair Slip 1 nearshore fill for disposal of contaminated sediments from Middle Waterway. Mitigation measures required for disposal in Blair Slip 1 are being addressed by the Port of Tacoma as part of the Hylebos Water cleanup (Project ID 10-01).

Source control associated with adjacent industries and sources has been completed for the Middle Waterway as of the end of 2000.

The total area of the Middle Waterway is approximately 49 acres. For purposes of

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remedial evaluation, 67 discrete areas (Sediment Management Units) have been designated in the Middle Waterway. As proposed in the 2001 ESD, which was a draft cleanup plan, about 10 acres would be dredged yielding an approximate disposal volume of 92,700 cubic yards, 1.5 acres would be dredged and backfilled, 0.24 acres would be capped, and 4 acres would be monitored for natural recovery and enhanced natural recovery. The estimated cost of this remedy, assuming disposal of dredged sediments at the Blair Slip 1 disposal site, is \$12.5 million. After a public comment period which ended October 9, 2001, the proposed cleanup plan was made official by issuance of an ESD in February 2002.

On August 14, 2003 two consent decrees were lodged in federal district court, defining the cleanup work to be performed in Middle Waterway. It was agreed that the Middle Waterway Action Committee (MWAC) would clean up both the mouth and middle portions of the waterway (estimated removal of 90,000 cy) and the Washington Department of Natural Resources with other parties would conduct a separate removal of 2,700 cy at the head of the waterway, in Sediment Management Unit 51a.

Dredging in the mouth and middle portions of the waterway began in mid-August 2003 along with other cleanup work including piling removal and capping and was completed in early 2004. A total of 107,700 cy was removed, primarily by mechanical dredging. The dredged sediments were disposed in Blair Slip 1.

Preparatory work at the head of the waterway has included removal of two derelict barges to improve habitat conditions. Design documents for removal of a now-estimated 4,000 cy of sediments are being prepared. This work is scheduled to begin in August 2004.

Key Conditions:

capping, confined disposal facility, dredging, natural recovery, tidal fluctuations

Estimated Target Volume:

Removal: 92,700 cy from ten acres; capping: 0.24 acres; natural recovery for 4 acres

Estimated Calendar Time to Implement Remedy:

undefined

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: **COMMENCEMENT BAY - PROJECT 5 (Asarco)**

SiteID: 10-15

US EPA Region: X

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund. Final.

Contaminants of Concern: arsenic, copper, lead, zinc

Overall Status Summary: The Commencement Bay Nearshore/Tideflats (CB/NT) site was placed on the NPL in 1983 and an RI/FS at the site was completed in 1988. The RI/FS identified types and levels of chemicals of concern in sediments and developed priority areas based on the potential impact of these chemicals on humans and wildlife. In 1989, EPA issued a ROD that designated two OUs: source control (OU-5) to focus efforts on controlling upland sources and discharges to the Bay and sediment remediation (OU-1) to focus on cleanup of contaminated sediments at the CB/NT. The Washington Department of Ecology is the lead agency for source control and EPA is the lead agency for sediment remediation.

In addition, the ROD selected the remedial actions to be used at eight of the nine contaminated sediment problem areas identified as being the most contaminated. These problem areas include: (1) Mouth of Hylebos Waterway, (2) Head of Hylebos Waterway, (3) Sitcum Waterway, (4) St. Paul Waterway, (5) Middle Waterway, (6) Mouth of Thea Foss Waterway, (7) Head of Thea Foss Waterway, and (8) Wheeler-Osgood Waterway. The ninth problem area, an area offshore from the Asarco Smelter, is addressed by a separate ROD and is the subject of this Overall Status Summary. Problem areas (1) and (2) are in this Database as Project ID 10-01; problem area (3) is in this Database as Project ID 10-05; problem area (5) is Project ID 10-11; and problem areas (6), (7), and (8) are Project ID 10-08.

The remainder of this Overall Status Summary comprises descriptive text quoted from the 2000 ROD for OU-6 (Reference A-877) for the ninth problem area. The paragraphs of quoted descriptive text are assembled to provide an Overall Status Summary narrative, but do not appear consecutively or necessarily in the same sequence in the ROD.

“From 1890 through 1912, the Facility was a lead smelter and refinery. Asarco, Inc., purchased the property in 1905. By-products of the smelting operations were refined to produce other marketable products, such as arsenic, sulfuric acid, and liquid sulfur dioxide. Asarco ended operations at the Facility in 1986.”

“The site is located on the northeast side of the Point Defiance Peninsula and borders Commencement Bay. The general area consists of steep slopes extending

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

down to Commencement Bay producing bluffs along portions of the shoreline.”

“The onshore portion of the Facility is approximately 67 acres in size. In addition, approximately 30 acres of offshore intertidal and subtidal lands are under Asarco ownership. The State of Washington also owns a portion of the offshore lands within OU-06. State-owned aquatic lands are managed by the Washington State Department of Natural Resources.”

“Surface water features within the Facility boundaries include springs and seeps which emanate from the face of the shoreline bluff from shallow groundwater bearing strata, and impoundments in drainage bottoms south and west of the main plant complex. Elevation across the Facility ranges from sea level to as high as 250 feet above mean sea level. Steep drainages are located in the vicinity of railroad tracks that cross the Facility in an east-west direction. There are areas of dense vegetation, primarily on steep drainage slopes and along the bluff slope above Commencement Bay.”

“Much of the Facility was constructed on slag fill, a waste byproduct of smelting arsenic- and lead-bearing ores. The slag fill was used to modify and extend the pre-existing shoreline by approximately 500 feet into Commencement Bay. In addition, the Breakwater Peninsula is composed of slag. The slag beneath the Breakwater Peninsula is up to 125 feet thick.”

“Since 1987, Asarco has completed two phases of demolition activities at the Facility. Structures in the stack area associated with copper smelting and the production of both arsenic trioxide and metallic arsenic were demolished in 1987 and 1988. The majority of the remaining buildings and structures, including the smelter stack, were demolished during the period of 1992 to 1994. Much of the Facility (where historical manufacturing processes were located) has been leveled and, to some extent, graded. Remedial actions required by the OU-02 ROD (for the upland portion of the facility) began in 1999 when construction of the On-Site Containment Facility began. The remaining remedial action required for OU-02 and OU-06 (groundwater/sediments) will extend through 2005.”

“EPA identified the Selected Remedy for OU-02 in a 1995 ROD (EPA, March 1995). Remediation of OU-02 . . . will be essential to the successful cleanup and long-term protection of groundwater and marine sediments included in OU-06. For example, OU-02 contaminants leaching to underlying groundwater in OU-06 are transported by prevailing groundwater flow to Commencement Bay where they are discharged and threaten marine water and sediments. Similarly, erosion and transport of slag particles from the nearshore areas of OU-02 into Commencement Bay result in deposition of these materials onto, and eventual mixing with, existing sediments.”

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

“In 1996, EPA formed the Asarco Sediments Groundwater Task Force (Task Force) to address the relationship between groundwater and sediment contamination. The Task Force addressed two questions:

1. “Does groundwater that is discharging from the Facility negatively impact the marine sediments and waters of Commencement Bay?”
2. “Would a sediment cap remain stable (e.g., stay in place) in the presence of strong currents in this part of Commencement Bay?”

“The first question was addressed by the Task Force. The Task Force evaluated the impacts of discharging groundwater on the marine sediments and waters of Commencement Bay. The second question was addressed by the placement and monitoring of a pilot-scale sediment cap to determine how well the test cap would physically remain in place over a 2-year period (Parametrix, February 2000). The pilot-scale cap was constructed offshore of the Facility, immediately northeast of the Fine Ore Bins building. The purpose of the cap was to determine the physical, chemical, and biological characteristics of two sediment plots, one with a thickness of 30 centimeters and the other with a thickness of 60 centimeters.”

“The Selected Remedy for marine sediments includes the following elements:

- Dredge contaminated sediment in the Yacht Basin and place the dredged sediment beneath a low-permeability soil cap to be constructed on the upland portion of the Facility (i.e., OU-02). The sediments will be contained under the low-permeability cap at an elevation such that groundwater will not come in contact with the sediment.
- Monitor the dredged area in the Yacht Basin to verify that it does not become recontaminated.
- Cap contaminated sediments in selected offshore areas.
- Monitor the sediment caps to confirm that they remain in place, continue to isolate the underlying contaminated sediment, become recolonized with healthy biological communities, and do not become recontaminated.
- Use institutional controls to prevent activities that could damage the sediment caps.
- Monitor the areas outside the capped and dredged areas to confirm that these areas meet RAOs.”

“No remedial action is planned for sediments offshore of the Breakwater Peninsula

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

area (approximately 85,000 square yards or 17.5 acres). Sediments within this area are within the Contaminant Effects Area. However, no remedial action is planned because of inherent engineering/construction impracticability associated with this area. The presence of steep slopes (as much as 50 percent slope) make capping or dredging infeasible. Further, the stability of a cap on such a steep slope is questionable. In addition, dredging is not possible because the entire Breakwater Peninsula would need to be removed since it is constructed entirely of slag (up to 125 feet thick).”

“An area approximately 75,000 square yards (15.5 acres) will be dredged in the Yacht Basin because it was determined to be a severely impacted area. It is estimated that approximately 1 to 2 feet of material (up to 50,000 cubic yards) will require removal. The exact depth of dredging will be based upon information obtained from core samples that are collected during the summer of 2000. Post-dredging confirmatory sampling will also be required . . .”

“The dewatered sediments are currently scheduled to be placed beneath the upland low-permeability cap no later than November 30, 2004 as stipulated by “Amendment Number One” to the Asarco Smelter Consent Decree (Lodged in the District Court of Washington, June 2000) and “Modification Agreement” signed by EPA and Asarco (EPA, November 1999).”

“Capping is the Selected Remedy for the Nearshore/Offshore and Northshore areas. Capping is the Selected Remedy because it will isolate contaminated materials from the benthic organisms. Capping is the most practicable solution given the constraints associated with the depth of sediment contamination and the character of the subtidal slopes. Approximately 88,000 square yards (18 acres) of existing contaminated sediments within the severely impacted portion of the Nearshore/Offshore area (including the sediment under and adjacent to the existing piers) will be capped with a minimum of 3 feet of clean sediment. Approximately 7,000 square yards (1.5 acres) of the severely impacted portion of the Northshore area will also be capped with a minimum of 3 feet of clean sediment . . . The borrow source(s) for the cap material will be determined during remedial design and will originate from either a marine (in-water) or upland source.”

Key Conditions:

capping, dedicated landfill or CDF, dredging, natural recovery, post monitoring, tidal fluctuations

Estimated Target Volume:

Up to 50,000 cy targeted for dredging from 15.5 acres in the Yacht Basin; 19.5 acres of contaminated sediments targeted for capping with three feet of clean material.

Estimated Calendar Time to Implement Remedy:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: CONVAIR LAGOON

SiteID: 09-03

US EPA Region: IX

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Cleanup and Abatement Order with the San Diego Regional Water Quality Control Board.

Contaminants of Concern: PCBs

Overall Status Summary: A 5.7-acre target area contaminated with PCBs was capped in Convair Lagoon (North San Diego Bay). Convair Lagoon is a 10-acre embayment with water depths ranging from 10-18 feet. The highest PCB levels in sediment were found at depth. PCB levels range from ND to 1600 ppm in the first three feet of sediment, with a median of 54 ppm (118 samples). The cap, in ascending sequence, consisted of geogrid, then one foot of crushed rock, then two feet of sand. Eelgrass was planted at the surface. The outer boundary of the cap was defined by the 4.6 ppm PCB line. Along this boundary a submerged rock berm was constructed. The purpose of the rock berm was to provide stability during placement, as well as subsequent to placement of the cap. Outside of the berm, a 50-foot width of sand was placed, 3-feet thick tapering out to zero. The outer sand layer was placed at the request of the US EPA in response to the presence of PCB levels < 4.6 ppm but > 1 ppm.

A substantial amount of submerged debris had to be removed prior to cap placement. Cap placement was completed in mid-1998. Total cost was about \$2.5 to 3 million dollars. Long-term monitoring is now in progress and consists of visual inspections by divers, cap thickness measurements through 30 probe locations, and cap coring and analysis for PCBs at three locations.

Key Conditions: capping, post monitoring

Estimated Target Volume: 22,000 cy (if removal were to be done)

Estimated Calendar Time to Implement Remedy:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: CROTTY STREET CHANNEL

SiteID: 05-32

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Voluntary Agreement. Final

Contaminants of Concern: PCBs

Overall Status Summary: The Crotty Street Channel target area is 950 ft. long by 105 ft. wide (about 2.3 acres). The channel lies adjacent to the General Motors Power Train (GMPT) facility in Bay City, Michigan and flows into the Saginaw River. Surface concentrations of PCBs range from 3 to 280 ppm, while concentrations at depth range up to 11,000 ppm.

The proposed remedial measure for the Crotty Street Channel (CSC) includes installation of a sheetpile wall across the mouth of the channel, down the west side of the channel, turning east at the south end of the channel, and connecting to an existing deep soil mixing wall around the machine storage area. As a result, the sheetpile wall identified in the GMPT Plant onsite RAP will not be installed along the east side of the CSC. The sheetpile wall for the GMPT Plant onsite RAP will extend across the north side of the lagoon area and machine storage area and then tie into the sheetpile wall across the mouth of the CSC. Two stormwater discharges to the CSC will be permanently abandoned. The channel will be dewatered, the sediment will be stabilized in-situ using lime, fly ash, or other suitable material, groundwater collection sumps will be installed, and the channel will be backfilled with fill material (stockpiled soil) from the Bay City Belinda Street stockpile. Surface water removed from the channel prior to backfilling will be treated at the GMPT onsite treatment plant and will be discharged to Bay City or to the river in accordance with applicable requirements. Final handling and permitting requirements of the treated water discharge will be determined during the final design stage. An engineered cap will be placed over the area of the channel and will consist of the following layers, from bottom to top: a) grading layer, b) 6-inch sand bedding layer, c) 40-mil HDPE liner, d) Geonet layer, e) filter fabric, f) 12-inch soil layer, and g) 6-inch layer of top soil, vegetated. The cap will be graded to direct stormwater runoff into the MSA stormwater collection system.

In Fall 1999, the remedy was implemented. Sheetpile was installed and the water was removed from the CSC. The removed water was treated at the GMPT onsite water treatment plant for use in the production facility or for discharge to the Saginaw River under an NPDES permit. Sediments were then stabilized and covered with soil (from Bay City) and sand. Remedial operations ceased for the winter to allow the installed cap materials to settle and stabilize. When weather

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

permits, the in-place cap materials will be regraded and the remaining cap components installed. Anticipated completion is Spring 2000. GM has accepted responsibility for long-term monitoring and maintenance of the containment structure.

Key Conditions:

capping, post monitoring

Estimated Target

At least 22,000 cy (950 ft. x 105 ft. x 6 ft. deep)

Volume:

***Estimated Calendar Time
to Implement Remedy:***

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: CUMBERLAND BAY

SiteID: 02-03

US EPA Region: II

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: NYS Hazardous Waste Site. Final. State Fund-Lead.

Contaminants of Concern: PCBs (1242); also present below action levels are phthalates, PAHs, PCDDs and PCDFs.

Overall Status Summary: In November 1994, the NYSDEC added the site to its Registry of Inactive Hazardous Waste sites making the site eligible for NY State funding. A Site Characterization and Feasibility Study was completed in March 1996 under the NYSDEC Superfund Standby Program. A NYS ROD was then issued in December 1997. The target was a 34-acre sludge bed in the bay that was found to contain PCB-contaminated wood pulp and wood chips. The bed was initially estimated to contain 93,000 cy of material. The remedy selected by the NYSDEC included: 1) isolating the sludge bed with temporary sheet piling and silt curtains, 2) removing the sludge bed to the underlying sand layer by a combination of hydraulic dredging and dewatering/dry excavation, 3) land-based dewatering and water treatment, and 4) disposal of dewatered sediment at commercial landfills. The remedy was estimated to cost \$18.3 million (present worth) and take two years to complete. Georgia-Pacific agreed to a cash settlement of \$9 million. The \$18.3 million is based on disposal of 90% of the dewatered sludge as non-TSCA (<50 ppm) waste.

An IRM consisting of removing PCB-contaminated wood chips from bay beaches had been implemented periodically since 1995, with 220 tons removed in 1995 and 1996.

Citizen concerns and high water levels in 1998, among other factors, pushed remediation into 1999. Seven bids were received in December 1998, ranging from \$23.2 to \$35.4 million. The low bidder was Severson Environmental Services. The NYSDEC issued a contract to Severson in March 1999 and site preparation activities began in April 1999.

Also in April 1999, the NYSDEC collected yellow perch for PCB analysis near Wilcox Dock. Eleven samples were collected. PCB concentrations ranged from non-detect (at a detection limit of 0.05 ppm) to 5.6 ppm and averaged 0.96 ppm. These levels are lower than for yellow perch collected from Cumberland Bay in 1994. In the 1994 sampling event, 20 yellow perch had PCB concentrations ranging from 1.37 ppm to 18 ppm and averaged 5.4 ppm.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Dredging began July 12, 1999, following the installation of sediment handling and wastewater treatment systems. Disposal of dewatered sludge was to TSCA and non-TSCA landfills in Model City, NY and BFI (Quebec, Canada), respectively. In-water dredging was stopped in early December 1999. In-situ volume removed was between 141,000 and 151,000 cy using two horizontal auger dredges simultaneously. Removal was at 3.5% solids. Project cost for 1999 was estimated at \$28 million. After the first month of dredging, the contractor shifted to a 24-hour per day, five-day per week schedule, plus one shift on Saturday. This resulted in 20-22 hours during week days (and 2-4 hours for maintenance) and 10 hours on Saturday being available for dredging.

The removal contractor originally anticipated project completion by the end of December 1999. Preliminary findings from bottom surveys following 1999 dredging indicated that the bottom was generally clean of wood pulp and chips. However, core samples and diver inspections performed in November 1999 showed areas where: 1) wind rowing of sludge had occurred; 2) the dredge head had bridged, leaving sludge in bottom valleys; and 3) a thin hard pan (~4 inches thick) covered sludge layers of up to 4 feet thick. As a result of these findings, further dredging was scheduled for 2000. Prior to the start of dredging in Spring 2000, additional sampling was performed. Unconsolidated material 1 to 3 feet thick and consolidated material up to 7 inches thick were identified and located across the dredge area. Additionally, consolidated material up to 6 feet thick was identified in Bay bottom depressions inaccessible to the dredge (these materials were targeted for removal by divers using hand-held suction lines).

Remobilization of equipment began in April 2000 and hydraulic dredging began in early May. The NYSDEC originally anticipated that dredging would be completed by the end of July; it continued however, into October. Hydraulic dredging was used to remove localized areas of sludge until about mid-September; diver assisted removal was then used until the removal operation was stopped on October 5. Dredging was performed 24 hours per day, 5 days per week until the end of July when operations were scaled back to 10-12 hours per day. As operations were systematically scaled back over the final two months of the project, excess equipment was moved by Severson to the Fox River SMU 56/57 project.

The estimated total volume of sludge bed material removed was approximately 195,000 cy containing an estimated 20,100 pounds of PCBs, at a cost of about \$34M. This equates to 25-30 cy per hour per dredge averaged over the two years of dredging. A total of 140,000 tons of material (combined sludge bed material and wetland and beach cleanup materials) was shipped offsite for disposal (39,171 tons TSCA; 97,996 tons non-TSCA).

Year 2000 confirmation samples were collected by the NYSDEC to assist in determining areas where dredging could be considered complete. The collection of

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

confirmation samples and acting on the results is a shift from the original, specified strategy of targeting a depth of removal only.

Following 2000 dredging, 115 confirmation cores were collected (indications are that a 50 ft. x 50 ft. grid was used). Analysis was not performed for 73 of the 115 cores as a result of either the collection point being located on shore (5 cores) or the core material being visually verified to contain only sand (68 cores). According to the NYSDEC, "Since it was previously established that sand is not PCB contaminated, no core sample exhibiting sand only was tested for PCBs." The remaining 42 cores yielded 51 samples (two samples each were collected from eight of the cores) that were analyzed for PCBs. The results ranged from 0.04 ppm to 18.0 ppm and averaged 6.82 ppm.

A long-term monitoring plan was prepared for Cumberland Bay and adjacent areas of Lake Champlain that required sampling to begin in Fall 2001. The goals of the monitoring program are: "a) to clearly document the effectiveness of the sludge bed PCB remediation activities, and b) to support revision/removal of the Cumberland Bay fish advisory." The program is to include the collection of fish tissue and zebra mussel samples and use of passive in-situ concentration extraction samplers as a method of comparison. Water column samples will also be collected. All samples will be subject to PCB analysis. The program is currently scheduled to end following sampling in Fall 2004.

Key Conditions:

commercial landfill, dredging, water handling limitations, wetlands

Estimated Target Volume:

93,000 cy (1997 ROD); 130,000 cy from 34 acres of sludge bed and 15,000 cy from shoreline (1998 Contract Documents).

Estimated Calendar Time to Implement Remedy:

Not targeted to begin until summer 1999 at the earliest. Two construction seasons are needed to complete sludge bed removal (1999-2000); wetland restoration is targeted for 2001.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: *DEER LAKE*

SiteID: 05-41

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: State initiative. State-lead.

Contaminants of Concern: mercury

Overall Status Summary: Deer Lake is a 906-acre man-made lake located near Ishpening, Marquette County, Michigan, contaminated primarily by mercury and listed as one of the Great Lakes Areas of Concern (AOC). Sources of mercury to the lake were historical discharges and runoff from a local gold mine and from mining laboratories that used mercury for iron ore assays to extract gold from crushed ore. These discharges occurred over about 50 years. Additionally, mercury contamination from air deposition continues to enter the lake. Because of these discharges, fish and sediment in Deer Lake reportedly contain the highest levels of mercury contamination in Michigan. Mercury levels in sediment range from 2 to 16 ppm and a ban on the consumption of any fish taken from the lake currently exists. Reportedly, elevated levels of mercury in fish have also affected the reproduction of fish-eating birds living around the lake.

In 1984, MDNR (now MDEQ) entered into a consent judgment with Cleveland Cliffs Iron (CCI) Company, which operated the laboratories responsible for much of the mercury discharges that contaminated the lake. In 1984, as part of the consent judgment, the lake was drawn down to its lowest possible level, killing most of the resident fish. In 1986, rotenone was applied as a piscicide to the remaining 90-acre natural lake to eliminate any remaining fish. The lake was allowed to refill in 1987. Subsequently, the lake was restocked with selected fish species in addition to allowing natural recovery of other fish species. Mercury levels in fish reportedly increased initially and then began to incrementally decrease until 1995. Since then, mercury levels in fish either have remained unchanged or have begun to slowly increase. Fish population levels are now considered to have fully recovered, although mercury levels remain above the Michigan Department of Public Health fish consumption advisory level of 0.5 ppm.

For two weeks during Summer 2000, MDEQ and EPA collected approximately 200 surface sediment samples and 100 sediment core samples to further evaluate the extent of mercury contamination in lake sediments. The results of the sampling are intended to assist in determining what, if any, measures are necessary to decrease mercury levels in fish. MDEQ is using the results from the 300 sediment samples to prepare a Feasibility Study which is targeted for completion in Spring 2002.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Key Conditions: fish harvesting, Great Lakes AOC

Estimated Target

Volume:

***Estimated Calendar Time
to Implement Remedy:***

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: *DETROIT RIVER - PROJECT 1 (Black Lagoon)*

SiteID: 05-18

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: State Fund-Lead. Remedial Action Plan.

Contaminants of Concern: PCBs, PAHs, heavy metals (including mercury), oil and grease

Overall Status Summary: Black Lagoon is one of six major areas harboring sediments contaminated with PCBs, PAHs, heavy metals, and oil and grease within the Trenton Channel section of the Detroit River (western one-third portion of the lower Detroit River). The other identified areas within the Trenton Channel are the Allied Fuel Oil Slip, Nicholson South Slip, Firestone Steel Area, Elizabeth Park North Canal, and Elizabeth Park, South Canal-Inlet.

MDEQ, in conjunction with USEPA, is negotiating with the Army Corps of Engineers (ACOE) to remediate 20,625 cy of highly contaminated sediments from Black Lagoon. The ACOE has completed a preliminary restoration plan for Black Lagoon. Following completion by ACOE of plans and specifications, EPA will most likely submit a plan proposal to dredge Black Lagoon. It is proposed that management of the project be performed by the ACOE. Disposal would be by either conventional disposal (offsite landfill or confined disposal) or use of innovative technologies to detoxify the sediments for reuse. The most recent proposed disposal option is to deposit the material in a specially constructed cell at an active Michigan-owned ACOE disposal facility. The State of Michigan is currently suing the ACOE over use of the landfill. The initial ruling was in favor of Michigan, however that ruling is now under appeal. The total cost of the dredging project is estimated between \$0.6 and \$6.5 million, depending on the disposal option(s) selected. No further progress is anticipated until the selection of a disposal option is complete.

MDEQ, along with the US EPA Great Lakes National Program Office, has recently selected ENDESCO Services, Inc. Cement-Lock™ ex-situ treatment technology for a demonstration project using Black Lagoon sediment. The demonstration project was originally scheduled to take place in Fall 2000, but was postponed. A contract has been signed between ENDESCO and Michigan DEQ for the demonstration project to be performed on 2,000 cy of Black Lagoon sediment at a cost of \$2.8 million. The demonstration project is currently planned for Summer 2003.

Key Conditions: dedicated landfill or CDF, dredging, Great Lakes AOC, solidification/stabilization

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Estimated Target Volume: 20,625 cy

Estimated Calender Time to Implement Remedy: Dredging targeted to begin Fall 1999 (earliest)

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: *DUPONT NEWPORT SITE*

SiteID: 03-02

US EPA Region: III

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Superfund. Final.

Contaminants of Concern: metals (Pb, Cd, Zn); solvents

Overall Status Summary: The Christina River Remediation project area is located at the Newport Superfund Site in Newport, New Castle County, Delaware. The Newport Superfund Site encompasses approximately 120 acres along the north and south sides of the Christina River. It includes an operations area consisting of a portion of the Dupont Holly Run plant and the Ciba Newport plant, the North and South Landfills, adjacent wetland areas, and a former ballpark.

Five areas of the Christina River targeted for remediation were consolidated into three major areas located in a 1.3 mile stretch of river and designated as Area 1, Area 2/3, and Area 4/5. These areas, which totaled 2.9 acres, were delineated based on several sediment sampling events that identified the extent of river bottom contamination. Constituents of concern were heavy metals (lead, cadmium, and zinc) and volatile organic solvents.

Performance standards and goals in the 1993 ROD were modified by EPA in 1996, and documented in an EPA memo to file (Reference A-769).

Removal was accomplished in 1999 and was accomplished initially using a crane operated Cable Arm Clamshell (for unconsolidated material), however, the great majority of the removal was by use of a backhoe on a barge. Target areas were bounded by sheetpile. Sediments were removed to a minimum depth of two feet or until the relatively impermeable underlying Marsh Deposit Formation was encountered. No confirmation samples were collected. Sediment removal depths ranged from 1.6 to 6.8 feet with a typical depth of 2.9 feet. A total volume of 11,870 cy was removed.

Removed materials were transported to an off-loading facility, located on the South Landfill side of the Christina River, via leak-proof scows. From there, the material was taken to and disposed of within a dedicated holding cell in the existing industrial South Landfill.

Dredged areas were backfilled with clean backfill material and intertidal areas were revegetated. No long-term monitoring is planned, other than periodic evaluation of the condition of the revegetated areas.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Key Conditions: capping, dedicated landfill, extended (> 1 mile) river, fish spawning limitations, habitat/streambank restoration, more-harm-than-good, post monitoring, tidal fluctuations, wetlands

Estimated Target

Volume:

***Estimated Calendar Time
to Implement Remedy:***

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: *DZUS FASTENER (Lake Capri)*

SiteID: 02-22

US EPA Region: II

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: NYS Inactive Hazardous Waste Site. State-Lead.

Contaminants of Concern: Primarily cadmium; also cyanide, chromium

Overall Status

Summary:

The site consists of Lake Capri, a private eight-acre man-made fresh-water lake that was created by damming Willetts Creek where it crosses Montauk Highway in West Islip, Long Island, NY, a small adjoining lagoon, and 1,500 ft. of Willetts Creek. The upper (northern) portion of the creek drains into Lake Capri to the south, which then drains into the tidal portion of Willetts Creek to the south of Montauk Highway and then eventually into the Southern Long Island Intercoastal Waterway. Lake Capri became silted-in over time and dredging to regain the lake's original water depth was proposed. Investigations performed as part of this proposed dredging identified the lake sediments as contaminated. Follow-up investigations of Lake Capri and Willetts Creek found both to be contaminated, primarily with cadmium, chromium, and cyanide. Levels were found to exceed NYS Standards, Criteria, and Guidance Values (SCGs) for sediment, surface water, and biota. The source of the contamination was determined to be the Dzus Fastener Company site that is located about 3,600 feet north of the lake and about 600 feet west of Willetts Creek. The site is on New York State's list of Inactive Hazardous Waste sites. Contamination historically entered Willetts Creek as a result of direct discharges from the now defunct manufacturing facility and surface and groundwater discharges from the site. The site was remediated as an Interim Remedial Measure (IRM) in 1991 and again under a source control ROD in 1995-96. The IRM resulted in removal and offsite disposal of 1,960 cy of soil from a contaminated leach field. The 1995-96 action consisted of in situ stabilization/solidification of cadmium-contaminated soils. Reportedly, contaminated groundwater continues to discharge to Willetts Creek from the direction of the site.

In June 1997, NYSDEC completed a Supplementary FS to address cadmium contamination in Lake Capri and Willetts Creek. The RI portion of the study included collection of sediment, surface water, groundwater, and biota samples from both Lake Capri and Willetts Creek to determine the extent and levels of contaminant concentrations in each. NYS SCGs exist for sediment, surface water, and groundwater. Cadmium was the predominant contaminant found in each media. NYS SCGs for cadmium in sediment are established at two levels: the Lowest Effect Level (LEL) of 0.6 ppm and the Severe Effect Level (SEL) of 9.0 ppm. Sediment sample results exhibited cadmium levels at ND to 79.8 ppm and 1.4 to 347 ppm in Willetts Creek and Lake Capri, respectively (23 of 39 samples

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were above the SEL). Cadmium concentrations in deeper lake sediments were consistently lower than concentrations in co-located surface sediments. Cadmium was also detected in surface water (9 of 22 samples above the SCG of 0.7 ppb) and in biota.

Based on these results, a remedy was implemented in 1999 to remove about 19,000 cy of sediment from Lake Capri and the adjoining lagoon, and a small amount of sediment from about 1,500 ft. of the upper portion of Willetts Creek. The total value of the removal contract was \$5.78 million. From July 29 through August 4, about 288 cy of sediment were removed from Willetts Creek using dry excavation. Additionally, water in the adjoining lagoon was pumped to Lake Capri and sediment was removed first by dry excavation (beginning July 20), then, following reintroduction of water to the lagoon, by hydraulic pumping of sediment from a localized area to Lake Capri (completed September 20).

Dredging of Lake Capri was implemented in two phases: the first phase targeted the removal of highly contaminated silty sediments and was implemented from August to October 1999; the second phase targeted a final excavation grade by removal of the less contaminated sand and gravel and any remaining soft sediment from Phase I dredging, and was implemented from October to December 1999. Prior to dredging, Rotenone was applied to the lake to eradicate all fish (about 5,800 pounds of fish carcasses were removed). A total of approximately 17,100 cy of sediment was removed. An eight-inch Ellicott Model SP 920 Mudcat horizontal auger dredge was used for most of the sediment removal. Dredging was performed on a 100-foot grid pattern to control dredge operation and for collection of verification samples. Additionally, lake draw-down and dry excavation were used to remove nearshore sediment inaccessible to the floating dredge. Slurry from the dredge was pumped to a slurry processing system located in a nearby high school parking lot. The processing system included shakers, hydrocyclones discharging to compartmentalized roll-off containers, polymer addition, and four plate and frame presses. Water from the presses was treated for metals prior to discharge to a settling basin and then to Lake Capri. Following dredging, verification samples (ponar grab) were collected in the center of 100 foot by 100 foot grids to determine if the sediment target level of 1 ppm cadmium was achieved. Reportedly, all but two of the final verification samples were below 1 ppm cadmium and all were below 3 ppm. Verification samples were required to be collected a minimum of four hours following dredging of the area to be sampled. Individual cells were dredged as many as three times in an attempt to reach the target level. Debris (e.g., shopping carts, other manmade objects) significantly hampered dredging. Additionally, the dredge was reportedly operated (moved) too quickly and the first pass was too deep, resulting in significant windrowing of sediment that required multiple dredge passes to remove.

Dredged sediment was originally to be landfilled as non-hazardous waste as a result

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of passing TCLP tests. The contractor requested that the contractor be allowed to attempt beneficial reuse of the removed sediment. NYSDEC eventually agreed to allow the material to be used for structural fill if first solidified. This became the selected disposal option. The sediments were moved offsite to a facility owned by the contractor, solidified, and used as structural fill at a new landfill under construction in Babylon, NY.

The final project contract cost was \$5.9 million. Considerable cost overage for dredging resulted from slower than anticipated dredging as a result of the extensive debris encountered. Poor characterization of the lake bottom prior to the start of dredging resulted in failure to identify much of the debris for removal prior to the start of dredging. Additionally, the dredge was not equipped with a coarse screen over the inlet of the dredge-head suction line, resulting in routine plugging of the line. The overall project cost increase does not reflect this increase in dredging costs due to offsets in other project costs.

The lake was restocked shortly after dredging was completed. Fish sampling to determine post-remedial cadmium levels will begin in 2003.

Key Conditions:

dredge spoil reuse/fill; dredging; fish harvesting; particle separation/soil washing; post monitoring; property access issues; solidification/stabilization; water handling limitations

Estimated Target Volume:

12,000 cy from Lake Capri and 100 cy from Willetts Creek. Later revised to 17,000 cy prior to the start of dredging.

Estimated Calendar Time to Implement Remedy:

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Site Name: ***FIELDS BROOK***

SiteID: 05-04

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund. Final.

Contaminants of Concern: PCBs (primarily 1248); metals; VOCs; SVOCs; radionuclides; DNAPL

Overall Status Summary:

The original ROD, for sediment OU-1, was issued in 1986. An ESD for OU-1 was issued in late 1997 and reduced the volume of sediments (contaminated with PCBs, metals, and VOCs) to be remediated from the 52,000 cy specified in the ROD to 14,000 cy. Target cleanup levels in sediments are set at 1.3 ppm PCBs and 3.1 ppm PCBs for areas adjacent to residential and industrial properties, respectively. Reasons for the volume reduction include (1) deleting stream areas lying upstream of the sources, (2) targeting average cleanup levels, and (3) allowing contaminated sediments below the depth of hydraulic scour to be left in place. An estimated 3,000 cy of sediments contaminated with 50 ppm or greater PCBs, and those sediments with high potential for mobility which have a soil/water partition coefficient (KOC) of less than 2,400, were to be thermally treated at an offsite facility; the remaining sediments were to be disposed of in an onsite landfill to be constructed on one of the industrial sites adjacent to the brook.

A separate ROD (OU-4) for the Floodplains/Wetlands areas (FWA) was issued in June 1997 and called for FWA sediments to be excavated in non-residential areas to 50 ppm PCBs and in residential areas to 30 ppm. Residential areas with PCB concentrations between 6 and 30 ppm were to be covered with 6 inches of soil. The ROD also specified that excavated soils/sediments would be disposed of in a TSCA-equivalent landfill to be located on the RMI Sodium property adjacent to the brook.

As of Oct. 1998, radioactive material (radium) was discovered on the Millennium property and in adjacent and downstream FWAs and brook sediment. This event required modification to the original design to address disposal of removed soils/sediments contaminated with radionuclides (i.e., upgrade the landfill design and determine the impact on incineration). An ESD was issued in April 1999 to modify the remedial actions proposed in the previous RODs to accommodate the impact of removing radionuclide-contaminated materials. The ESD provided cleanup levels for radionuclides in FWAs and Fields Brook sediment (residential areas: 5 pCi/g above background; industrial areas: 10 pCi/g above background). In addition, the ESD required that all FWA soils and creek sediments with radionuclides above cleanup levels be removed and that the landfill design be modified to add an additional three-foot thickness of clay to the base of the landfill and an additional

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two-foot thickness of clay to the landfill cover.

A consent decree was signed in 1999 that required the 25 PRPs to pay the government \$1,703,817 in past costs, \$840,000 in NRD, and to finance the cost for clean up and long-term monitoring of Fields Brook.

Remediation began in late August 2000, about one month behind the proposed construction schedule as a result of weather-related delays in completing the landfill. Remediation was by dry excavation; 2,000-ft. sections of the creek were isolated by damming and by-passing creek flow to allow removal of creek sediment and FWA soils simultaneously. Floodplain areas were removed to a maximum two-foot depth and were to be revegetated with native plant species following completion. Excavation of FWA soils began in upstream areas adjacent to the industrial properties; work continued downstream toward the residential properties. In addition, although no homes are situated in the contaminated areas, residential properties reportedly extend across the floodplain to the brook centerline. Property access issues in and around the residential properties required resolution prior to working in these areas.

The specified removal depth for sediments from the brook was set at the depth of scour (estimated at 1 - 3.5 ft.), but in no case was excavation depth to exceed two feet. Sediments contaminated with PCBs above the action level at depths greater than the depth of scour (or two feet, whichever was less) were to be left in place as long as the area remediated was backfilled and armored. Excavated areas susceptible to scour were to be covered with erosion-resistant materials following excavation.

The combined volume of sediment and FWA soils to be removed from areas adjacent to residential and industrial properties was estimated to be 19,200 cubic yards and 20,000 cubic yards, respectively. Disposal for a majority of the removed material would be to a three-acre double-lined landfill located at the former RMI Sodium Plant (one of the industrial sites identified as a historical source of contamination to Fields Brook). An estimated 3,000 cy was to be sent off-site to Port Arthur, TX for thermal treatment.

Confirmation sampling was required only in areas where radionuclides were found; all other areas required excavation to the depth target of two feet maximum. During excavation of the FWA and creek adjacent to the Millennium property, which was the identified source of the radionuclides, the contractor reportedly found previously unidentified radionuclide hot spots that required removal and added to the originally estimated total removal volume.

During work in 2000, a layer of DNAPL was discovered in soil beneath the FWA and Sediment OU adjacent to the Detrex property. As a result of this discovery, an

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ESD was issued in August 2001 that specified the remedial and treatment requirements for DNAPL-contaminated soil. The ESD required that areas with liquid DNAPL would be excavated and areas with no liquid DNAPL would be excavated to 200 ppm hexachlorobenzene. The anticipated removal volume was 10,000 cubic yards of DNAPL-contaminated soil. The ESD also changed the treatment method for DNAPL-contaminated soil from offsite incineration to onsite thermal treatment. Liquid DNAPL collected during soil excavation was sent for offsite incineration.

Harding Lawson Associates was the original primary cleanup contractor but was replaced by Severson Environmental Services following the 2000 work season; de maximus, inc. was the oversight contractor; and Conestoga-Rovers provided QA/QC support.

Work on the project ended in February 2003 following demobilization of equipment from the site. A total of 53,094 cy of soil and sediment was removed at a cost of between \$15 and \$16 million (between \$283 and \$301 per cy). Of the total volume of material removed, 31,238 cy were disposed in an onsite dedicated landfill, 1,436 cy went to offsite thermal treatment, and 20,420 cy were thermally treated onsite.

Key Conditions:

commercial landfill, dedicated landfill or CDF, floodplains targeted, incineration, post monitoring, property access issues

Estimated Target Volume:

Creek Sediments (OU-1): 14,000 cy; Floodplain/Wetland Area (OU-4): 15,300 cy.

Estimated Calendar Time to Implement Remedy:

Preparation work to commence in Spring 1999 and removal work to extend through 2000.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: **FORD OUTFALL**

SiteID: 05-05

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Non-Time Critical Removal Action (NTCRA) under the Superfund Accelerated Cleanup Model (SACM). AOCs between the PRP and US EPA in 1993 and 1997.

Contaminants of Concern: PCBs (1242)

Overall Status Summary: In 1993, US EPA re-classified the site as a Non-Time Critical Removal Action (NTCRA) under the Superfund Accelerated Cleanup Model (SACM). The PRP prepared an Engineering Evaluation/Cost Analysis (EE/CA) and US EPA selected the removal and disposal option, also in 1993. Several years of delays ensued pending review and approval of the features of and location for a proposed dedicated disposal facility (Sediment Containment Unit).

In-plant sewer cleaning and related work were implemented with a combination of hydraulic, mechanical and pneumatic methods during July 1996. The sediment removal phase conducted under a Non-Time Critical Removal Action began in late June 1997 and was completed in late September 1997, except water treatment activities continued into July 1998. Approximately 28,500 cy of sediment were removed from a 2.6 acre area in the River Raisin using a Cable Arm clamshell bucket, supplemented by a conventional clamshell bucket. Materials were stabilized/solidified with cement and then disposed in a 3-acre onsite dedicated TSCA cell. The dedicated 3-acre cell is within a 32-acre onsite landfill. Final sediment verification samples exhibited concentrations ranging from 0.5 to 20 ppm PCBs in about 60% of the dredged area; insufficient sediment remained for sample collection in about 40% of the dredged area.

A year after the removal, in Fall 1998, MDEQ collected 16 sediment core and 30 fish tissue samples, and conducted 3 caged fish studies as part of their ongoing investigation of the River Raisin. Core samples exhibited average PCB concentrations of ~10 ppm in river sediments outside the former hot spot area. Two samples collected within the former hot spot area exhibited PCB concentrations of 64 ppm (0-6") and 110 ppm (0-18"). MDEQ has documented these results, as well as results from 1995 and 1997, in an August 1999 report. MDEQ collected additional sediment cores from River Raisin in Summer 2001. The results are being used to develop remedial alternatives for the river. A Remedial Alternatives Report is targeted for completion by MDEQ in Summer 2002.

Key Conditions: dedicated landfill or CDF, specialty dredge, extended (>1 mile) river, Great Lakes

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AOC, post monitoring, solidification / stabilization

***Estimated Target
Volume:*** 44,000 cy

***Estimated Calender Time
to Implement Remedy:***

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: **FORMER MESSER STREET MGP**

SiteID: 01-12

US EPA Region: I

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Final. Voluntary PRP cleanup with State oversight.

Contaminants of Concern: PAHs

Overall Status

Summary:

The removal was performed as Phase II of a voluntary action under an agreement between two primary PRPs and the State. Phase I work was completed in 1999 and included construction of a 420 foot long slurry wall and collection trench to eliminate NAPL migration to the river, vacuuming of free phase tar globules from the sediment surface, and remediation of a former gas holder structure that was part of the former manufactured gas plant. The Phase II project targeted two one-half-acre areas and multiple smaller, localized areas in the Winnepesaukee River and one three-quarter-acre area in Lake Opechee; the total removal area was approximately 3 acres. Removal was to a target depth of two feet in nearly all areas that was to result in the removal of an estimated 80% of free product existing in the river. Mechanical dredging, with a Cable Arm clamshell bucket designated as the primary method, was to be used to remove about 40% of the sediment; the remaining sediment was to be removed by dry excavation during a 5-foot lowering of both lakes that was scheduled to occur between about October 9 and November 9, 2000. The lakes are typically lowered for two weeks annually or semi-annually to allow for maintenance of nearshore structures (e.g., docks, ramps). The State of New Hampshire owns the dams on both lakes and leases them for hydroelectric generation. The State negotiated with the leasees to allow the water level to remain lowered for an additional two weeks to provide additional time for sediment removal by dry excavation.

Sediment removal began on or about September 18, 2000 in a 20-foot deep backwater area adjacent to the site of the former manufactured gas plant considered to be the source of coal tar to the river. The removal contractor began sediment removal using a 2 ½ cy Cable Arm clamshell bucket attached to land-based 200-ton crane, resulting in a production rate of about 80 cy per day. The automated GPS system (WINOPS) for bucket placement was nonfunctional at startup and bucket locations were being directed manually using survey equipment. Reportedly, the Cable Arm bucket was unable to effectively penetrate the sandy sediment, resulting in the bucket being less than full capacity during each bucket cycle; this negatively impacted production rates. The 2 ½ cy Cable Arm bucket was replaced with a similar type 4 cy bucket the first week of October (the 4 cy bucket was proposed in the bid specifications). Incomplete sediment penetration continued to limit production. A 100-ton crane located at the site was equipped with the 2 ½ cy

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Cable Arm bucket, positioned on a modular barge and used to remove sediment from areas of the river unable to be accessed by the land-based 200-ton crane. The dredge contractor used both a conventional clamshell bucket and a hydraulic clamshell bucket (built by the removal contractor) to remove sandy sediment unable to be removed using the Cable Arm clamshell buckets.

The lowering of lake water levels began the week of October 9, allowing sediment removal by dry excavation to begin. Two long-boom excavators located on an exposed sand bar and one conventional excavator positioned on a modular barge were used to remove sediment and place it directly into trucks for transport to the solids handling area. Following the start of dry excavation in the river areas, the removal contractor then began dry excavation of the target area located in Lake Opechee. Maximum production rates for the project are estimated at 200-300 cy per day (including both dredging and dry excavation working simultaneously).

Removed sediment was discharged to roll-off containers for unloading in the solids handling area by excavator. Sediment was allowed to gravity dewater prior to being loaded onto trucks for disposal at a commercial thermal desorption facility, ESMI, located in Loudon, NH. The reported cost for disposal was \$60-65 per ton of material. Water drained from the sediment collected in sumps located in the solids handling area and was pumped to a small (average 60K gal/day) wastewater treatment system consisting of (in sequence of operation) one sand filtration unit, one bag filtration unit, polymer addition, and one carbon filtration unit followed by discharge to local POTW. In-river monitoring during removal was for turbidity only; the limit was 10 NTUs above background (background was at 100 feet upstream of any work area). The prime contractor was Haley & Aldrich and the removal contractor was Maxymillian Technologies.

Following sediment removal, areas were backfilled with one foot of mostly gravel material. Backfilling was performed throughout the project as dredging was completed in individual areas. The dredge contractor used the same equipment used to remove sediment from each area to place the backfill material. A total of about 8,250 cy of gravel and stone (higher flow areas) was used as backfill material; both were obtained from local sources.

In-river operations were completed the first week of February 2001. Total volume of sediment removed was 12,000-13,000 cy.

Key Conditions:

capping, dredging, floating oil, post monitoring, specialty dredge, thermal desorption

Estimated Target Volume:

13,000 cy using a combination of mechanical dredging and wet and dry excavation.

Estimated Calendar Time to Implement Remedy:

September 2000 to January 2001

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Site Name: ***FORMOSA PLASTICS***

SiteID: 06-04

US EPA Region: VI

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Emergency response action with the Texas Water Commission and the Calhoun County Navigation District.

Contaminants of Concern: ethylene dichloride

Overall Status Summary: A spill of ethylene dichloride (EDC) contaminated a 1.1 acre area in a harbor in Lavaca Bay, TX. Hydraulic dredging only removed 500 cy due to severe water capacity limitations on land. Subsequently, in 1992, 7000 cy was removed to 500 ppb EDC in 4 weeks using a barge-mounted crane and 4 cy environmental bucket. Material dewatered, stabilized with cement, and transported to two commercial hazardous waste landfills.

Key Conditions: commercial landfill, dredging, water handling limitations, solidification / stabilization

Estimated Target Volume: 3,300 cy

Estimated Calender Time to Implement Remedy: Unknown

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Site Name: *FOX RIVER - PROJECT 1 (SMU 56/57)*

SiteID: 05-06

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: 1999 dredging: Part of a Cooperative Agreement between the Fox River Group (FRG) and the State of Wisconsin; 2000 dredging: Consent Order for Time-Critical Removal Action between USEPA, Wisconsin DNR, and Fort James Corporation (now Georgia-Pacific).

Contaminants of Concern: Mainly PCBs (1242), metals (mercury); PAHs to a lesser extent.

Overall Status Summary: A voluntary cooperative coalition was funding dredge studies several years ago in the Fox River. Pilot dredging projects were planned for two depositional areas: Deposit N (refer to Project No. 05-20) and Sediment Management Unit (SMU) 56/57, with planned removal of 12,000 cy and up to 92,000 cy, respectively. Dredging of both areas was anticipated to remove approximately 10% of the mass of PCBs in the river. An agreement between the State of Wisconsin and seven paper mills, collectively the Fox River Group (FRG), was reached for a \$10 million lump sum and a one-year moratorium on litigation, beginning January 31, 1997, until work under the agreement was completed.

It was originally anticipated that up to 92,000 cy of sediment would be dredged during the proposed pilot dredging project from the 9-acre sediment depositional area designated as SMU 56/57 beginning in Spring 1999. Wisconsin DNR collected seven core samples in 1995 through a preliminary sediment sampling effort and then again in November 1997, with the USEPA, at an additional 32 locations, both in SMU 56/57, to determine the sediment chemical and physical characteristics for use in a conceptual design. The Basis of Design Report (BODR), prepared by Montgomery Watson, presents the pre-design results and conceptual design for the sediment removal project. The project was designed for sediment to be removed to a target depth based on a sediment PCB concentration of one ppm. In the January 1997 Agreement between the State of Wisconsin and the FRG, the FRG agreed to perform monitoring during SMU 56/57 dredging.

In November 1998, a 22-acre property known as the former Shell Oil Company property, currently owned by Fort James and located near the Fort James facility, was identified as available to locate land-based operations to support dredging activities. Sediments with PCB concentrations of 50 ppm or greater were to be disposed of at Wayne Disposal (MI); sediments with PCB concentrations <50 ppm were to be disposed in a local landfill. (The local populace was unsupportive of the plan for local disposal. Disposal issues required resolution prior to implementation of the planned remedial action.) By July 1999, Fort James had agreed to allow

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disposal of SMU 56/57 sediments in the Fort James landfill located about six miles from the land-based operations. The sediments would be isolated in a separate cell (Cell 12A) in the landfill and Fort James would monitor the cell and test the leachate for PCBs for the life of the landfill. The final removal volume was lowered to 80,000 cy based in part on landfill volume capacity limits in Cell 12A.

Montgomery Watson was the selected engineer and general contractor and Four Seasons Environmental the selected dredge contractor. Dredging began August 30 and ended December 15, 1999. The 9-acre area is adjacent to the shoreline of the Fort James property. Access was not an issue. A host of unanticipated complications, including the use of overly optimistic design assumptions and mechanical and operational failures combined to significantly lower project performance indicators (e.g., total dredge volume removed; average hourly and average daily dredging rates; dredge slurry percent solids; filter cake percent solids). As a result, only about 31,500 cy of the originally targeted 80,000 cy of sediments were removed and disposed at the Fort James landfill. Total cost was reportedly just under \$12.4 million (about \$396/cy) and included about \$3.4 million of in-kind services by Fort James, such as use of Shell property and transport and disposal of sediment.

Dredging was terminated due to winter weather conditions, including icing on the river and within the wastewater treatment system, and the exhaustion of designated funds. As reported by Wisconsin DNR following the conclusion of dredging (Reference A-541):

“In the subunits where the cleanup pass was completed, post-dredge concentrations tended to be lower than pre-dredge concentrations. Three of four subunits demonstrated a decrease in surface PCB concentration. The fourth subunit (Subunit 28) showed a slight increase in surface concentration. All cleanup pass subunits demonstrated that surface residual concentrations left after dredging were 10 to 1000 times less than the maximum pre-dredging concentration present in that subunit (Note, not part of quote: Eleven subunits (100 ft. x 100 ft.) were dredged as part of the project. The dredge “cleanup pass” was performed on smaller sections (30 ft. x 30 ft. each) within Subunits 25, 26, 27, and 28 only, reportedly centered over pre-dredging core sample locations. Therefore, in the quote, post-dredge surface residuals are being compared to maximum pre-dredge PCB concentration at that location, regardless of depth, and not pre-dredge surface PCB concentrations.) Further, Subunits 25 and 26 demonstrated that the proposed sediment quality threshold of 0.25 ppm proposed in the draft of the RI/FS can be readily achieved.”

“In subunits where the cleanup pass was not performed (Subunits 12-24), surface sediment concentrations increased considerably. Pre-dredging surface sediment concentrations generally ranged from 2 to 5 ppm in these subunits while post-

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dredging surface sediment concentrations ranged from 32 to 280 ppm. Four of these subunits have TSCA level material (>50 ppm) exposed at the surface.”

Initial conclusions (from Reference A-541) are:

- “That the project design and pre-dredging data provided sufficient resolution to define the lateral and vertical extent of contamination;”
- “Contaminated sediment can be effectively removed from areas with the highest PCB concentrations in the entire river without increasing the surface concentrations;”
- “The final cleanup pass is an important component of the dredging design;” and
- “Partial cleanup left significantly higher PCB concentrations in surface sediments that must be addressed.”

Follow-up sampling performed by the FRG in February 2000 in the four subareas where the additional “cleanup pass” was performed indicated that PCB concentrations in surface sediments in these areas increased nearly 10-fold in the two-month period since the previous sampling. As a result of these findings, the FRG proposed to USEPA and Wisconsin DNR the capping of SMU 56/57 to isolate the high residual PCB concentrations found in the surface sediments.

On May 26, 2000, a Consent Order was finalized between USEPA, Wisconsin DNR, and Fort James that required Fort James to complete the dredging at SMU 56/57 as a time-critical removal action. Fort James bid the additional dredging work (50,000 cy estimated) in early Summer 2000 and Severson Environmental Services was awarded the contract on July 14. Severson began mobilization of equipment to the site on July 17. Land-based facilities to support the dredging were again situated on the former Shell property. Dredging began on August 23, approximately three days ahead of Severson's proposed schedule. Dredging was performed in two phases: Phase I targeted areas previously dredged in 1999, performing follow-up passes in an attempt to lower PCB concentrations in surface sediments, and Phase II targeted areas not previously dredged. Phase I was also used by USEPA and Wisconsin DNR as a demonstration project to verify that the dredge and land-based systems would operate as designed.

Severson completed the removal of about 50,000 cy of sediment in 69 days vs. the proposed 60-day schedule for dredging. Three horizontal auger dredges were onsite throughout the removal but dredging reportedly was performed using only one at a time. The third dredge was mobilized to the site near the end of September. Of four targeted sections, Sections 1 and 2 were completed first and Section 3 was completed on or about October 13. Section 4 was the last area to be completed. Dredging was completed on October 31, 2000. A total of 50,316

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cy of in-situ sediment was removed and 51,613 tons of dewatered sediment (2,484 truck loads) were disposed of in the Fort James landfill.

Dredge production averaged about 720 cy per day and sediment slurry solids content averaged 4.4% (target was 7.5%). Production rates in areas of virgin sediment reached as high as 1,600 cy per day and sediment slurry solids content averaged 8.4% and ranged from 3.5% to 14.4% in these areas. The highest daily production rate averaged over a one-week period was 1,265 cy. Typical production rates in areas of virgin sediment were 1,000 to 1,200 cy per day (50-60 cy per hour over 20 hours). All production rates reflected 24-hour-per-day operation.

Nine recessed-plate filter presses were used (total capacity: 1725 cu. ft.); a 94 cu. ft. capacity press was replaced near the end of September with two 220 cu. ft. capacity presses (relocated from the Cumberland Bay project) to provide contingent dewatering capacity.

Nine to 12 inches of clean sand was placed over dredged areas using a clamshell bucket immediately upon receipt of confirmation sample results showing between 1 and 10 ppm PCBs. It is not clear how many dredge passes preceded collection of confirmation samples. No increase in river turbidity levels were reported due to the dredging, however, river water was periodically very turbid due to an unusually large algae bloom in the upstream areas of the river. Silt curtains were deployed around the perimeter of the dredging area to control resuspension and to divide the dredge area into cells. Treated water reportedly was consistently discharged back to the river at below PCB background levels (river water background level: 0.2 ppb PCBs).

The following summarizes the results of the Phase II removal project (2000):

- Prior to the start of 2000 dredging, surface sediment concentrations reportedly averaged 47.9 ppm (310 ppm maximum).
- Average remaining PCB concentrations in surface sediments (the top 4 inches) was 2.2 ppm; verification sample results ranged from “non-detect” to 9.5 ppm with 11 of 28 samples being below 1 ppm and 24 of 28 samples being below 4 ppm.
- Based on pre- and post-dredging bathymetric surveys, a total of 50,316 cy of in situ sediment was removed.
- The average daily removal rate was 723 cy per day (~30 cy per hr); maximum daily and maximum average weekly removal rates were 1,600 cy per day (67 cy per hr) and 1,265 cy per day (53 cy per hr), respectively.

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- Approximately 52,000 tons (41,000 cy) of dewatered sediment was disposed in the Fort James Landfill near Green Bay; this equated to 2,484 truckloads of sediment.
- Approximately 66 million gallons of water were treated and discharged back to the Fox River.
- Project cost as reported by Fort James is: \$8.2 million (direct costs only) (\$163/cy); \$14.9 million (direct costs plus the costs for in-kind services) (\$296/cy).

Key Conditions:

capping, dedicated landfill or CDF, dredging, Great Lakes AOC, pilot/demonstration test

Estimated Target Volume:

Originally 92,000 cy. Subsequently, a \$2.5 million dollar contract was awarded in mid-1999 for removal of about 55,000 cy in 1999 (the primary dredging goal was to sustain an average production rate of 200 cy per hour). The year 2000 removal action targeted removal of up to 50,000 cy.

Estimated Calendar Time to Implement Remedy:

Dredging was targeted to begin in August in both 1999 and 2000.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: *FOX RIVER - PROJECT 2 (Deposit N)*

SiteID: 05-20

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Part of a Cooperative Agreement between the Fox River Group and the State of Wisconsin.

Contaminants of Concern: Mainly PCBs (1242); metals (mercury) to a lesser extent.

Overall Status Summary: A voluntary cooperative coalition provided funding for studies of the Deposit N area. Pilot dredging projects were proposed for Deposit N and Sediment Management Unit 56/57 for the removal of 12,000 cy and up to 92,000 cy of PCB-contaminated sediment, respectively. The removal of PCB-contaminated sediment from these areas was anticipated to result in the removal of approximately 10% of the total mass of PCBs in the entire river system. The State reached an agreement with seven of the paper mills for a \$10 million lump sum and a moratorium on litigation, beginning January 31, 1997, until work under the agreement was completed. The status of the agreement and moratorium remain in place.

In the January 1997 Agreement between the State of Wisconsin and the FRG (Fox River Group), the FRG agreed to fund monitoring of the Deposit N dredging demonstration. WDNR and the FRG jointly developed a monitoring plan to assess dredging effectiveness. The WDNR retained Foth and Van Dyke, Green Bay, WI, working with Malcolm Pirnie and Superior Special Services (a marine contractor) for design and bid specification work and Koester Environmental to perform dredging, dewatering, and water treatment.

Site preparation work began October 1998. An area located adjacent to the river on the opposite side of the river from Deposit N was available to locate land-based facilities to support dredging activities. Sediments with 50 ppm or greater PCBs were disposed of at Wayne Disposal (MI) (TSCA); sediments with < 50 ppm PCBs were disposed at the Winnebago County landfill for a quoted tipping fee of \$58 per ton. The local populace was unsupportive of the plan for local disposal. Resolution of disposal issues with the Winnebago County Solid Waste Board was required prior to implementation of the planned remedial action.

Dredging of the Western Lobe of Deposit N began in late November 1998 and ended on December 31, 1998 due to cold and icing conditions (Phase I). Reportedly about 3,800 cy of sediment containing 95 pounds of PCBs were removed. Dredging resumed in the Eastern Lobe (Phase II) on August 20, 1999 and ended October 14, 1999, resulting in the removal of an additional 2,980 cy from this area of Deposit N. An additional 135 cy of sediment was removed from

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

the Western Lobe during this time that was not included in the original scope of work (Phase III). Reportedly, dredging resulted in the removal of 114 of the estimated pre-project 142 pounds of PCBs from Deposit N. Following dredging in Deposit N, dredging was performed in Deposit O, across the river from Deposit N, resulting in removal of 1,000 cy of sediment from Deposit O (Phase IV).

Key Conditions:

commercial landfill, dredging, Great Lakes AOC, pilot/demonstration test, water handling limitations

Estimated Target

12,000 cy

Volume:

Estimated Calendar Time to Implement Remedy:

Dredging originally targeted to begin September 1998 and end by December 1998. Site preparation activities began in October 1998; dredging began in late November 1998 and is targeted for completion by end-of-year 1998.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: *FOX RIVER - PROJECT 3 (OU 1)*

SiteID: 05-27

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Negotiated agreement between the State of Wisconsin and the Fox River Group.

Contaminants of Concern: PCBs (1242); also, dioxin, furan, DDT, heavy metals (arsenic, lead, mercury)

Overall Status Summary: The 1989-1990 Lower Fox River/Green Bay Mass Balance Study quantified PCB contamination in the 39 miles of the Lower Fox River and began seven years of data gathering and water and fish quality model development. In response, the Fox River Coalition (FRC) formed in 1992, because members of the coalition felt it was apparent that a potential human and wildlife health problem existed due to PCBs in the river and bay. The goal of the FRC was to develop a process for private and public participation in determining the degree of cleanup, cost-effective methods, funding, and timetables for contaminated sediment remediation in the Lower Fox River.

The Fox River Coalition is a voluntary, cooperative coalition comprising various paper mills and other industries, citizens groups, public officials, WI DNR, and quasi-public agencies. From 1992-1995, a subset of the FRC and liaisons from the Green Bay Remedial Action Plan Science and Technical Advisory Committee met to discuss and develop consensus on a full range of technical issues. These included: examining all existing data and model results; prioritizing contaminated sites upstream and downstream of DePere; managing a remedial investigation and feasibility study at selected sites upstream of DePere; identifying the need for and coordinating collection of detailed sediment data downstream of DePere; and developing methods to represent environmental benefits of various levels of remediation. This resulted in a draft technical package presented to the FRC in January 1996.

In 1997, the State of Wisconsin reached agreement with the Fox River Group (seven paper companies) providing for a moratorium on litigation and a \$10 million lump sum to fund several projects in the river including sediment removal demonstration projects, additional modeling, and habitat restoration. Two removal demonstration projects have since been implemented (Projects No. 05-06 and 05-20 in this Database). As a result of this agreement, the role of the FRC has decreased substantially.

In early 1998, EPA approved a grant of \$1.7 million to the WI DNR to proceed with development of an RI/FS for the Lower Fox River. The initial draft RI and FS documents, including a Baseline Risk Assessment, were issued for public comment

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

in late February 1999. The RI/FS explored remedial options for sediments which exceed 0.25 ppm PCBs, a volume estimated at 8.9 million cy. Also, in 1998, EPA proposed the Fox River for Superfund listing. The public comment period, which ended in September 1998, generated a record number of responses for a proposed Superfund site. A decision on NPL listing remains "on hold."

A Fact Sheet (Reference A-116) issued by the WI DNR in March 1999 explained that the draft RI and FS identify PCBs in sediments as the primary constituent of concern, and stated that the great majority of calculated risk to human health is from exposure to PCBs, primarily through consumption of contaminated fish and waterfowl. Thirty-five sediment deposits have been identified in the 32 miles between Lake Winnebago and DePere which contain an estimated 2 million cubic yards and an overall average PCB concentration of roughly 1 to 1.5 ppm. For the remaining seven miles of river, from the DePere Dam downstream to Green Bay, there is reportedly a continuous layer of contaminated sediment, representing 8 million cubic yards with an overall average PCB concentration of roughly 2 to 2.5 ppm. According to the FS, the maximum PCB level measured in any sediment samples from above the DePere Dam is 223 ppm, and below the DePere Dam is 710 ppm.

The draft FS (Reference A -171) summarized the volumes of sediments which exceed the target cleanup level of 0.25 ppm PCBs as follows:

- Reaches 1-3 (first 32 miles): 86,500 cy (TSCA)
3,088,250 cy (non-TSCA)
- Reach 4 (final 7 miles): 250,000 cy (TSCA)
5,440,000 cy (non-TSCA)

Five remedial action objectives (RAOs) were identified in the draft FS. These RAOs are (1) Achieve, to the extent practicable, surface water quality ARARs and TBCs throughout the Lower Fox River; (2) Reduce, to the extent practicable, the potential for chemicals of concern in the Lower Fox River to cause adverse human health effects principally through exposure to PCBs from ingestion of fish by anglers; (3) Reduce, to the extent practicable, the potential for chemicals of concern in the Lower Fox River to cause adverse effects to environmental receptors in the Lower Fox River; (4) Reduce, to the extent practicable, future transport of PCBs from the Lower Fox River to Green Bay; and (5) Minimize the potential for contaminant releases during any active remediation. The FS presented and evaluated eight remedial alternatives for each of the four reaches across the 39 miles, but did not present a recommendation.

After receipt of public comments on the draft RI and FS documents (References A-170 and A-171) in April 1999, and after review of the draft RI and FS documents

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

by the National Remedy Review Board beginning in July 1999, EPA pushed back the release of a proposed cleanup plan until mid-2000. In the meantime, EPA granted the WI DNR \$1.5 million for additional RI/FS work, including broadening the scope to include Green Bay.

In November 1999, the Trustees issued the sixth in a series of reports that have addressed claimed injuries to natural resources of the Lower Fox River and Green Bay ecosystems due to releases of PCBs. The purpose of the latest report (Reference A-538) is to present an injury determination and quantification for fishery resources in the ecosystems.

Also in November 1999, EPA released two reports prepared by two separate peer review panels. In one instance, a peer review panel reviewed the draft RI and Data Management Reports that had been issued for public comment in February 1999. In the second instance, a peer review panel reviewed the draft FS that had been released at the same time.

The peer reviewers for the draft RI report concluded that data are adequate for characterization and remedy selection but are insufficient for developing in-situ biotechnologies. The review panel further concluded that "the RI does not summarize or evaluate all available data gaps that should have been addressed as part of the RI" and recommended that "information on the ongoing sediment demonstration projects, Deposit N and SMU 56/57, . . . should be included in the development of a remedy." Other conclusions and recommendations are also presented in the peer reviewer's report (Reference M-207).

The peer reviewers for the draft FS were charged with responding to two questions, namely, (1) is natural recovery appropriately characterized and (2) are the literature review and subsequent analyses complete regarding the environmental transformation (e.g., dechlorination, changes in toxicity) of PCBs in sediments. Several of the conclusions drawn by the peer reviewers questioned the validity of the science which supports the draft FS, as follows:

"Although the Draft FS references the WI DNR model as the basis for the natural recovery predictions, the Draft FS does not provide sufficient information on input assumptions or model outputs to permit an adequate assessment of the accuracy or reliability of the predictive modeling. In fact, as indicated above, in some cases the Draft FS seems to contradict previously published reports on the WI DNR model." And "Reliable long-term predictions of contamination with depth are critically important when it is recognized that the Draft FS indicates that only 4.8% of the contaminants in the DePere to Green Bay Reach of the Fox River are presently located within 10 cm of the surface. The presence of more than 95% of the contaminants at depths below the biologically active zone also raises concerns for active removal options that will expose and redistribute a portion of this material.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

This redistribution is recognized in the Draft FS in that partial remediation options assume a residual surficial sediment concentration of 2 ppm PCBs. Complete remediation options, however, assumed 0.25 ppm residual surficial sediment concentrations. These differing assumptions may significantly influence the relative effectiveness of partial and complete remedial options."

Other conclusions and recommendations are also presented in the peer reviewer's report (Reference M-208).

In October 2001, WI DNR issued new draft versions of the RI and FS documents for public comment. Other documents included with the RI/FS documents were a draft Baseline Human Health and Ecological Risk Assessment, a draft Model Documentation Report, and a Proposed Remedial Action Plan (PRAP). The study area for the revised RI/FS included the Lower Fox River as well as Green Bay. The PRAP identified the proposed remedial alternative selected for each of the Lower Fox River OUs and for the Green Bay OU, as well as the rationale for the selection.

The RAOs in the 2001 Draft RI/FS were similar to the 1999 Draft RI/FS discussed above. The proposed alternative described in the PRAP targeted the removal by environmental dredging of approximately 7.25 million cy of contaminated sediment containing an estimated PCB mass of greater than 64,000 lbs. (29,000 kg) from the Lower Fox River. The proposed alternative also incorporated the concept of monitored natural recovery for addressing the residual PCB-contaminated sediment that would remain in both dredged and undredged areas. The PRAP proposed the following remedial alternatives:

- Operable Unit 1 (Little Lake Butte des Morts): Dredging with offsite disposal for 784,200 cy of sediment, to a remedial action level (RAL) of 1.0 ppm PCB.
- Operable Unit 2 (Appleton to Little Rapids): Monitored Natural Recovery to include 40 years of measuring PCB and mercury levels in water, sediment, invertebrates, fish, and birds, and the use of institutional controls.
- Operable Unit 3 (Little Rapids to DePere): Dredging with offsite disposal for 586,800 cy of sediment, to a RAL of 1.0 ppm PCB.
- Operable Unit 4 (DePere to Green Bay): Dredging with offsite disposal for 5,879,500 cy of sediment, to a RAL of 1.0 ppm PCB.
- Operable Unit 5 (Green Bay Zones 2, 3, and 4): Monitored Natural Recovery to include 40 years of measuring PCB and mercury levels in water, sediment, invertebrates, fish, and birds, and institutional controls.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

The PCB remedial action level for the Lower Fox River and Green Bay was selected to be 1.0 ppm to balance the feasibility (implementability), effectiveness, duration, and cost of remedial actions. In addition to the proposed remedial alternatives, monitoring is required during remedial activities and a model long-term monitoring plan was developed to direct the monitoring of site conditions for 40 years following remedy implementation.

The PRAP estimated the proposed remedial alternatives would cost approximately \$307.6 million to implement at the 1.0 ppm action level. This includes a cost estimate of approximately \$258.1 million to remove contaminated sediments from OUs 1, 3, and 4 and \$49.5 million for Monitored Natural Recovery in OUs 2 and 5. The PRAP did not include a contingency amount (typically 20%) as part of these costs.

The public comment period for the RI/FS and PRAP concluded in January 2002. In December 2002, WDNR and USEPA Region 5 issued a ROD for OU 1 and OU 2 in which the selected remedy for both OUs closely mirrored the proposed remedy described above. The stated goal for the OU 1 selected remedy is to reduce PCB levels in the top 10 centimeters of sediment to a surface-weighted average concentration of below 0.25 ppm PCBs by implementing dredging to remove all sediment above the RAL of 1.0 ppm PCBs. The ROD also allows for capping with sand in areas where the RAL cannot be achieved and the use of an engineered cap as a contingent remedy as long as specific conditions, as specified in the ROD, are met. The ROD estimates the present-worth cost of the selected remedy for both OUs is \$76.1 million. Of this amount, OU 1 is estimated to cost \$61.7 million, \$50 million of which is to be paid by WTM 1 and P.H. Glatfelter Company. OU 2 will cost an estimated \$14.4 million for 40 years of long-term monitoring. In June 2003, a separate ROD was released with selected remedies for OUs 3 through 5.

In October 2003, WTM 1 (formerly Wisconsin Tissue) and P.H. Glatfelter Company entered into a Consent Decree under which they agreed to design and implement the remedy for OU 1. The Consent Decree was approved in Federal court in April 2004. The remedy includes dredging and landfilling an estimated 784,200 cy from LLBdM. WTM 1 has agreed to take the lead for designing the remedy. WTM 1 and P.H. Glatfelter formed GW Partners LLC, under which the dredging of OU 1 is to be implemented.

Dredging within LLBdM is expected to begin in September 2004 and is intended to test various dredging equipment and the use of geotubes for the dewatering of the removed sediment. A single hydraulic dredge will remove between 6,000 and 10,000 cy of sediment from two separate areas of OU 1. The sediment slurry will be transported up to two miles through pipelines to a staging area for discharge into geotubes. The dredge will initially be working 10 hours per day, 5 days per week,

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

and then in October, likely expand this to 24 hours per day, 6 days per week. Water that drains from the geotubes will be treated and released back to the river. Also to be tested as part of the in-water activities are various methods of sand placement, which will be done in a separate area of the river outside of OU 1. Reportedly, dredged material will be made available to study other dewatering technologies as well. Beginning in early 2005, the dewatered sediment will be transported by truck for offsite disposal; a contract between GW Partners and Onyx Hickory Meadows Landfill, LLC, located in the Town of Chilton, Calumet County, WI, is in place for the disposal of all sediment containing less than 50 ppm PCBs.

Reportedly, lessons learned from the 2004 dredging will be used to finalize the dredging design to be implemented for the remainder of OU 1. Dredging in 2005 and beyond is currently anticipated to require the use of two dredges operating 24 hours per day, 6 days per week and take six years to complete.

Key Conditions:

capping, commercial landfill, dredging, extended (> 1 mile) river, Great Lakes AOC, hydrodynamic modeling, natural recovery, particle separation/soil washing, pilot/demonstration test, property access issues

Estimated Target Volume:

OU 1: 784,000 cy

Estimated Calendar Time to Implement Remedy:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: *FOX RIVER - PROJECT 4 (OUs 2 - 5)*

SiteID: 05-43

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Negotiated agreement between the State of Wisconsin and the Fox River Group.

Contaminants of Concern: PCBs (1242); also, dioxin, furan, DDT, heavy metals (arsenic, lead, mercury)

Overall Status Summary: The 1989-1990 Lower Fox River/Green Bay Mass Balance Study quantified PCB contamination in the 39 miles of the Lower Fox River and began seven years of data gathering and water and fish quality model development. In response, the Fox River Coalition (FRC) formed in 1992, because members of the coalition felt it was apparent that a potential human and wildlife health problem existed due to PCBs in the river and bay. The goal of the FRC was to develop a process for private and public participation in determining the degree of cleanup, cost-effective methods, funding, and timetables for contaminated sediment remediation in the Lower Fox River.

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Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

in late February 1999. The RI/FS explored remedial options for sediments which exceed 0.25 ppm PCBs, a volume estimated at 8.9 million cy. Also, in 1998, EPA proposed the Fox River for Superfund listing. The public comment period, which ended in September 1998, generated a record number of responses for a proposed Superfund site. A decision on NPL listing remains "on hold."

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Five remedial action objectives (RAOs) were identified in the draft FS. These RAOs are (1) Achieve, to the extent practicable, surface water quality ARARs and TBCs throughout the Lower Fox River; (2) Reduce, to the extent practicable, the potential for chemicals of concern in the Lower Fox River to cause adverse human health effects principally through exposure to PCBs from ingestion of fish by anglers; (3) Reduce, to the extent practicable, the potential for chemicals of concern in the Lower Fox River to cause adverse effects to environmental receptors in the Lower Fox River; (4) Reduce, to the extent practicable, future transport of PCBs from the Lower Fox River to Green Bay; and (5) Minimize the potential for contaminant releases during any active remediation. The FS presented and evaluated eight remedial alternatives for each of the four reaches across the 39 miles, but did not present a recommendation.

After receipt of public comments on the draft RI and FS documents (References A-170 and A-171) in April 1999, and after review of the draft RI and FS documents

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

by the National Remedy Review Board beginning in July 1999, EPA pushed back the release of a proposed cleanup plan until mid-2000. In the meantime, EPA granted the WI DNR \$1.5 million for additional RI/FS work, including broadening the scope to include Green Bay.

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"Although the Draft FS references the WI DNR model as the basis for the natural recovery predictions, the Draft FS does not provide sufficient information on input assumptions or model outputs to permit an adequate assessment of the accuracy or reliability of the predictive modeling. In fact, as indicated above, in some cases the Draft FS seems to contradict previously published reports on the WI DNR model." And "Reliable long-term predictions of contamination with depth are critically important when it is recognized that the Draft FS indicates that only 4.8% of the contaminants in the DePere to Green Bay Reach of the Fox River are presently located within 10 cm of the surface. The presence of more than 95% of the contaminants at depths below the biologically active zone also raises concerns for active removal options that will expose and redistribute a portion of this material.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

This redistribution is recognized in the Draft FS in that partial remediation options assume a residual surficial sediment concentration of 2 ppm PCBs. Complete remediation options, however, assumed 0.25 ppm residual surficial sediment concentrations. These differing assumptions may significantly influence the relative effectiveness of partial and complete remedial options."

Other conclusions and recommendations are also presented in the peer reviewer's report (Reference M-208).

In October 2001, WI DNR issued new draft versions of the RI and FS documents for public comment. Other documents included with the RI/FS documents were a draft Baseline Human Health and Ecological Risk Assessment, a draft Model Documentation Report, and a Proposed Remedial Action Plan (PRAP). The study area for the revised RI/FS included the Lower Fox River as well as Green Bay. The PRAP identified the proposed remedial alternative selected for each of the Lower Fox River OUs and for the Green Bay OU, as well as the rationale for the selection.

The RAOs in the 2001 Draft RI/FS were similar to the 1999 Draft RI/FS discussed above. The proposed alternative described in the PRAP targeted the removal by environmental dredging of approximately 7.25 million cy of contaminated sediment containing an estimated PCB mass of greater than 64,000 lbs. (29,000 kg) from the Lower Fox River. The proposed alternative also incorporated the concept of monitored natural recovery for addressing the residual PCB-contaminated sediment that would remain in both dredged and undredged areas. The PRAP proposed the following remedial alternatives:

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- Operable Unit 2 (Appleton to Little Rapids): Monitored Natural Recovery to include 40 years of measuring PCB and mercury levels in water, sediment, invertebrates, fish, and birds, and the use of institutional controls.
- Operable Unit 3 (Little Rapids to DePere): Dredging with offsite disposal for 586,800 cy of sediment, to a RAL of 1.0 ppm PCB.
- Operable Unit 4 (DePere to Green Bay): Dredging with offsite disposal for 5,879,500 cy of sediment, to a RAL of 1.0 ppm PCB.
- Operable Unit 5 (Green Bay Zones 2, 3, and 4): Monitored Natural Recovery to include 40 years of measuring PCB and mercury levels in water, sediment, invertebrates, fish, and birds, and institutional controls.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

The PCB remedial action level for the Lower Fox River and Green Bay was selected to be 1.0 ppm to balance the feasibility (implementability), effectiveness, duration, and cost of remedial actions. In addition to the proposed remedial alternatives, monitoring is required during remedial activities and a model long-term monitoring plan was developed to direct the monitoring of site conditions for 40 years following remedy implementation.

The PRAP estimated the proposed remedial alternatives would cost approximately \$307.6 million to implement at the 1.0 ppm action level. This includes a cost estimate of approximately \$258.1 million to remove contaminated sediments from OUs 1, 3, and 4 and \$49.5 million for Monitored Natural Recovery in OUs 2 and 5. The PRAP did not include a contingency amount (typically 20%) as part of these costs.

The public comment period for the RI/FS and PRAP concluded in January 2002. In December 2002, WDNR and USEPA Region 5 issued a ROD for OU 1 and OU 2 in which the selected remedy for both OUs closely mirrored the proposed remedy described above. The stated goal for the OU 1 selected remedy is to reduce PCB levels in the top 10 centimeters of sediment to a surface-weighted average concentration of below 0.25 ppm PCBs by implementing dredging to remove all sediment above the RAL of 1.0 ppm PCBs. The ROD also allows for capping with sand in areas where the RAL cannot be achieved and the use of an engineered cap as a contingent remedy as long as specific conditions, as specified in the ROD, are met. The ROD estimates the present-worth cost of the selected remedy for both OUs is \$76.1 million. Of this amount, OU 1 is estimated to cost \$61.7 million, \$50 million of which is to be paid by WTM 1 and P.H. Glatfelter Company. OU 2 will cost an estimated \$14.4 million for 40 years of long-term monitoring. In June 2003, a separate ROD was released which selected remedies for OUs 3 through 5.

In October 2003, WTM 1 (formerly Wisconsin Tissue) and P.H. Glatfelter Company entered into a Consent Decree under which they agreed to design and implement the remedy for OU 1. The Consent Decree was approved in Federal court in April 2004. The remedy includes dredging and landfilling an estimated 784,200 cy from LLBdM. WTM 1 has agreed to take the lead for designing the remedy. WTM 1 and P.H. Glatfelter formed GW Partners LLC, under which the dredging of OU 1 is to be implemented.

In March 2004, NCR and Fort James Operating Company (Georgia-Pacific) entered into an Administrative Order on Consent in which they agreed to design the remedy for OUs 2 through 5. A program for collecting sediment samples to support the design effort was to begin in Summer 2004 and actual design should begin in Spring 2005 following receipt of sample analytical results. No PRP has agreed to-date to implement the remedy once design is complete.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Key Conditions: commercial landfill, dredging, dedicated landfill or CDF, extended (> 1 mile) river, Great Lakes AOC, hydrodynamic modeling, natural recovery, property access issues

Estimated Target OU 2 and OU 5: Monitored Natural Attenuation

Volume: OU 3: 586,800 cy

OU 4: 5,880,000 cy

OU 5: 200,000 cy (limited dredging)

Estimated Calendar Time to Implement Remedy:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: ***GILL CREEK (DuPont)***

SiteID: 02-05

US EPA Region: II

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Final; Dupont and Olin agreed to cooperate with the New York State Department of Environmental Conservation in implementing the remediation program described in the Gill Creek Plans and Specifications (April 1992).

Contaminants of Concern: VOCs, mercury, and PCBs

Overall Status Summary: Voluntary removal of about 7,000 - 8,000 cy by PRP in 1992. The creek was isolated with a cofferdam at the confluence with the Niagara River; and the creek was rerouted. Vacuum dredging, mechanical excavation, and vacuum removal after spray washing were used to remove sediments. Most removed materials were stabilized with fly ash and kiln dust and sent to a hazardous waste and TSCA-permitted landfill. A portion of the material from Area 3 (3,230 cy) went to a RCRA-permitted incinerator. Five years of post-remediation monitoring, consisting of periodic inspection of sediment traps and annual collection of surface-water and sediment samples, were completed in 1998. According to Dupont, these data show "no indication that recontamination of sediment is occurring." Therefore, no further post-remediation monitoring is planned for the portions of Gill Creek examined during this study.

Key Conditions: commercial landfill, Great Lakes AOC, incineration, post monitoring, solidification / stabilization

Estimated Target Volume: Area 1: 3,400 cy; Area 2D: 160 cy; Area 3: 40 cy; Riverbank: Not estimated.

Estimated Calendar Time to Implement Remedy:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: ***GILL CREEK (Olin Industrial Welding Site)***

SiteID: 02-17

US EPA Region: II

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: NYSDEC Order-on-Consent

Contaminants of Concern: Mercury; hexachlorocyclohexane (BHCs) (a product manufactured at the plant); PAHs

Overall Status Summary: An RI reported submitted to NYSDEC in February 1992 indicated a need for additional soil investigation at the site. Sampling of site soils, along with Gill Creek sediments, was performed during September 1992. Gill Creek sediments were found to contain low levels of mercury, BHCs, and PAHs. A ROD was issued in November 1994 by NYSDEC. The selected remedy for the site included waste containment with a leachate collection system, excavation of off-site contaminated soils and Gill Creek sediments and their consolidation under the capped containment area, and long-term operation and maintenance. The sediment remedial action was performed from mid-July 1998 to the end of August 1998. The stream was diverted and 6,850 cy of contaminated sediments were removed from 1800 ft of stream bed using typical construction equipment. The dredged material was placed in an on-site temporary containment area and will be used as site fill material as needed. The removal effort was considered successful by the PRP.

Key Conditions: dedicated landfill or CDF, dredge spoil reuse/fill

Estimated Target Volume: 7,500 cy of contaminated soft sediments.

Estimated Calendar Time to Implement Remedy:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: GM CENTRAL FOUNDRY (Massena)

SiteID: 02-04

US EPA Region: II

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Superfund. Final.

Contaminants of Concern: PCBs (1242 and 1248)

Overall Status Summary: Dredging of the St. Lawrence River portion of the site was completed in November 1995. Overall construction activities occurred from May 8 to December 19, 1995. A 2,500 foot long nearshore river area was enclosed by sheetpiling and was hydraulically dredged; 13,800 cy of sediment and rock (in situ) were removed. The sediments were dewatered and placed onsite in lined cells, pending a decision on ultimate disposal. The ROD required the onsite treatment of sediment containing greater than 10 ppm PCBs to less than 10 ppm and disposal of treated and untreated sediment containing less than 10 ppm in an onsite landfill. Strong public opposition to onsite thermal treatment and a reduction in commercial disposal costs since the original ROD was issued were two factors that led EPA to reconsider the disposal option. (A 1999 ROD Amendment, described below, allowed for offsite disposal.) Boulders that were removed as part of the dredging were either placed in lined cells located in areas of low PCB concentration or were power washed and reused in shoreline restoration.

One of the six quadrants, a 1.72 acre dredged area, was also capped due to the presence of PCBs at post-dredging average PCB levels of 27 ppm. The cap had an average thickness of 13 inches of sand (mixed with activated carbon), then 11 inches of gravel, and 8.5 inches of stone. EPA's decision to have this area capped "was made only after it was determined that dredging had not been successful in that area" (Reference B-199). The remaining five quadrants (9 acres) exhibited a post-dredging average of 3 ppm PCBs and were not capped. Five years of annual fish monitoring and cap inspection have occurred since completion of the remediation. The cove adjacent to the river embayment, however, has not yet been remediated due to difficulties obtaining access from the owner (the St. Regis Mohawk tribe).

A March 1999 ROD Amendment changed the method of disposal for sediment with PCB concentrations greater than 10 ppm from onsite treatment to disposal at an offsite TSCA-permitted facility. The ex-situ dewatered volume of sediment resulting from the 1995 removal totaled 10,230 cy. The offsite transport (by rail) and disposal of the stockpiled sediment was completed in Fall 1999. A total of 7,830 cy of sediment were disposed of at a cost of \$2.7 million (\$345 per cy). Prior to loading into railcars the sediment was screened to remove rocks and

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

boulders, thereby reducing the volume of sediment requiring offsite disposal from the initial 10,230 cy to 7,830 cy. A plan has been submitted by GM to EPA to allow onsite disposal of these rocks and boulders.

Remediation of the Raquette River and Turtle Creek was also designated in the original ROD. The Raquette has primarily a rocky bottom and flows along the southern boundary of the GM site and into the St. Lawrence River. The 1999 Amended ROD called for the removal of an estimated 2,600 cy of bank soils and 1,400 cy of sediments from the Raquette River and disposal of the removed sediments in the same manner as the sediment removed from the St. Lawrence River. A remedial work plan for performing the remedial activities in the Raquette River was submitted to EPA by GM in August 2001.

Remediation in the Raquette River commenced in August 2002, with the bulk of the work involving removal of contaminated bank soils. Some sediments are being removed from about a one-acre area using a vac truck. Disposal is to offsite commercial TSCA and non-TSCA landfills.

Turtle Creek and associated cove have not been remediated due to the absence of an access agreement with the property owner, the St. Regis Mohawk Tribe.

Key Conditions:

capping, commercial landfill, dedicated landfill or CDF, dredging, Great Lakes AOC, post monitoring, property access issues, rail transport for disposal

Estimated Target Volume:

The 1990 ROD projected dredging/treatment/disposal of 62,000 cy of sediments. Based on an extensive sampling program performed in 1993 and as referenced in a 1994 media statement (Reference B-29), the total targeted for removal was defined as 29,000 cy (which included some limited sediment removal in Turtle Creek and the Raquette River).

Estimated Calendar Time to Implement Remedy:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: *GOULD (Portland)*

SiteID: 10-07

US EPA Region: X

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Superfund. Final. Sediment removal an Interim Measure.

Contaminants of Concern: volatile organics, chlorinated herbicides, petroleum hydrocarbons, lead and other heavy metals, furans

Overall Status Summary: The East Doane Lake remnant, part of the Gould Superfund site in Portland, was a 3.1 acre impoundment, the result of a larger water body that had been gradually filled as a result of industrial development and waste disposal activities. Contaminants from several adjacent industrial sites include volatile organics, chlorinated herbicides, petroleum hydrocarbons, heavy metals (especially lead), and furans. Extensive industrial debris was present on the bottom of the lake.

A 1997 ROD Amendment called for removal of the most contaminated layer of sediment, generally the top two feet on average (the range was 0 - 3 feet depending on the area of the lake) and focusing on lead as the primary contaminant in this sediment layer, with disposal in an onsite RCRA containment cell - - to be sized and constructed to contain waste generated from both lake and onsite cleanup activities. The PRPs were responsible for this portion of the removal action. In addition, ODEQ determined that any remaining deeper, organic-contaminated sediments, based on ODEQ historical lake bottom delineation coring samples, should also be removed from the lake. ODEQ worked with the PRPs to "piggy-back" onto the PRP dredging contract to have all contaminated sediments removed during a single dredging operation. ODEQ required that the organic-contaminated sediments be removed down to the "historic" lake bottom, at times requiring removal of sediments down to 5 feet deep. ODEQ financed the additional dredging work.

The removal was performed as an Interim Measure over a four-month period, August through November 1998. Debris was first removed by divers, followed by hydraulic dredging of 11,000 cy of sediments. A 10-inch specialty dredge was used - - an IMS 4010 horizontal auger Versi-Dredge. The dredged slurry was pumped into 20,000 gallon holding tanks, then dewatered using filter presses. Dewatered material and removed debris was stockpiled onsite, then disposed into a new onsite RCRA landfill which was constructed in 1999. The lake was backfilled with 95,000 tons of rock. Cost was \$3 million.

Key Conditions: dedicated landfill or CDF, dredging, specialty dredge

Estimated Target Volume: 6000 cy (1997 ROD Amendment)

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

***Estimated Calendar Time
to Implement Remedy:***

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: **GRAND CALUMET RIVER**

SiteID: 05-07

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: 1998 Clean Water Act Consent Decree and 1998 Facility-wide RCRA Corrective Action Order.

Contaminants of Concern: PAH's, PCBs (primarily 1254); metals

Overall Status Summary: The Statement of Work attached to the 1998 Corrective Action Order specified five miles of river to be dredged of an estimated 687,000 cy of sediment that would be landfilled within a 40-acre Corrective Action Management Unit (CAMU) constructed by U.S. Steel (a subsidiary of USX Corporation) on U.S. Steel Gary Works property. The dredging plan proposed the use of cofferdams and flow diversion in the first mile, where the river is narrower with more stable banks, and floating dredges for the remaining four miles. The target was to remove "non-native sediment" down to 20-foot depth, maximum.

Planning for the project spanned 12 years. The total project cost is \$41 million; this includes only the Earth Tech contract awarded in about February 2001. Prior to this, Montgomery Watson was contracted to U.S. Steel and had begun preliminary work on the project including initial dredging design and submittal of a 60% design completion report for the CAMU to U.S. Steel; these costs are not included in the \$41 million.

The dredging was proposed as a result of the sediment in the five miles of river closest to the U.S. Steel Gary Works facility being heavily contaminated with PAHs and relatively high levels of PCBs. The ingestion of PCB-contaminated fish is the primary human health risk at the site. Sediment contaminant concentrations are greatest in the upstream sectors of the river and gradually decrease moving downstream.

Detailed project design performed in 2001 increased the target volume of sediment for removal to 750,000 cy (including non-native sediment, a six-inch over-dredge allowance, and removal of soft side slough material) and required the use of three cofferdam areas (each one-half mile long) in the most heavily contaminated upper 1½ miles of river and open water dredging in the remaining 3½ miles. The five miles of river were further divided into 36 transects with spacing that varies from 500 to 1,000 feet as part of an earlier characterization study. Project design and bidding were completed in early 2001. Bids received for CAMU construction and dredging reportedly ranged from \$35 to \$70 million.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site preparation activities began in January 2002 and construction of the CAMU began in March 2002. The CAMU was constructed with two units: a 10-acre Unit 1 for the disposal of TSCA and RCRA regulated wastes (primarily the estimated 125,000 cy of contaminated sediment to be removed from the upper 1½ miles of river) and a 26-acre Unit 2 for disposal of sediment removed from the lower 3½ miles of river. Installation of the CAMU outer berms and Unit 1 liner system were completed in November 2002 and the Unit 2 liner system was completed in February 2003. The water treatment system was constructed and the three cofferdams installed in the upper 1½ miles of river during this same period. The water treatment system began operating in March 2003 following the start of open water dredging. Additionally, sheetpile installation was performed along select areas of the river within the cofferdam areas. The sheetpile was installed to increase bank stabilization following dredging of these areas.

Dredging was accomplished in the upper 1½ miles with an 8-inch hydraulic cutterhead dredge and in the lower 3½ miles with a 12-inch hydraulic cutterhead dredge. Dredging began with the removal of 11,000 cy of sediment from Transect 17 Horizon 1 (a localized area of sediment with elevated levels of contaminants in the lower 3½ miles of river) from December 4 – 18, 2002. This was followed by the start of open water dredging in the remaining lower 3½ miles of river on February 25, 2003, which continued until approximately the end of October 2003. Dredging in the cofferdam areas began on March 20, 2003 following the installation of the sheetpile for bank stabilization and continued intermittently until approximately the end of November 2003.

Final sediment removal volume was 788,000 cy and the final project cost was \$50.9 million (total for 13 years; includes design, permitting, construction, WTP operation and dredging).

Key Conditions:

dedicated landfill or CDF, dredging, extended (>1 mile) river, Great Lakes AOC, wetlands

Estimated Target Volume:

687,000 cy sediment (559,000 cy non-native sediment; 38,000 cy six-inch over-dredging; and 90,000 cy soft-sides); increased to 750,000 cy in the final design documents.

Estimated Calendar Time to Implement Remedy:

1. Design, permit application, and negotiations with PRPs in progress;
2. CAMU construction targeted for 1999 and 2000;
3. Dredging to be performed in 2001 and 2002.
4. Post-remediation monitoring to begin in 2005.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: GRASSE RIVER - PROJECT 1 (Hot Spot)

SiteID: 02-01

US EPA Region: II

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: EPA-Lead. Interim; removal of highest PCB concentrations as non-time critical removal action; voluntary action by PRP; agency approval.

Contaminants of Concern: PCBs (1242/1260)

Overall Status Summary: RODs were issued by NYSDEC for land-based areas. Dredging was pursuant to an EPA Administrative Order. Pilot dredging of 2,600 cy of sediment and wet excavation of 400 cy of rocks/boulders were performed as a non-time critical removal action (NTCRA) in a nearshore one-acre hot spot in the Grasse River in 1995. The removed material was deposited in an existing onsite TSCA/RCRA landfill.

Sediment sampling within the hot spot area by Alcoa following the removal indicated that average PCB levels in the top one-foot of sediment had been reduced from 518 ppm to 75 ppm and in all depths of sediment from 1,109 ppm to 75 ppm. Caged fish studies performed during the removal indicated that levels of PCBs in the caged fish increased significantly during sediment removal (20 to 50 times higher) and remained elevated (2 to 6 times) up to 6 weeks following the removal. Resident fish PCB levels also were shown to have significantly increased at the time of the removal and reportedly slowly reduced to near pre-removal levels in the three years following the removal.

Key Conditions: dedicated landfill or CDF, dredging, hydrodynamic modeling, pilot/demonstration test, post monitoring

Estimated Target Volume: Approximately 3,500 cy of in-situ sediment.

Estimated Calendar Time to Implement Remedy: June to September 1995

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: GRASSE RIVER - PROJECT 2 (*the River*)

SiteID: 02-16

US EPA Region: II

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: EPA-Lead

Contaminants of Concern: PCBs (1242/1260)

Overall Status Summary: A draft Analysis of Alternatives (AA) document for the remaining sections of the river (including the NTCRA area) was submitted by Alcoa to EPA, the NYSDEC, and the St. Regis Mohawk Tribe in December 1996. Comments on the draft AA were received in September 1998. Alcoa submitted a revised AA document incorporating three additional years of data collection in December 1999. A final Analysis of Alternatives (AA) document for the Grasse River Study Area (GRSA) was submitted by Alcoa to EPA, the NYSDEC, and the St. Regis Mohawk Tribe in June 2002 and has been approved. This evaluation considered monitored natural attenuation, dredging, capping, and combinations thereof.

Alcoa conducted a Capping Pilot Study over a 7-acre portion of the Grasse River between July 23 and October 9, 2001 with post-monitoring activities conducted in November 2001 and throughout 2002. The project involved capping an approximate 750-foot long by 400-foot wide section of the Grasse River downstream of the Alcoa Massena facility using a variety of capping materials and cap material placement techniques. The project was performed with EPA and USACE oversight. Camp Dresser & McKee was the oversight contractor and had overall responsibility for completion of the project. Severson Environmental Services was the materials handling and placement contractor, contracting directly with Alcoa. Blasland, Bouck, & Lee provided pre-, during, and post-capping monitoring of the water column, sediments/cap material, and benthic community. Quantitative Environmental Analysis provided data management and evaluation.

(Source: Reference A-884) The objectives of the capping pilot study were to evaluate the following:

- “alternative cap placement techniques (alone or in combination) through surface and subsurface placement via mechanical clamshell, subsurface placement via tremie pumping, and surface placement via pneumatic broadcasting (bentonite only);” and
- “alternative cap materials (alone or in combination) including 1:1 sand/topsoil mixture, granulated bentonite, and AquaBlok™ (a commercial, clay, gravel composite).”

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

(Source: Reference A-884) The metrics for evaluation during the capping pilot study included the following:

- “cap coverage effectiveness (including the ability to cap steep side slopes, and the extent of particle size fractionation of cap material during placement);”
- “extent of potential entrainment of underlying contaminants into cap materials during placement;”
- “water column impacts during placement;”
- “cost;” and
- “recolonization of sediment by benthic organisms.”

The following characterize the capping site at the time of the pilot study (Source: Reference A-884):

- “steep side slopes (30 to 50%) (thus minimal adjacent wetlands);”
- “relatively flat bottom;”
- “water depths (excluding side slopes) averaging about 16 feet;”
- “low erosion potential (water velocities during tests ranged from 0.02 to 0.80 ft/sec);”
- “bottom sediments, ranging from 1 to 6 feet in depth, composed primarily of silt, sand, and organic matter;”
- “PCB concentrations in surficial sediments on the order of 10 mg/kg; and”
- “minimal presence of boulders, cobbles, or debris on the sediment bed.”

“During the capping period, the flow in the River was generally low, averaging 237 cfs (range 78 to 765 cfs).”

The Capping Pilot Study is summarized below (Source: Reference A-884):

“The 7-acre site was divided into four cells, and the project was divided into two phases. The first phase, designed to screen a number of capping materials and application methods, was conducted in Test Cell #1 (the Test Cell), which was divided into five subcells. The second phase, conducted in Pilot Cells #2, #3, and #4 (the Pilot Cells), was designed to evaluate, under operating conditions

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

approximating a full-scale project, the material/application combinations considered most promising based on the Phase 1 work. In four treatments, the cap was applied in two or three lifts; a single lift was used in the other four treatments. Target cap thickness (considering all lifts in a cell) ranged from 0.75 to 2 feet, with 1 foot being the most common. The Test Cell was aligned along the north shore of the River. The Pilot Cells were aligned along the south shore. The site extended from bank to bank, and upon completion of the project a cap was in-place over the entire site except for nearshore vegetated areas and nearshore areas blocked by overhanging trees.”

“Capping was conducted with an in-water equipment barge, usually carrying an 80-ton crane outfitted with a 2.5 yd mechanical clamshell bucket. Capping materials, prepared at an on-shore staging area, were placed on a separate barge. A key element of the capping was accurate horizontal control of the bucket using a combination of global positioning systems (GPS) and the Windows Offshore Positioning Software (WINOPS). Vertical control was maintained by the crane operator using markings on the lowering cable. The clamshell bucket was opened at the water surface when using the surface application technique or at a predetermined depth below the water surface when using the subsurface application technique.”

“The principal capping material used was a 1:1 mix of locally obtained sand and topsoil. The mixture had a total organic carbon content averaging about 0.7% (range ND to 1.8%). Other capping materials including granulated bentonite and AquaBlok™, a commercial clay-gravel composite. All capping materials were tested/analyzed for a broad range of physical and chemical properties prior to use in the study.”

“During nearly all capping activities, an in-River silt curtain containment system was used along the perimeter of the cell or subcell being capped. Silt curtains were selected because they have the ability to reduce the migration of cap materials downstream and to adjacent cells during placement without unacceptably restricting the flow of the River. The placement of the silt curtains was adjusted during the program so that one side of the River always remained open for boat traffic and fish movement. Silt curtains were not used for the capping of a small, centerline wedge area that was found to have been blocked by the curtains.”

“Monitoring was conducted prior to, during, and immediately following capping activities in order to address each of the objectives listed above. Of note is an extensive water quality monitoring program that included sampling at (1) upstream and downstream locations; (2) in-cell locations; and (3) locations adjacent to each cell (just outside silt curtain). A total of approximately 900 water samples and 490 sediment samples were collected and analyzed during the study. The results of water quality monitoring during capping were continually compared to a set of

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

“corrective action triggers.” Results exceeding these triggers could have resulted in suspension or modification of capping activities, however, no trigger levels were ever exceeded.”

(Note, not part of quote: Monitoring activities included water column sampling, use of semi-permeable membrane devices (SPMDs), sediment bed elevation measurements, collection of sediment cores, benthic community assessment, bathymetric surveys, side slope characterization, flow measurements, diver observation, and visual and photographic documentation.)

“Results of the pilot study indicate that capping of PCB-containing sediments can be successfully implemented in the lower Grasse River. Several application methods and capping materials were evaluated. Optimal results were achieved with a 1:1 sand/topsoil capping material applied - - at the water surface or subsurface - - via a clamshell attached to a barge-mounted crane. This combination was capable of generating a cap: (1) of acceptable uniformity and thickness; (2) with no significant PCB entrainment from the in-place sediments; and (3) with no significant alteration of the cap material (i.e., TOC loss or grain size fractionation). A sophisticated clamshell positioning system (GPS/WINOPS), as well as crane operator experience, was found to be important to success.”

“The pilot capping was carried out with minimal impacts on the environment. Water quality impacts during capping were negligible. Nearshore aquatic vegetation areas were left undisturbed, and on-shore land disturbance (for the staging area) was minimal since a prior staging area was utilized. Results of the post-capping benthic community analyses also generally indicate that the cap provides suitable habitat for benthic recolonization.”

“The pilot study provided valuable operational information - - including data on application rates and unit costs - - that will allow a reliable evaluation of full-scale operational parameters.”

A final remedial alternative has yet to be selected. The data collected during the pilot capping project reportedly will be used to assist in the development and selection of remedial alternatives.

In Spring 2003, USEPA completed a review of remedial alternatives that Alcoa had presented in its Analysis of Alternatives Report and was ready to begin finalizing a proposed remedial action plan (RAP) for the site. Work on the RAP was put on hold when Alcoa's annual monitoring results from Spring 2003 indicated that the pilot cap had failed and underlying sediment had been disturbed. At the time it was believed that the cause was ice from breakup of an ice jam during the Spring 2003 thaw. Alcoa performed follow-up investigations to learn more about the disturbance to the cap and underlying sediment.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

USEPA and Alcoa have elected to perform a pilot program to evaluate a number of potential remedies. As part of the pilot program, Alcoa will evaluate dredging, armored capping, and use of an ice control structure within an area of the river identified as being susceptible to ice scour. The dredging component targets the removal of 75,000 cy of sediment. Work in 2004 includes constructing an already permitted landfill cell at Alcoa's West Plant for disposal of the removed sediment and completion of the project design. In-water work is targeted to begin in Spring 2005.

Key Conditions:

capping, extended (> 1 mile) river, hydrodynamic modeling, pilot/demonstration test

Estimated Target

Volume:

***Estimated Calendar Time
to Implement Remedy:***

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: GRUBER's GROVE BAY

SiteID: 05-36

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: State-lead. Final

Contaminants of Concern: Primarily mercury (some as soluble methyl mercury); also lead, copper, and ammonia compounds.

Overall Status Summary: Gruber's Grove Bay is a 25-acre waterbody that is part of man-made Lake Wisconsin and is located just south of the former Badger Army Ammunition Plant (BAAP) (now a Superfund site) near the towns of Merrimac and Sumpter, Sauk County, WI. Mercury is the primary contaminant (also lead, copper, and ammonia compounds) originating from both manufacturing and onsite sewage treatment wastewater discharges to the Bay from the BAAP. The removal targets about 87,000 cy of sediment containing greater than 0.36 ppm of total mercury from the Bay. Total mercury levels in Bay sediment have been found as high as 24 ppm. Background mercury levels in Lake Wisconsin sediment have been shown to be 0.36 ppm; the removal will target Bay sediments that exceed this level.

The USACE - Omaha District provided design and engineering oversight. Stone & Webster was the prime contractor for these services. Bay West, Inc. was contracted to perform the dredging and WDNR provided agency oversight. The U.S. Army is the PRP and funded the removal action.

Dredging began in April 2001 and was completed on November 18, 2001. A 10" Ellicott Mudcat MC-2000 hydraulic auger dredge -- the same model dredge modified (to increase dredging depth from 20 feet to 30 feet) for use during 2000 at Fox River SMU 56/57 (Project ID 05-06) -- was operated 8 to 12 hours per day, five to six days per week, and discharged an average 83 cubic yards per hour. (Note: The average discharge rate of 83 cubic yards per hour conflicts with the discharge rate calculated using other operational parameters provided. Assuming that dredging occurred an average of 5.5 days per week, 10 hours per day, for 26 weeks (mid-April through mid-November, with 28 days of non-dredging time subtracted due to geotube tearing problems) and resulted in the removal of 88,300 cy of sediment, the average production rate is calculated to be 62 cy per hour.) Reportedly, a maximum production rate of 1,500 cy per day was achieved during peak periods that included dredge operation during available daylight hours, six days per week.

Dredging began at the silt curtain (placed across the mouth of the Bay) and progressed towards the BAAP using a grid pattern with overlap to provide

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

complete coverage of the target areas. Dredging depth was verified using a mapping-grade differential global positioning system unit in conjunction with an echosounder. Depths from the echosounder were verified with direct measurements in the field. Problems affecting dredge operation included an above-average precipitation event near the beginning of the project, approximately 28 days when dredging was not performed due to geotube tearing problems, and dredge downtime due to encountering debris such as golf balls, tree branches and roots, tires, metal, and anchors. Dredging was completed in November 2001.

Sediment slurry was hydraulically pumped from the dredge through 4,500 feet of 10-inch pipe to the dewatering area located on the BAAP. A booster pump, located on the edge of the BAAP property, was used to pump the sediment slurry to the dewatering and disposal area located in an area of elevated terrain. The dredge slurry was then discharged through a pipe header distribution system into multiple geotubes for dewatering.

Approximately 102 geotubes, stacked parallel to one another (horizontally and vertically) and up to 3 tubes high, were used. Initially, empty tubes were placed on a polyethylene-lined, 245-foot by 895-foot laydown area with berms to contain the water. The geotubes were 200 feet long and 20 feet in diameter, and were filled directly from the dredge slurry transport pipe. Dredged material was concurrently injected into the tops of multiple tubes through a manifold system attached to a series of ports with a pinch valve for each geotube. This allowed for uniform filling of the tubes and allowed the operators to shift from tube to tube without stopping the dredge. Once a maximum sediment depth of six feet (per the manufacturer's instructions) was achieved in the tubes, the tubes were left to settle and dewater, typically overnight. This process was repeated until each tube reached its maximum pressure and fill capacity. Initially, fine clay particles were found to be passing through the geotube filter fabric. A polymer was subsequently added to the dredge slurry pipe prior to the booster pump, about two gallons per hour for a slurry flow rate of 2,000 gallons per minute, to increase flocculent growth and, therefore, retention of fine particles in the water.

Water from the geotubes discharged to a primary catch basin that was divided by a weir to assist in further separating solids from the water. Water flowing over the weir was then pumped to a temporary 2.3 million gallon storage lagoon for spray irrigation. The system was sized to handle the anticipated water load generated from both the geotubes and precipitation events. Mercury levels in the effluent were typically measured at nondetect (less than 0.1 ppb) or, if detected, below the discharge permit level of 2 ppb. In the last two days of dredging, water effluent lead levels exceeded the discharge permit level of 15 ppb. Reportedly, because of the short duration of the project remaining, WDNR allowed the project to be completed without the implementation of a corrective action to address the elevated lead levels.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Water from the temporary lagoon was pumped about 0.6 miles to the northeast and applied to three separate effluent application areas, two alfalfa fields (25 and 71 acres) and a 55-acre forested area. The water was sprayed over the fields and tree canopy via spray nozzles. Spray irrigation was limited to 10,000 gallons per 1.21 acres per day, averaged over a week.

Habitat restoration is to be in 0.5 acres of nearshore bottom to a depth of 1.5 feet and approximately 1.7 acres of nearshore bottom in water depths of 5 feet. These areas are to be examined following dredging and, if found disturbed by dredging, replanted with appropriate native species.

Geotube dewatering continued until Summer 2002 when the geotubes were covered by a 2.5-foot layer of clean subsoil followed by a 0.5-foot layer of topsoil. Total project cost is estimated at \$7 million.

In 2003, Michigan DEQ decided to list Gruber's Grove Bay on their 303(d) list of impaired water bodies. Additional sediment sampling was required to verify contaminant levels within the Bay and for eventually removing the site from the MDEQ 303(d) list. In early 2003, MDEQ staff performed limited sampling of Bay sediments and the sample results indicated that areas of sediment still contained levels of total mercury that exceeded the remedy target level of 0.36 ppm. Because of these findings, in February 2004 the USACE implemented a more extensive sediment sampling program within the Bay. The preliminary results of this sampling effort have confirmed the likely existence of sediment above the remedy target level. Preparation of a final report by the USACE is ongoing and its issuance will likely be by October 2004.

Key Conditions:

dedicated landfill or CDF, dredging, habitat/streambank restoration, property access issues, water handling limitations

Estimated Target Volume:

87,000 cy

Estimated Calendar Time to Implement Remedy:

April - September 2001: Dredging of sediment from Gruber's Grove Bay and filling of geotubes.
September 2001 - May 2002: Geotube dewatering and burial, and restoration.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: **HARBOR ISLAND**

SiteID: 10-03

US EPA Region: X

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund. Final.

Contaminants of Concern: PCBs (1248/1254); metals (primarily copper, lead, mercury, tributyltin (TBT), and zinc); PAHs

Overall Status Summary: The Harbor Island Superfund Site is divided into seven operable units (OU): (1) the petroleum storage tank facilities OU, (2) the Soil/Groundwater OU, (3) the Lockheed Shipyard OU, (4) the Lockheed Shipyard Sediment OU, (5) the Todd Shipyard Sediment OU, (6) the East Waterway Sediment OU, and (7) the West Waterway Sediment OU. This Database Project ID 10-03 covers the Lockheed Shipyard Sediment Operable Unit, the Todd Shipyard Sediment Operable Unit, and the East and West Waterways Operable Units.

A November 1996 ROD for the Shipyard Sediments Operable Unit called for dredging of contaminated sediments to the Washington State Sediment Management Standard Cleanup Screening Level (CSL) for each constituent. Dredging was to be followed by capping with 2' of clean sediments to meet Sediment Quality Standards (SQSs) as defined in the Sediment Management Standards. The 1996 ROD addressed shipyard sediments in the Todd and Lockheed Shipyards. Estimated sediment removal volumes were 116,000 cy at the Todd Shipyard and 18,000 cy at the Lockheed Shipyard. The volume of clean sand for cap materials was estimated at 91,000 cy. Sediment disposal most likely would be in a confined nearshore disposal or confined aquatic disposal (CAD) facility. The PCB dredging target level is 65 ppm; dredging target levels are also defined for individual metals and PAHs. In September 1998, additional sediment data collection commenced at Todd Shipyard to support the remedial design work.

The additional sediment data collection by Todd Shipyard was to identify sediment contamination exceeding state chemical criteria, conduct optional biological tests, and identify areas containing significant amounts of sandblast grit. The data show contamination present outside the ROD boundary. As a result, EPA collected samples outside of the ROD boundary to determine the extent of the contaminated sediments. In addition, Todd Shipyard collected bathymetric data to determine the contours and depths of the targeted cleanup area, identified additional areas containing sandblast grit and shipyard debris, and addressed other pre-design data gaps. As a result of this new information, EPA expanded and redefined the ROD boundary area. This change is outlined in a 1999 Explanation of Significant Differences (ESD) and expands the boundaries to encompass all of the potentially-

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

contaminated sediments requiring remediation. The ESD also designated the Todd Shipyard site as an independent operable unit (the Todd Shipyard Sediment Operable Unit), separate from the Lockheed Shipyard Sediment Operable Unit.

In November 1999, the EPA issued a Proposed Plan for the marine sediments in the West Waterway Operable Unit. The West Waterway OU includes about 70 acres of estuarine sediments. The West Waterway is a dredged navigation channel used extensively for industrial and port purposes. EPA concluded that . . . "a no action decision is appropriate because environmental investigations and site-specific risk assessments found that concentrations of chemicals (including PCBs, tributyltin, and mercury) in marine sediments within the West Waterway Operable Unit do not pose unacceptable risks to human health and the environment. Further, environmental investigations did not identify any "hot spots" of contaminated sediments that warranted cleanup. (Note: Maximum concentrations measured in the West Waterway are 1.5 ppm PCBs, 88 ppm PCBs carbon-normalized, 15.3 ppm tributyltin, and 2.2 ppm mercury.) EPA believes that sediments with the highest concentrations of chemicals on the western side of Harbor Island are already targeted for clean up under EPA's Record of Decision for the "Shipyard Sediments" (Todd and Lockheed Shipyards). Finally, EPA believes that the majority of that contamination associated with the Harbor Island Site, including contamination that could have contributed to sediment problems in the West Waterway Operable Unit, is being addressed as part of the Shipyard Sediments cleanup, upland soil and groundwater cleanups, and upland source cleanups implemented to reduce contaminant inputs into the marine environment. Future work remains to address sediments in the East Waterway adjacent to Harbor Island." The no action decision for the West Waterway was confirmed by EPA in a September 2003 ROD.

For the Lockheed Shipyard Operable Unit, an ESD to the 1996 ROD was issued for public comment in December 2001 (and subsequently issued final in February 2002). In the ESD (Reference A-727), the reason for its issuance is described as follows:

"EPA's November 1996 ROD . . . selected a remedy involving five essential elements:

- (1) dredging to remove shipyard waste and contaminated sediments exceeding the cleanup screening level (CSL) of the State of Washington Sediment Management Standards (SMS);
- (2) capping contaminated sediments exceeding the sediment quality standards (SQS) of the SMS;
- (3) identification of acceptable disposal options;
- (4) specification of design criteria for acceptable habitat and to prevent future recontamination; and
- (5) institution of long-term monitoring and maintenance of the remedy."

“The ROD also identified eight remedial design objectives which are to:

- (1) identify sediment contamination exceeding the CSL and SQS;
- (2) conduct confirmatory biological effects tests (optional);
- (3) characterize dredged sediments;
- (4) evaluate armoring of any caps;
- (5) conduct habitat inventory;
- (6) evaluate potential disposal sites;
- (7) evaluate physical separation technologies for shipyard waste; and
- (8) determine the extent of dredging under-pier sediments.”

“Additionally, the ROD notes that “(t)he extent of dredging of contaminated sediments and waste under piers at . . . Lockheed Shipyard will be determined during remedial design based on cost, benefit and technical feasibility.”

“Therefore, prior to the start of 30 percent remedial design, additional data gathering and analyses are necessary to determine the extent of contamination and the appropriate remedial action.”

“Also, the cost estimated in the ROD to implement the remedy is low. The cost estimate only included the cost of remediating the open water sediment management unit (SMU) and did not include costs for remediation of the majority of the Lockheed Shipyard Sediment Operable Unit . . .”

“In the 1996 ROD, EPA concluded that additional information is required to more fully define the dredge and cap remedies. For example, a more detailed understanding of the locations of CSL exceedances was needed before a dredging plan could be developed. Also, as stated in the ROD, the extent of under-pier remediation was not determined and was left to later in remedial design work based on consideration of cost, benefits, and technical feasibility.”

The additional data were collected and evaluated and documented in 1999-2000. The data showed that contamination beneath the Lockheed Shipyard pier exceeded the State standards at sediment depths down to 12.5 feet below the mudline and contamination in the open water exceeded the standards typically at sediment depths down to 5 feet below the mudline. EPA evaluated six remedial strategies for dredging and capping of the Lockheed Shipyard sediments, described in the 2002 ESD. All of the strategies assumed the removal of the Lockheed pier and its more than 6,000 pilings.

The selected remedy for the Lockheed Shipyard sediments, described in the 2002 ESD, is to remove pier and shipway decking and pilings; dredge to a depth sufficient to accommodate a cap in the under-pier, shipway, and enclosed water

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sediment management unit (SMU); and dredge to the sediment quality standards (SQS) in the open water SMU without capping. SQSs are established for arsenic, copper, mercury, lead, zinc, PAHs, and PCBs. The remedy includes estimates of removal of 6,000 piles, dredging of 46,600 cy of sediments, removal of 11,100 yards of surficial debris, and placement of 53,400 cy of cap material. Estimated cost is \$12 million. A 2003 ESD designated that disposal of dredged sediments would be at upland disposal facilities.

In a June 2002 Interim Remedial Design report (Reference A-936), the planned remediation of the Lockheed Shipyards sediments was described as follows:

- Approximately 130,000 square feet of existing pier superstructure and 2,800 timber piles, which support existing piers and crane ways, will be removed during demolition of piers; an additional 30,000 square feet of timber decking and approximately 3,000 timber piles will be removed from South, Middle, and North Shipways during demolition.
- Sediment dredging will be performed within the Channel and Slope Areas of the LSSOU and will remove about 131,000 cy of sediment and debris. “The objective of the proposed design is to remove contaminated sediment within the Channel Area while maintaining to the degree possible the existing elevations in the Slope Area. . . This was accomplished by designing the dredge prism below the depth of SQS exceedances within the Channel Area, and cutting stable slopes within the Slope Area to accommodate both the channel dredging and cap thickness.”
- Following dredging, a 5-foot-thick, three-layer sediment cap will be constructed within the slope area, by placement of about 54,000 cy of cap materials. “The cap is designed to provide the following: 1) chemical and physical isolation of the underlying sediment, 2) protection for burrowing organisms, 3) protection from erosive forces, 4) a final surface that is habitat compatible, and 5) restoration of critical habitat elevations above –10 feet MLLW.”

In mid-2003 two proposed consent decrees (one for the Lockheed Shipyard sediments and one for the Todd Shipyard sediments) were issued for public comment by the U.S. DOJ. These two consent decrees proposed the following remedies – for the Lockheed Shipyard: remove pier, including 6,000 piles; dredge 130,000 cy of contaminated sediments; and cap four acres of contaminated sediments; - for the Todd Shipyard: remove two piers, including 3,000 piles; dredge 200,000 cy of contaminated sediments; and cap contaminated sediments under remaining piers. (It has not been determined why the dredging volumes described in Reference A-936 and subsequently proposed in the two consent decrees are so much larger than those estimated in the 1999 and 2002 ESDs.)

The Lockheed Shipyard sediment remedial work began in Summer 2003 and is

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

targeted for completion in February 2004. TRC Companies (Windsor, CT) is the construction contractor. The Todd Shipyard sediment remedial work also started in Summer 2003, with pier and pile removal work targeted for completion by the end of 2003; dredging is targeted to start in August 2004; and all cleanup work is scheduled to be completed by February 2006.

For the East Waterway operable unit, a proposed plan described in an Engineering Evaluation/Cost Analysis was issued for public comment in August 2003. The plan proposes cleanup of a 20-acre area in the East Waterway, that is contaminated with PCBs above State of Washington standards, by dredging about 200,000 cy of contaminated sediments with disposal in a commercial landfill and about 59,000 cy of clean sediment (to improve navigation) with disposal in an Elliot Bay disposal area. Construction can only take place from August to the middle of February, due to a "fish window." Work is expected to take two in-water construction seasons. Estimated cost is \$17 million.

Key Conditions:

capping, confined disposal facility, dredging, fish spawning limitations, navigational dredging component, tidal fluctuations

Estimated Target

Volume:

Estimated Calendar Time to Implement Remedy:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: ***HOOKER (102nd Street)***

SiteID: 02-06

US EPA Region: II

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Superfund. Final.

Contaminants of Concern: VOCs; heavy metals (including mercury)

Overall Status Summary: Removed about 28,500 cy of sediments in 1996 and 1997; about 25,000 cy from an Embayment along the Site's 1700' water front, along with 3,500 cy removed from the Little Niagara as part of a voluntary removal action to improve channel navigation; a minimum removal depth of 2 feet was used, with some areas exceeding the 2 foot minimum removal depth as dictated by site characterization data; removed sediments were replaced with 1 foot of clean soil (to create a net gain in water depth of 1 foot in the area); no verification sampling was performed; sediments were disposed of in an onsite landfill and capped. No cost data are available.

The site was officially deleted from the NPL on August 5, 2004.

Key Conditions: dedicated landfill or CDF, Great Lakes AOC

Estimated Target Volume: 4,600 cy at "hot spot" locations; 15,000 cy remaining sediments (based on dredging to "clean line" and a depth of 2 ft.)

Estimated Calender Time to Implement Remedy: Dredge and incinerate "hot spot" sediments - 2.5 years;
dredge and dispose of sediments on-site beneath cap - 18 months

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: HOUSATONIC RIVER - PROJECT 1 (Hot Spot)

SiteID: 01-01

US EPA Region: I

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: CERCLA 106 Administrative Order. Interim removal.

Contaminants of Concern: PCBs (1254/1260)

Overall Status Summary: RCRA Corrective Action Permit issued in 1994 covers six areas; Area 6 is the Housatonic River and Silver Lake; overall investigation proceeded, leading toward to a Corrective Measures Study. Subsequently, a multi-party negotiation effected a global settlement of plant site and river issues. (Refer to report for Project 01- 09.)

State/EPA administrative order was issued in November 1996 for GE to remediate shoreline and in-river hot spot area contaminated with PCBs, located opposite Building 68. In 1997, 6,000 cy (4,900 cy sediment, 1,100 cy bank soil) was removed and disposed at an offsite TSCA landfill. Removal was completed in December 1997. Removal was accomplished by dry excavation from within sheetpile cells. Subsequently, in 1998, in response to the negotiated settlement, additional bank soils in the Building 68 area were targeted, removed, and disposed offsite at a TSCA landfill. This work was accomplished from November 1998 through mid-January 1999 and resulted in removal and disposal of 1445 tons (roughly 1000 cy) of bank soil.

Key Conditions: commercial landfill, post monitoring

Estimated Target Volume: 2,600 - 2,800 cy of sediments and bank soils combined.

Estimated Calendar Time to Implement Remedy: Targeted for November 1997.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: *HOUSATONIC RIVER - PROJECT 2 (First Half Mile)*

SiteID: 01-09

US EPA Region: I

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Consent Decree, pursuant to both CERCLA and RCRA. Final.

Contaminants of Concern: PCBs (1254/1260)

Overall Status Summary: On October 7, 1999, representatives of the U.S. EPA; U.S. Department of Justice; the Commonwealth of Massachusetts Department of Environmental Protection, Office of the Attorney General and Executive Office of Environmental Affairs; the State of Connecticut Department of Environmental Protection and Office of the Attorney General; the U.S. Department of the Interior; the National Oceanic and Atmospheric Administration; the City of Pittsfield; the Pittsfield Economic Development Authority; and the General Electric Company (GE) reached a comprehensive agreement relating to the cleanup of GE's Pittsfield facility, certain off-site properties, and the Housatonic River. The detailed terms of this agreement are incorporated in a Consent Decree which was lodged on October 7, 1999, with the United States District Court of Massachusetts, Western Division, in Springfield, Massachusetts. Following a public comment period in early 2000, the Consent Decree was entered by the Court on October 27, 2000.

The Consent Decree provides for cleanup of the Housatonic River and associated areas, cleanup of the General Electric Plant facility, environmental restoration of the Housatonic River, compensation for natural resource damages, and government recovery of past and future response costs. In addition, a Definitive Economic Development Agreement among GE, the City of Pittsfield, and the Pittsfield Economic Development Authority provides for economic redevelopment of the GE Plant facility. That agreement became effective upon entry of the Consent Decree.

The Consent Decree divides the Housatonic River into three separate segments for purposes of cleanup responsibilities. For the first 0.5 mile of the East Branch, from the Newell Street Bridge to the Lyman Street Bridge in Pittsfield (MA), GE will perform source control measures and cleanup of the river sediments and bank soil. For the next 1.5 miles, from the Lyman Street Bridge to the confluence of the East and West Branches, EPA will perform cleanup of the river sediments and bank soil to the top of bank, while GE is responsible for cleanup of the floodplain soil (i.e., all contaminated property beyond the top of bank). The cost to implement the removal action in the 1.5-mile segment will be shared by EPA and GE with the amount of EPA funding increasing as the overall costs increase. For the segment below the confluence, the "Rest of River," GE is responsible for implementing a remedy to be selected by EPA. In this Major Contaminated Sediment Site Database, the first 0.5

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

mile segment is Project 01-09, the next 1.5 miles is Project 01-11, and the Rest of River is Project 01-13.

One of the elements of this Consent Decree is for GE to implement remediation of PCB-contaminated sediments in the 0.5-mile segment of the East Branch of the Housatonic River, starting opposite the GE plant site. Elements of the remediation in the 0.5-mile segment include (1) removal of PCB-contaminated sediments, and restoration by capping and (2) removal of PCB-contaminated bank soils, and restoration by backfilling and seeding/planting. This work was estimated to remove 8,100 cubic yards of sediment and 4,000 cubic yards of bank soils from the one-half mile, with disposal into a dedicated TSCA landfill on the GE plant site. Targeted PCB cleanup levels in bank soils are 10 ppm avg. PCBs in the top foot and 15 ppm avg. from one to three feet deep.

Work on the one-half mile segment started in mid-October 1999. Sediment removal began in mid-November 1999 and was completed in July 2002. Removal work was performed year-around, weather permitting. Sediment removal was performed by dry excavation from within dewatered, sheetpiled cells. A total of 6,356 cy of bank soils and 11,782 cy of sediment was removed. The removed bank soils were predominantly TSCA material (76.6%, vs. 23.4% non-TSCA). The majority of removed sediments were non-TSCA material (78.4%, vs. 21.6% TSCA). Water collected and treated as a result of the dewatering activities totaled 178.3 million gallons.

After sediment removal was completed in each cell, an isolation cap system was installed. The isolation cap typically consisted of, from bottom to top, a geotextile layer, an isolation sand layer, another layer of geotextile and geogrid, and a stone armor layer. Excavated bank areas were backfilled and revegetated.

The progress of the project was slowed by the periodic presence of non-aqueous phase liquids (NAPLs), often consisting of PCBs and coal tar, or just coal tar. The presence of NAPL caused a temporary work stoppage to determine the possible source, extent, and method of control. NAPLs were either removed, or controlled by some means such as by installation of barrier walls or recovery and monitoring wells, or both. (Volumes of NAPL-impacted material removed included 715 cy of bank soil and 2,662 cy of sediment -- volumes which are included in the above soil and sediment removal volumes.) High-flow events in June 2000 and again in April 2001 also slowed the project.

Work was completed in October 2002.

Key Conditions:

capping, dedicated landfill or CDF, floating oil, floodplains targeted, habitat/streambank restoration, post monitoring

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Estimated Target Volume: 8,100 cy sediments; 4,000 cy bank soils.

Estimated Calendar Time to Implement Remedy: October 1999 to May 2001

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: *HOUSATONIC RIVER - PROJECT 3 (Next 1.5 Miles)*

SiteID: 01-11

US EPA Region: I

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Consent Decree, pursuant to both CERCLA and RCRA. Final.

Contaminants of Concern: PCBs (1254/1260)

Overall Status Summary: On October 7, 1999, representatives of the U.S. EPA; U.S. Department of Justice; the Commonwealth of Massachusetts Department of Environmental Protection, Office of the Attorney General and Executive Office of Environmental Affairs; the State of Connecticut Department of Environmental Protection and Office of the Attorney General; the U.S. Department of the Interior; the National Oceanic and Atmospheric Administration; the City of Pittsfield; the Pittsfield Economic Development Authority; and the General Electric Company (GE) reached a comprehensive agreement relating to the cleanup of GE's Pittsfield facility, certain off-site properties, and the Housatonic River. The detailed terms of this agreement are incorporated in a Consent Decree which was lodged on October 7, 1999, with the United States District Court of Massachusetts, Western Division, in Springfield, Massachusetts. Following a public comment period in early 2000, the Consent Decree was entered by the Court on October 27, 2000.

The Consent Decree provides for cleanup of the Housatonic River and associated areas, cleanup of the General Electric Plant facility, environmental restoration of the Housatonic River, compensation for natural resource damages, and government recovery of past and future response costs. In addition, a Definitive Economic Development Agreement among GE, the City of Pittsfield, and the Pittsfield Economic Development Authority provides for economic redevelopment of the GE Plant facility. That agreement became effective upon entry of the Consent Decree.

The Consent Decree divides the Housatonic River into three separate segments for purposes of cleanup responsibilities. For the first 0.5 mile of the East Branch, from the Newell Street Bridge to the Lyman Street Bridge in Pittsfield (MA), GE will perform source control measures and cleanup of the river sediments and bank soil. For the next 1.5 miles, from the Lyman Street Bridge to the confluence of the East and West Branches, EPA will perform cleanup of the river sediments and bank soil to the top of bank while GE is responsible for cleanup of the floodplain soil (i.e. all contaminated property beyond the top of bank). The cost to implement the removal action in the 1.5 mile segment will be shared by EPA and GE with the amount of EPA funding increasing as the overall costs increase. For the segment below the confluence, the "Rest of River," GE is responsible for implementing a remedy to be selected by EPA. In this Major Contaminated Sediment Site Database, the first 0.5

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

mile segment is Project 01-09, the next 1.5 miles is Project 01-11, and the Rest of River is Project 01-13.

For the 1.5 mile segment, the objective is to achieve a cleanup that is protective of human health and the environment and to prevent downstream migration of contaminants. EPA has prepared and GE has funded an Engineering Evaluation/Cost Analysis (EE/CA) of the remedial alternatives for the 1.5 mile segment. The investigations conducted as part of the EE/CA included sediment and riverbank soil sampling during the period August 1998 to July 1999. An EE/CA Report was issued for public review and comment on February 11, 2000. An Addendum to the EE/CA was issued on October 4, 2000 and an Action Memo and Responsiveness Summary describing the selected remedy was issued on November 21, 2000.

The selected remedy calls for removal of an estimated 95,400 cy from the 1.5 mile segment, including an estimated 45,100 cy of sediments and 50,300 cy of bank soils. The first 50,000 cy would be disposed of in the permitted facility on the GE plant site; the remainder would be sent to offsite commercial disposal facilities. Removal will be predominantly by dry excavation, with river diversion by sheetpiling in about 0.8 mile and river diversion by pumping bypass in 0.7 mile. Implementation of the remedy is the responsibility of EPA, in accordance with the terms of the Consent Decree. The selected remedy is estimated to take 3 to 5 years to complete. Original estimated cost was \$49.7 million (present worth); current estimated cost is \$90 million.

Work began in September 2002, after GE had completed work in the first 0.5 mile segment (Project 01-09). After one year, as of September 30, 2003, a total of 27,950 cy of bank soils and sediments had been removed. This included 20,800 cy of non-TSCA material, 5,550 cy of TSCA material, and 1,600 cy of NAPL-impacted material. As of mid-May 2004, the total removed was about 36,000 cy. Completion is targeted for 2007.

Key Conditions:

capping, dedicated landfill or CDF, extended (>1 mile) river, post monitoring, property access issues, wetlands

Estimated Target

Volume:

Estimated Calendar Time to Implement Remedy:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: *HOUSATONIC RIVER - PROJECT 4 (Rest of River)*

SiteID: 01-13

US EPA Region: I

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Consent Decree, pursuant to both CERCLA and RCRA. Final.

Contaminants of Concern: PCBs (1254/1260)

Overall Status Summary: On October 7, 1999, representatives of the U.S. EPA; U.S. Department of Justice; the Commonwealth of Massachusetts Department of Environmental Protection, Office of the Attorney General and Executive Office of Environmental Affairs; the State of Connecticut Department of Environmental Protection and Office of the Attorney General; the U.S. Department of the Interior; the National Oceanic and Atmospheric Administration; the City of Pittsfield; the Pittsfield Economic Development Authority; and the General Electric Company (GE) reached a comprehensive agreement relating to the cleanup of GE's Pittsfield facility, certain off-site properties, and the Housatonic River. The detailed terms of this agreement are incorporated in a Consent Decree which was lodged on October 7, 1999, with the United States District Court of Massachusetts, Western Division, in Springfield, Massachusetts. Following a public comment period in early 2000, the Consent Decree was entered by the Court on October 27, 2000.

The Consent Decree provides for cleanup of the Housatonic River and associated areas, cleanup of the General Electric Plant facility, environmental restoration of the Housatonic River, compensation for natural resource damages, and government recovery of past and future response costs. In addition, a Definitive Economic Development Agreement among GE, the City of Pittsfield, and the Pittsfield Economic Development Authority provides for economic redevelopment of the GE Plant facility. That agreement became effective upon entry of the Consent Decree.

The Consent Decree divides the Housatonic River into three separate segments for purposes of cleanup responsibilities. For the first 0.5 mile of the East Branch, from the Newell Street Bridge to the Lyman Street Bridge in Pittsfield (MA), GE will perform source control measures and cleanup of the river sediments and bank soil. For the next 1.5 miles, from the Lyman Street Bridge to the confluence of the East and West Branches, EPA will perform cleanup of the river sediments and bank soil to the top of bank while GE is responsible for cleanup of the floodplain soil (i.e. all contaminated property beyond the top of bank). The cost to implement the removal action in the 1.5 mile segment will be shared by EPA and GE with the amount of EPA funding increasing as the overall costs increase. For the segment below the confluence, the "Rest of River," GE is responsible for implementing a remedy to be selected by EPA. In this Major Contaminated Sediment Site Database, the first 0.5

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

mile segment is Project ID 01-09, the next 1.5 miles is Project ID 01-11, and the Rest of River is Project ID 01-13.

The objective for the Rest of River is to implement a process which is designed to identify a remedy for the downstream portions of the Housatonic River that is protective of human health and the environment and for GE to implement the remedy. Under the terms of the Consent Decree, EPA is conducting extensive characterization studies and investigations in the Rest of River and environs to support the Agency in developing human health and ecological risk assessments and in performing a modeling study of the hydrodynamics, sediment transport, and PCB fate and bioaccumulation in the river. The reports from these activities will undergo formal peer review. GE will prepare a Supplemental RCRA Facility Investigation (RFI) Report to supplement an earlier (January 1996) GE RFI Report, will propose cleanup goals, and will evaluate cleanup alternatives (corrective measures), including a no action scenario. After public comment, EPA will select the corrective measure(s) to be implemented by GE for the Rest of River. GE may then appeal EPA's decision as described in Appendix G, Part II, Section J of the Consent Decree.

The following reports have been prepared thus far for the Rest of River:

- Charge for the Hydrodynamic Modeling Peer Review, February 1999;
- Final Preliminary Ecological Characterization Report, Newell Street to Woods Pond, March 1999;
- Supplemental Investigation Work Plan for the Lower Housatonic River, February 22, 2000;
- Quality Assurance Project Plan, Modeling Study of PCB Contamination in the Housatonic River, October 2000;
- Modeling Framework Design, Modeling Study of PCB Contamination in the Housatonic River, October 2000;
- Comments of the General Electric Company on the USEPA Modeling Study of PCB Contamination in the Housatonic River, November 2000;
- Preliminary and Final Peer Review Comments, Modeling Study of PCB Contamination in the Housatonic River, Modeling Framework Design, June 2001;
- Contractor Quality Control Plan, September 2001;
- Phase I Human Health Risk Assessment for Rest of River, November 2001;

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

- Responsiveness Summary to the Peer Review of the Modeling Framework Design and Quality Assurance Project Plan, June 2002; and
- Rest of River Site Investigation Data Report, August 2002
- Rest of River RCRA Facility Investigation Report, January 2003
- Human Health Risk Assessment for Rest of River, June 2003
- Ecological Risk Assessment for Rest of River, July 2003

Model calibration is targeted for 2002 and model validation is targeted for 2003. Peer review of both the Human Health Risk Assessment and Ecological Risk Assessment is targeted for late 2003. A Corrective Measures Study Report is targeted for 2004, with a proposed remedy to follow.

Key Conditions:

hydrodynamic modeling, extended (>1 mile) river, floodplains targeted, natural recovery, property access issues, wetlands

Estimated Target

Volume:

Estimated Calendar Time to Implement Remedy:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: **HUDSON RIVER**

SiteID: 02-07

US EPA Region: II

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund. Final.

Contaminants of Concern: PCBs (1016/1242/1254)

Overall Status Summary:

Over a 30-year period ending in 1977, two General Electric (GE) capacitor manufacturing plants near Fort Edward and Hudson Falls, New York, legally discharged polychlorinated biphenyls (PCBs) to the Hudson River. Much of the PCBs in the discharges were apparently trapped in sediments behind a rock-filled timber crib dam at Fort Edward, originally built in 1822. Because of deterioration of the dam structure, the Federal Power Commission granted the dam's owner, the Niagara Mohawk Power Corporation, permission to remove the dam and it was removed in July-October 1973. With removal of the dam, the impounded pool behind it disappeared and the river eroded a channel into the entrapped sediments, leaving five extended sediment deposits or "remnant deposits" exposed along the river banks in the 1.5 mile reach of river upstream of the former dam. Subsequently, Spring floods in 1974 mobilized large volumes of sediment and debris and associated PCBs from the former dam pool.

Action brought against GE by the New York State Department of Environmental Conservation (NYSDEC) in 1975 resulted in a \$7,000,000 program for the investigation of PCBs and the development of methods to reduce or remove the threat of PCB contamination. Subsequent sediment surveys revealed that the most extensive contamination was apparently located in 40 submerged so-called PCB hot spots (average PCB concentration of 50 ppm or greater). These 40 hot spots are distributed along 31 of the 43 miles of Upper Hudson River between Hudson Falls and Troy.

In 1984, the Upper Hudson River site was placed on the NPL and in September 1984 a no-action ROD was issued by EPA which concluded "that a technologically feasible, cost-effective remedial response to PCB contamination in the riverbed that would be reliable and would effectively mitigate and minimize damage to public health, welfare and the environment is not presently available."

In 1989, Region II of EPA announced it was reassessing the 1984 decision. From 1989 to 2000, EPA conducted a multi-phased reassessment program that included a review of site data, collection and analysis of new data, and evaluation of different remedial action strategies for Upper Hudson River sediments. GE was extensively involved in the reassessment process, providing comments on EPA work products,

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

performing independent data collection and analyses, and conducting field and laboratory research..

In November 1999, the New York State Attorney General sued GE to pay for additional dredging and disposal costs associated with maintaining a 12-foot minimum depth in the Champlain Canal. The suit contended that the PCBs were preventing New York State from performing navigational dredging in the canal, due to increased costs and disposal constraints posed by the PCBs. The lawsuit was dismissed without merit by the court in October 2000.

In early December 2000, as a culmination of the 11-year reassessment, EPA issued a Proposed Plan proposing removal of 2.65 million cubic yards from 493 acres of river bottom over a stretch of 40 miles of river extending from Fort Edward to near Troy, NY. The plan also proposed returning one foot of clean fill backfill onto dredged areas, totaling 851,600 cubic yards, restoring 97 acres of habitat and wetlands disturbed by the dredging, and rebuilding 17 miles of disturbed shoreline. Disposal to offsite TSCA and non-TSCA commercial landfills, by rail, is proposed. The public comment period ended April 17, 2001.

Following a nine and one-half month period for review of public comments, EPA issued the ROD on February 1, 2002. EPA determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate. EPA expected that the remedial design and mobilization that would be necessary for dredging would be completed in time to allow dredging to begin in 2005. EPA expected dredging to be completed in six years, including a) a Phase 1, encompassing one year (the first) at less than full-scale to allow performance testing of dredging and extensive monitoring and b) a Phase 2, encompassing five years at full-scale operation. Subsequently, EPA extended the pre-dredging phase by one year, with Phase I dredging scheduled to start in 2006 instead of 2005. The ROD also calls for performance standards to be established for the project. These will be used to evaluate the first year of dredging and provide information to make necessary adjustments to the succeeding years of operation.

The 2001 ROD further specifies that sediment will be removed from the river using environmental dredging techniques and transported by barge or pipeline to the land-based sediment handling and processing facilities, and that the dewatered sediments will be transported via rail and/or barge to licensed landfills for disposal outside of the Hudson River Valley. Using trucks for transporting processed material, or backfill, is precluded. Backfill material may be transported only via rail or barge. However, the ROD permits materials destined for beneficial use to be transported out of the project area via rail, barge, or truck. The potential beneficial use of dredged material will be evaluated during design.

On July 26, 2002, GE and EPA agreed to an Administrative Order on Consent

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calling for GE to perform an estimated two-year in-river sediment sampling and investigation program to delineate the areas for dredging, a prerequisite for the remedial design process. In 2002, the first year of sampling, 5,515 sediment samples were collected by coring from about 1,100 locations and were analyzed primarily for PCBs. In 2003, sediment cores were collected from about 4,500 additional locations. Some additional samples are expected to be collected in Spring 2004. At completion of the sampling program in 2004, it is expected that about 30,000 sediment samples will have been analyzed.

On August 18, 2003 GE and EPA agreed to an Administrative Order on Consent calling for GE to perform the design work required before dredging can begin. One of a number of major design deliverables, a Preliminary Design Report, was prepared by GE and submitted to EPA on December 23, 2003.

EPA retained direct responsibility for three aspects of the design project: (1) selecting the locations for land-based sediment handling and processing facilities along the Upper Hudson River; (2) the development and peer review of engineering performance standards; and (3) the development of quality of life performance standards. All three of these aspects are expected to be finalized in 2004.

In 2001, GE completed, under agreement with the NYSDEC, a feasibility study for the Hudson Falls plant site and recommended that the primary manufacturing building be demolished, a cap be placed over the site, and the existing groundwater collection and treatment system be expanded. This groundwater system expansion would include the installation of approximately 2,000 feet of bedrock tunnel 160 feet below ground, between the site and the Hudson River. The tunnel, when installed, would capture the remaining minute quantities of PCBs migrating toward the river through the bedrock fractures adjacent to the site. A final decision on this Hudson Falls remedy is expected soon from the NYSDEC. The 2001 Hudson River ROD indicated that this source control remedy should be implemented before the start of the Phase 1 dredging remedy.

REMEDIATION HISTORY

A series of remedial actions have already taken place in and near the Upper Hudson River which are summarized below.

- Following removal of the Fort Edward Dam in 1973 and subsequent downstream movement of sediment and debris, several sediment removal actions were undertaken by New York State in the Hudson River, primarily in the upper reaches near Rogers Island. These removal activities were associated with maintenance of the Champlain Canal navigational channel, and included dredging approximately 775,000 cubic yards (cy) of sediment and debris, which were placed in several disposal sites located along the river in the Fort Edward area. These

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"spoils" sites were covered with low permeability soil caps and are vegetated and maintained by New York State.

- The in-place containment ("capping") of the 50-60 acres comprising Remnant Deposits No. 2, 3, 4 and 5 was accomplished by GE during the period July 1990 through April 1991. Seeding (revegetation) was completed by October 1991. Remnant Deposit No. 1 was not included in this program due to its in-river location and its typically underwater condition. The cap system for each of the four remnant deposits consisted of, in ascending order, subgrade fill material, a sand fill bedding layer, an impervious geosynthetic composite liner called Claymax consisting of bentonite sandwiched between geotextile fabric, a sand drainage layer, topsoil, and vegetative cover. The horizontal limits of the cap on the inland boundaries were, in all but a few isolated instances, extended to a least five feet beyond the 5 ppm PCB boundary.
- An increased water column loading of PCBs in late 1991 was subsequently traced to a release from an old abandoned mill structure (the Allen Mill) located adjacent to the river and immediately below the GE Hudson Falls plant site. (The GE Hudson Falls plant site sits on top of a cliff adjacent to and above the abandoned Allen Mill.) The mill structure had served as a collection point for PCBs in the form of "dense non-aqueous phase liquid" (DNAPL), originating from a plume beneath the Hudson Falls plant site which migrated through bedrock fractures and into raceway tunnels within the mill. In January 1993, with the cooperation of the Bakers Falls Hydroelectric Dam owner and NYSDEC, water flow through the Allen Mill and the associated PCB discharges were largely controlled. By Spring 1993, two of the three raceways within the mill were isolated from the river, allowing entry inside the mill (difficult and hazardous due to the deteriorating condition of the structure). Subsequently, in 1994 and 1995, GE implemented a remedial action which resulted in removal of an estimated 45 tons of PCBs from the mill contained in 3,430 tons of sediment removed.
- A number of actions have been taken to contain and control the PCB DNAPL seeps observed in the river bed adjacent to the Allen Mill. These activities included grouting of bedrock fractures, manual collection of DNAPL, when accessible, and installation and operation of pumping wells to hydraulically control the seeps. The release of PCB DNAPL through these bedrock seeps has declined in response to mitigation efforts, but has not ceased. In September 1996, divers discovered an additional area of PCB DNAPL seepage at the base of Bakers Falls just above the Allen Mill adjacent to the Hudson Falls plant site. This seep was producing approximately 0.5 pounds per day of PCBs. A sub-aquatic collection system was installed to arrest the flow of the PCBs into the river. In January 1997, a groundwater collection well was installed on shore and up gradient in an effort to hydraulically control PCB discharges from the seep. Significant quantities of PCB DNAPL are recovered from this well, which appears to have controlled discharges

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from the seep.

- In addition to the activities to control riverbed PCB seeps and PCB movement from the Allen Mill, GE conducted an intensive subsurface investigation and remedial program at the Hudson Falls plant site. By April 2001, more than 3,000 gallons of DNAPL had been removed from the subsurface and shipped offsite for disposal. A network of about 230 groundwater recovery and monitoring wells has been installed to create a hydraulic barrier between the site and the river, and to collect PCB-containing groundwater and DNAPL. The effectiveness of this system in reducing PCB flux from the site to the river is being monitored by measuring PCB levels in the river and through an assessment of the hydraulic capture zone created by the groundwater pumping system. Based on the results of this monitoring, the system is expanded or reconfigured, as appropriate. Collected groundwater is treated onsite with an advanced wastewater treatment facility, operated by GE, prior to discharge back to the Hudson River.

- Between October 1997 and September 1998, GE performed an Interim Remedial Measure (IRM) just above the Bakers Falls Dam, in a small, relatively quiescent area of the Hudson River located between the former GE pump house and the eastern raceway intake structure leading to the Allen Mill. The primary historical outfall for the GE Hudson Falls facility had discharged into this area. The objective of this IRM was to remove debris and sediment containing PCBs from the area to allow inspection of the underlying bedrock for the presence of DNAPL. This information was used to further evaluate the sources of bedrock DNAPL seeps observed downstream in Bakers Falls, as described above. Approximately 1,075 cy of material were removed from the river and transported offsite for commercial disposal.

In 2003, the NYSDEC undertook the excavation of PCB-containing soil and sediment from a shoreline area along the east bank of the Hudson River at former Outfall 004 near GE's Fort Edward plant site, just downstream from Hudson Falls. Excavation work was halted for the winter in November 2003, and was completed in Spring 2004. At completion, 12,500 tons of PCB-contaminated material had been removed and transported offsite for commercial disposal. Also removed were 8,000 tons of less-contaminated soil and 5,000 tons of debris that were blocking access to the area. An investigation into oil seeping from bedrock is continuing in the area.

Key Conditions:

commercial landfill, dredging, dredge spoil reuse/fill, extended (> 1 mile) river, habitat/streambank restoration, hydrodynamic modeling, more-harm-than good, natural recovery, navigational dredging component, particle separation/soil washing, post monitoring, property access issues, wetlands

Estimated Target

Volume:

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***Estimated Calendar Time
to Implement Remedy:***

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Site Name: ***INLAND STEEL***

SiteID: 05-08

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Supplemental Environmental Project by Inland Steel resulting from a multimedia Consent Decree (1993) including the Clean Water Act.

Contaminants of Concern: PCBs, PAHs, metals, taconite (ore)

Overall Status Summary: Plan to dredge 200,000 cy from the Indiana Harbor Canal. Taconite is to be recovered and recycled because of being a valuable resource and not because of environmental concerns. Remedial dredging yet to begin. The plan is to integrate remedial dredging with a much larger USACE navigational dredging project and is being performed as a result of RCRA and Clean Water Act violations. A final Environmental Impact Statement (EIS) was issued by the USACE in October 1998. EPA is moving forward to finalize the project QAPP (target completion in 6 months) and the USACE ROD was signed in early February 1999. The USACE is presently (as of May 1999) working with railroad companies to acquire the property rights necessary to construct the CDF. Construction of the CDF is targeted to begin in 2000 with dredging targeted to begin no earlier than 2002.

Key Conditions: confined disposal facility, dredging, Great Lakes AOC, navigational dredging component, pilot/demonstration test

Estimated Target Volume: 200,000 cy from Indiana Harbor Canal.

Estimated Calendar Time to Implement Remedy: Dredging is targeted to begin in 2002.

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Site Name: JAMES RIVER

SiteID: 03-03

US EPA Region: III

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Mitigation Feasibility Study (EPA).

Contaminants of Concern: Kepone (a chlorinated pesticide)

Overall Status Summary: Natural recovery (slow burial by natural sedimentation). The remedy was to allow slow burial of river sediments by natural sedimentation; allow natural recovery of fish and biota (crab/oyster Kepone levels dropped from 0.8 to 0.1-0.2 ppm from 1976-85); and allow maintenance dredging of the main channel (a six-year moratorium on maintenance dredging was lifted in 1982), with disposal of dredge spoils on the flanks of the river bottom adjacent to the dredged channel. The commercial fishing ban was lifted in 1988; only a subsistence fish eating advisory remains in place.

Key Conditions: extended (> 1 mile) river, hydrodynamic modeling, natural recovery

Estimated Target Volume: 221 million cubic yards (69 miles to 38 cm depth)

Estimated Calendar Time to Implement Remedy: N/A

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Site Name: *KETCHIKAN (Ward Cove)*

SiteID: 10-09

US EPA Region: X

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Final, CERCLA Action.

Contaminants of Concern: ammonia, sulfide, and 4-methylphenol

Overall Status Summary: (Source: Reference A-575) "In September 1995, . . . as part of the Consent Decree, Ketchikan Pulp Company (KPC) agreed to conduct a Ward Cove sediment remediation project to address sediments in the Cove. A technical studies work plan for the Ward Cove sediment remediation project was submitted to EPA in April 1996. The technical studies work plan described the studies and actions necessary to identify an appropriate remedy to address ecological and human health issues associated with Ward Cove sediments. . . .

. . . The technical studies were conducted in two phases. In May and June of 1996 (Phase I), surface sediments were sampled at 28 stations throughout Ward Cove and at 2 stations in a reference area (Moser Bay, Alaska) to characterize the horizontal distribution of chemicals of potential concern (CoPCs) and sediment toxicity throughout the Cove. Ecological and human health evaluations of the Phase 1 data were conducted to communicate the implications of the data to regulators and to build consensus on the appropriate evaluation techniques. The Phase 1 report identified the CoPCs and areas of focus that warranted further study in Phase 2."

(Source: Reference A-594) "The Selected Remedy consists of the following interrelated components:"

- "Placement of a thin layer cap (approximately 6 inches to 12 inches) of clean, sandy material where practicable. Thin layer capping is estimated to be practicable over approximately 21 acres within the AOC. Thin-layer capping is preferable over mounding."
- "Placement of clean sediment mounds in areas where thin-layer capping is either infeasible or impracticable, and where mounding is considered to be practicable. Mounding is currently considered to be practicable in areas where the organic-rich sediments are less than 5 ft thick and have a bearing capacity that is greater than 6 psf. Mounding is estimated to be practicable over approximately 6 acres within the AOC."
- "Dredging of approximately 17,050 cubic yards (cy) of bottom sediments from

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an approximate 4-acre area in front of the main dock and dredging of approximately 3,500 cy of bottom sediments from an approximate 1-acre area near the shallow draft barge berth area to accommodate navigational depths, with disposal of the dredged sediments at an upland location. After dredging, a thin-layer cap of clean, sandy material will be placed in dredged areas unless native sediments or bedrock is reached during dredging.”

- “Removal of sunken logs from the bottom of Ward Cove in areas to be dredged.”

- “Natural recovery in areas where neither capping nor mounding is practicable. Natural recovery is estimated to be the remedy for approximately 50 acres of the 80-acre AOC, as follows:

- 1) an 8-acre area in the center of Ward Cove and a 2-acre area near Boring Station 8 that exhibit a very high-density of sunken logs (>500 logs/10,000 m²);

- 2) a 13.5-acre area where water depth to the bottom of the Cove is greater than - 120 ft mean lower low water (MLLW) and depth of the sediment is currently considered to be too great to cap;

- 3) a 14.5-acre area where slopes are estimated to be greater than 40 percent and are currently considered to be too steep for capping or mounding material to remain in place;

- 4) an 11-acre area where the organic-rich sediments do not have the bearing capacity (i.e., strength is less than 6 psf) to support a sediment cap and are too thick (i.e., thickness is greater than 5 ft) to practicably allow for placement of sediment mounds, and,

- 5) a 0.2-acre area near the sawmill log lift where maintenance dredging generally occurs on an annual basis.”

- “Institutional controls requiring that post-remediation activities within the AOC that materially damage the thin-layer cap or mounds will be required to redress such damage, at the direction of EPA”

- “Implementation of a long-term monitoring program for the remedial action until RAOs are achieved, at the direction of EPA.”

- “Subtidal investigation of sediments near the east end of the main dock, and subsequent dredging and disposal of PAH-contaminated sediments, as deemed appropriate by EPA.”

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Total cost for the remedy is estimated to be \$4.4 million that includes \$400,000 for long-term monitoring.

The following provides an update on site activities as of about Feb. 12, 2001:

DREDGING-RELATED ISSUES:

- The dredge contractor is J.E. McAmis, Inc., of Washington State; Foster Wheeler is the design engineer and oversight contractor.
- Work began in early November with mobilization to the site. Site preparation and in-water debris removal were completed by the third week of November. The contractor was held up from beginning dredging for a few days while awaiting approval of the Consent Decree. Dredging was allowed to begin the last week of November 2000 and ended on or about January 12, 2001.
- Dredging was performed primarily for navigational purposes except for a small area of PAH contaminated sediment (141 cy) near the north end of the main dock area.
- Three areas were targeted for dredging, a new one-acre shallow berthing area near the north end of the Cove and adjacent to the existing wood pulp processing facility and two areas totaling about 3 acres and located adjacent to the facility's main dock.
- Dredging was performed primarily using a 6 cy Cable Arm clamshell bucket. An environmental bucket was required by the project specifications as a means of reducing resuspension during dredging and to minimize the dewatering requirements of the removed sediment. The contractor was permitted to use a conventional clamshell bucket when the Cable Arm bucket became ineffective (i.e., when bucket loads reached about one-half of bucket capacity), typically when encountering native sediment. In addition, log tongs were used for removal of submerged pilings and logs missed during debris removal. It is estimated that about one-third of the dredged sediment was removed using a conventional clamshell.
- The contractor began dredging one 9-hr shift per day, six days per week. After a slow start and no ability to extend the schedule (due to fish window constraints), the contractor changed to two 9-hr shifts, 6 days per week and every other Sunday.
- The total volume of sediment removed was 11,865 cy (11,865 tons) vs. the originally estimated volume of 20,550 cy (this includes one-foot of tolerance dredging in all areas). The lower volume of sediment removed was the result of not having to dredge the two areas near the main dock as deep as originally planned. Both areas were originally to be dredged to a depth sufficient to allow installation of

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a cap over the remaining sediment and to preclude the effects of prop wash on the cap material. The installation of the cap, and thus dredging to the lower depth, was found unnecessary when native sediment was encountered at a much shallower depth than originally anticipated. The total volume of sediment removed from these two areas was 9,563 cy and included about 141 cy of PAH contaminated sediment from the north end of the main dock.

- Water depths in areas targeted for dredging varied from –10 to –44 ft MLLW. Spuds were used to anchor the derrick barge during dredging to about –50 ft.
- Silt curtains were not required; an exclusionary zone, or “short-term variance area,” of 300-foot radius from the point of the dredging operations was used for the purpose of monitoring water quality, primarily turbidity. A turbidity limit of 25 NTU was used based on the Alaska State water quality turbidity standard. DO, temperature, and salinity were also monitored. During monitoring, water samples were collected at 2 ft. below the water surface, midway in the water column, and 2 ft. above the bottom. Turbidity and DO were exceeded on a few occasions but follow-up samples were below WQ limits. No corrective actions were required.
- Removed sediments were stockpiled on-site to allow gravity dewatering and settling. Water draining from the sediment was allowed to percolate into the ground. The sediment will remain in the dewatering area until Summer 2001 and then be disposed of in an industrial landfill located adjacent to the site. The 141 cy of PAH-contaminated sediment were tested and found suitable for disposal in the on-site industrial landfill.

CAPPING-RELATED ISSUES

- The purpose of thin cap placement in Ward Cove is “to reduce surface sediment toxicity and improve benthic habitat so a greater variety of organisms can live there.” Water depths in areas proposed for capping range from about –10 MLLW to –110 MLLW.
- The USEPA originally anticipated placing a thin cap of 6 inches of sand over 15 areas totaling about 27 acres and placing mounds of combined cobbles and sand in another one-acre area. Engineering design calculations (apparently flawed) indicated that the bearing capacity of the sediments was low, such that many of the sediments would not be able to support the proposed 6-inch cap. Of the 27 acres proposed for thin capping, about 18 acres were thought to be potentially unable to support a 6-inch sand cap and would require mounding instead. All sediment targeted for capping was covered by a thin-layer cap; mound capping was not required since all sediment addressed by the capping remedy maintained sufficient bearing capacity to support a thin-layer cap.

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- Capping was performed using a standard Cable Arm clamshell bucket. Coverage was based on boom swing speed, bucket opening speed, and bucket volume. The contractor reportedly spent considerable time practicing the cap placement procedure on the haul barge (containing the cap material) prior to implementation in the water. Issues included:
 - The contractor attempted to integrate the recording of the opening and closing of the bucket during material release with the WINOPS system but was unsuccessful. A manual toggle switch was eventually installed in the crane to allow the operator to manually indicate when the bucket opened and closed for electronic recording.
 - The contractor found it difficult to obtain reproducible bucket volumes when picking up sand stockpiled in the haul barge. Initially, workers were used to even out the sand pile after each bucket load removed but this was determined to be labor intensive. Eventually, baffles were installed in the bucket that provided more consistency in the bucket loads. The baffles were installed to provide a 5 ½ cy load, the volume determined to provide the most control during material placement.
 - Cap material placement was originally specified to be performed by opening the bucket below the water at 10 feet above the sediment surface. Cables associated with the barge four point anchor and wire system (used in water generally greater than 50 feet deep) were found to interfere with the swing of the bucket during placement. As a result, the oversight and dredge contractors agreed to begin releasing the cap material from above the water surface. This resulted in increased turbidity and concerns by USEPA of exceeding WQ criteria. A second modification to the method of placement was made by EPA and the Corps requesting that, if possible, the bucket be below the water surface prior to release of the capping material. Despite this, cap material was typically released with the bucket above the water surface.
- Water quality monitoring requirements are the same as performed for dredging except that the “short-term variance area” includes all of Ward Cove.
- A capping design area of about one-half acre is first tested in each of the target areas to verify that the sediment is capable of supporting the thin cap. The first capping design area was completed on or about January 23, 2001.
- The maximum placement rate during capping was > 1,000 cy per day (achieved during two 9-hr shifts per day). This resulted in an accelerated schedule that allowed completion of the project by the end of February 2001 (based on six days per week and every other Sunday).
- The contractor was required by the work plan to provide a second method of

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cap placement in the event that the clamshell bucket proved inadequate. The contractor proposed the use of a “square-end skip box.” According to the USEPA, the “square-end skip box” was in such disrepair that it could not possibly be used for the placement of capping material.

- The cap material was obtained from Victoria BC Construction Aggregates. Reportedly, the material was of a consistent high-quality grade containing very little fines, allowing for improved quality control over the cap placement process.
- Reportedly, cap placement resulted in a uniform and consistent cap over each targeted area. Twelve verification samples were collected from each capped area. If samples could not be collected from above the water surface, typically due to debris, divers were used to collect the samples. The primary acceptance criterion for the cap was 40% sand by weight in the top 10 cm of sediment. As a result of mostly positive confirmation sampling results at about the mid-point of the capping project, the contractor was allowed to skip the design confirmation step and begin production capping immediately upon starting a new area.

Dredging was completed on or about January 16, 2001. A total of 11,865 cy of sediment was removed of which only 8,701 cy was paid volume. The final cost for dredging was \$1.4 million (\$159/cy based on 8,701 cy), excluding the cost for disposal which was to an industrial landfill adjacent to the nearby Ketchikan Pulp Company property. Capping was completed on or about February 28, 2001 and resulted in the placement of about 23,000 cy of material over 30 acres of cove bottom. The final cost for capping was \$2.6 million (\$96,000/acre; \$113/cy).

Key Conditions:

capping, dedicated landfill or CDF, dredging, fish spawning limitations, natural recovery, navigational dredging component, post monitoring, tidal fluctuations

Estimated Target Volume:

20,550 cy to be dredged (navigational); also includes thin-layer capping of approximately 21-22 acres that includes a 2-acre area to be capped following dredging, 2 acres that may be capped or mounded and 4 acres considered transition areas between the different remedial options. Natural recovery is designated for the remaining 50 acres.

Estimated Calendar Time to Implement Remedy:

Six months.

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Site Name: *KOPPERS (Charleston Plant)*

SiteID: 04-08

US EPA Region: IV

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund. Final.

Contaminants of Concern: PAHs; pentachlorophenol; trace amounts of dioxin, lead, and arsenic

Overall Status Summary: According to the 1998 ROD: "The remedy selected in this ROD is the Final response action selected for the Site. EPA issued an Interim Action ROD in March 1995 to address potential short-term human health risks associated with exposure to surface water and sediments of the Hagood Avenue and Milford Street drainage ditches. This ROD selects a site-wide, multi-media response action to address surface/subsurface soil, sediments of drainage ditches, groundwater and NAPL, surface water, contaminant transport pathways, and sediments of the Ashley River, Barge Canal, and North/South/Northwest Tidal Marshes. The major components of EPA's selected remedy for sediments are:"

- "Enhanced sedimentation (using pile barriers along a 1,500-foot strip) in the Ashley River;"
- "Placement of a protective cap over sediments of the 3.2 acre Barge Canal;"
- "Excavation of an estimated 0.25 and 1.50 acres of acutely toxic tidal marsh sediments in the North and South Tidal Marshes, respectively, followed by restoration/revegetation and off-site disposal in an approved hazardous waste landfill; and"
- "In-situ bioremediation [increasing the rate of biodegradation to address organics; phytoremediation to address inorganics] for sediments in the Northwest Tidal Marsh and portions of the South Tidal Marsh which did not demonstrate significant toxicity."

"The remedy selected for other site media being addressed by the remedial action are:"

- "Excavation of an estimated 12,000 tons of the most heavily impacted soil with subsequent off-site disposal in an approved hazardous waste landfill;"
- "Installation of an estimated 29.7 acre cap over lead-impacted soil and relatively less impacted soil to provide additional risk reduction;"

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- “Reconstruction of an estimated 3,600 linear feet of on-site surface water drainage ditches; and”
- “Recovery of groundwater/NAPL via extraction wells at three source areas to remove/treat NAPL to the maximum extent practicable, contain non-restorable source areas, and contain/restore aqueous contaminant plumes.”

Implementation of the remedy began in January 1999. Soil work, which included excavation, a soil cap, and reconstruction of onsite surface water drainage ditches, was completed in Summer 1999. Sediment excavation in the North Tidal Marsh was also completed during this time. Approximately one foot of sediment was excavated from a 1,300 ft long section of the marsh (0.85 acres) that resulted in a total removed volume of about 1,600 cy. The sediment was stabilized onsite, and then sent offsite for disposal. The remediated marsh area was then restored and revegetated.

By February 2002, about 20,000 tons of lead-containing soil and between 1,800 and 2,000 tons (approximately 2,500 cy) of upland drainage ditch sediment had been excavated. Ashley River near-shore sediments were capped and solidified in-place during 2001 (the original remedy of enhanced sedimentation was determined to be technically infeasible). An assessment was performed to evaluate the effectiveness of an in-situ bioremediation pilot project on South Tidal Marsh sediment in the Summer of 2001. Results of the project indicated that while the addition of fertilizer was found to lower PAH toxicity, other constituents were not addressed by the remedy and prompted the need for a more expeditious remedy. As a result, sediment exhibiting significant acute toxicity based on results from whole sediment acute toxicity tests will be excavated (about 1.5 acres of South Tidal Marsh). The design for the excavation work is anticipated to be completed by Spring 2002 and construction is targeted for Fall or Winter 2002. The remedial design for groundwater is anticipated by mid-2002. The ROD designated a 24-inch cap for the final component of the site, the barge canal. This remedy, however, is currently being reevaluated vs. natural sedimentation (at the request of the PRPs).

Key Conditions:

capping, commercial landfill, habitat/streambank restoration, more-harm-than-good, natural recovery, post monitoring, property access issues, solidification/stabilization, tidal fluctuations, wetlands

Estimated Target Volume:

- Subaqueous cap (consisting of two feet of clean sediments) over 3.2-acre Barge Canal;
- Removal of about 3,300 cy of the most toxic sediment from the North and South Tidal Marshes;
- In-situ bioremediation in portions of the Northwest and Southwest Tidal Marshes. Methods of bioremediation being considered are increasing the rate of

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biodegradation and phytoremediation to address organics and inorganics, respectively; and

- Enhanced sedimentation in a sector of the Ashley River. This will entail the use of 50 ft. long, 12 in. diameter timber pilings placed on two foot centers along a 1,500 foot strip of river bottom adjacent to the site which stretches from a sample point north of the site to a sample point south of the site. The installation of timber pilings is intended to increase the depositional nature of the area immediately downstream of the pilings, similar to the effect of a snow fence.

Estimated Calendar Time to Implement Remedy: Fiscal year 1998

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Site Name: *LAVACA BAY - PROJECT 1 (Treatability Study)*

SiteID: 06-03

US EPA Region: VI

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Superfund. Interim.

Contaminants of Concern: mercury

Overall Status

Summary:

A draft RI report and Baseline Risk Assessment were submitted by Alcoa to USEPA in August 1998 and an interim cleanup was initiated in mid-1998. The interim cleanup was performed as a dredging treatability study for the industrial channel. For the treatability study, several contiguous areas adjacent to the Alcoa facility were selected that contained sediments with elevated levels of mercury. During the study it was estimated that 73,000 cy of contaminated sediments would be removed, a total of 103,000 cy including sediments removed due to overdredging. The treatability study was designed to test a variety of dredging conditions. The areas selected were located along the eastern shore of the channel along the facility shoreline and included areas with both deep and shallow water and various structures to dredge around. Areas selected for dredging included 1) a shallow draft barge mooring area, 2) a contaminated pipe trench area, 3) sloped areas bordering the navigation dredging areas, and 4) an area adjacent to the former chlor-alkali facility which was contaminated from ground water influx. The contamination profiles for these areas included elevated mercury concentrations at surface and at depth as well as higher concentrations at depth and lower concentrations at the surface.

The treatability study was performed in combination with a larger navigational dredging project. The deep water areas were targeted as Phase I of the study in conjunction with maintenance dredging of the navigational channel using a 20-inch hydraulic cutterhead dredge. Phase II was performed in the shallow water areas using a 12-inch hydraulic cutterhead dredge. The Phase II area was originally to be at the northern end of the previously targeted eastern channel area but was eventually moved to the western side of the channel near the northern tip of Dredge Island due to sensitive habitat identified in the original area.

The dredge spoils were discharged either to an existing upland dredge material disposal lake typically used for navigational dredge spoils (Phase I) or to Dredge Island (Phase II).

The Phase I project was completed in 3 weeks and removed between 60,000 and 80,000 cy containing an estimated 1,500 pounds of mercury at a total cost of \$1,840,000. The project resulted in the removal of mercury contaminated

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

sediments in an area considered subject to sediment suspension via ship and barge traffic. Comparison of pre- and post-dredge surface mercury data indicated significant variability in the results. In some areas with moderate pre-dredge mercury levels (surface and at depth), significant reductions in sediment mercury levels were achieved. In these areas the impacted sediments were typically interlaid with a hard virgin clay, which was used to define the depth of dredging. In other areas which exhibited high mercury concentrations at depth, post-dredge surficial mercury concentrations were in some cases significantly elevated over pre-dredge concentrations.

Monitoring (oyster study) during dredging indicated no significant dispersion of dredged material downcurrent for either total or dissolved mercury. Some elevated mercury levels were observed during water column readings. Resuspension of dredge material and resuspension losses were minimized by using silt curtains, a shield over the cutterhead, slow advance rate for the dredge, slow cutterhead speed (5 rpm), and slow lateral movement of the cutterhead.

A smaller scale pilot dredging project (Phase II) was conducted as part of the treatability study in a shallow water area adjacent to Dredge Island. Phase II resulted in removal of an estimated 9,500 cy of contaminated sediments at a total cost of \$251,000. Dredging, using a 12-inch hydraulic cutterhead, began the week of January 18, 1999 and ended February 4, 1999. The contamination profile for this area showed increasing mercury concentrations with depth. Spoil material was placed in an impounded area on the adjacent Dredge Island. Pre- and post-monitoring of sediment, oysters, and water column mercury levels was conducted. Sediment verification sampling data indicated that post-dredge surficial concentrations were generally not significantly reduced from pre-dredge concentrations. Water column, oyster, and sediment monitoring outside of the dredge area showed no significant resuspension or transport of contaminants outside the silt curtain area during dredging.

A ROD was issued in 2001 that describes the long-term cleanup of sediments in Lavaca Bay. This project is described in the MCSS Database as Lavaca Bay - Project 2 (the Bay), Project ID 06-05.

Key Conditions:

confined disposal facility, dredging, hydrodynamic modeling, more-harm-than-good, post monitoring, navigational dredging component, pilot/demonstration test, tidal fluctuations

Estimated Target Volume:

Originally 150,000 cy total from two separate locations; this was later revised to 103,000 cy (22,000 from the northern area [Phase II] and 51,000 from the southern area [Phase I], plus 30,000 cy from overdredging in both areas). The area selected for Phase II of the project was subsequently moved to a new location across the channel near the northern tip of Dredge Island.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Estimated Calendar Time to Implement Remedy: Begin March 1998 in conjunction with the start of navigational dredging.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: *LAVACA BAY - PROJECT 2 (the Bay)*

SiteID: 06-05

US EPA Region: VI

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund. Final.

Contaminants of Concern: mercury; PAHs

Overall Status Summary: In 1970, elevated levels of mercury found in oysters from the bay prompted the Texas Department of Health (TDH) to close the bay of oystering and the issuing of an order to Alcoa to discontinue the discharge of mercury-containing wastewater to the bay. The bay was reopened to oystering in 1971. In 1988, as a result of finding elevated mercury levels in fish, the TDH closed a section of the bay to commercial and recreational fishing. In 1990, an NRD preassessment was performed and in March 1994 the bay was placed on the National Priorities List. Investigative and remedial activities also began in 1994. In 2000, the TDH reduced the size of the area of the bay closed to fishing.

A draft RI report and Baseline Risk Assessment were submitted by Alcoa to USEPA in August 1998 and an interim cleanup was performed in mid-1998. The interim cleanup was designated a dredging treatability study for selected areas of contaminated sediment in the industrial channel. As part of the treatability study, several contiguous areas adjacent to the Alcoa facility were selected for dredging that contained sediments with elevated levels of mercury. The treatability study was performed in two phases. Phase I was performed in August 1998 in a deeper area of the industrial channel adjacent to the former Chlor-Alkali Process Area and in conjunction with an ongoing maintenance dredging project. Phase II was performed during February 1999 in an area of shallower water depth adjacent to the channel and near the eastern tip of Dredge Island. The combined dredge study resulted in the removal of between 69,500 cy and 89,500 cy of mercury-contaminated sediment at a cost of \$2,091,000 (\$23 to \$30 per cy). (See Project ID 06-03.) The relatively low cost for the treatability study is due in large part to no costs associated with either disposal or water treatment.

In addition to performing the dredge treatability study, two additional early actions have been performed: (1) the Dredge Island stabilization and Northern Marsh Removal which included relocation and stabilization of mercury-containing sediment and increasing the height of the island's dikes; and (2) hydraulic control and treatment of groundwater originating from the Chlor-Alkali Process Area.

In 2001, USEPA issued a ROD for the site that designates remedies for three specific areas: (1) the Bay System; (2) the Chlor-Alkali Process Area (CAPA)

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Soils, and (3) the Former Witco Soils. The remedies for the Bay System address both source control issues and existing areas of contamination, including the recommendation to dredge 200,000 cy of mercury-contaminated sediment from the Witco Channel. These are described in the ROD (Reference A-1132) as follows:

- “Installation of a DNAPL Collection or Containment System at the Witco Area –West of the former Witco Tank Farm Area, a collection trench or containment system will be installed for the purpose of intercepting DNAPL potentially migrating to Lavaca Bay. Recovered DNAPL will be collected and sent off site for treatment and disposal at a licensed disposal facility. The DNAPL will not be treated or stabilized on site prior to off site disposal. The specific areas of shoreline to be addressed by a remedy may be modified based on site conditions observed during remedy implementation. The use of either a DNAPL containment or collection technology will be refined during the remedial design. (estimated cost: \$1,210,000)”
- “Dredging of the Witco Channel - approximately 200,000 cubic yards of mercury-contaminated sediment will be dredged and disposed of in an on site confined disposal facility located on Dredge Island. The dredged sediments will not be treated or stabilized before disposal. A final cover for the disposal areas will consist of dredged material taken from an area of Lavaca Bay that has mercury concentrations below human health and ecological risk-based values. (estimated cost: \$3,000,000)”
- “Remediation of the Witco Marsh by Dredging or Filling - the Witco Marsh would be actively remediated to address the concern of biological uptake of mercury. The decision to dredge or fill the marsh will be made in the remedial design. (estimated cost: \$790,000)”
- “Enhanced Natural Recovery North of Dredge Island - the areas north of Dredge Island would receive a thin cap over the entire area to accelerate the natural recovery process currently observed occurring in Lavaca Bay. (estimated cost: \$1,740,000)”
- “Natural Recovery of Sediments - sediments that are not actively remediated will recover to acceptable levels through natural sedimentation. It is estimated that surficial sediment mercury levels in all areas are expected to decline to levels in the current range of open areas of the Bay within a 5 to 10 year time frame.”
- “Institutional Controls to Manage Exposure to Finfish/Shellfish - the fish closure originally established by the Texas Department of Health in 1988 and updated in January 2000 will remain in place to control the consumption of finfish and shellfish for the “Closed Area”.”
- “Monitoring - long term monitoring of sediments and fish will be required to

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

confirm the natural recovery of sediment and fish tissue to acceptable levels. In addition, monitoring of surface water will be conducted to evaluate the effectiveness of the CAPA hydraulic containment system. Full details of the monitoring program will be established during the design of the selected Bay System remedy.”

The ROD estimates the scope of long-term monitoring in the bay will include fish tissue monitoring in years 1-10, 15, 20, and 30 and sediment monitoring in years 2, 4, 6, 8, 10, 15, 20, and 30 at an estimated cost of \$1,660,000. The total estimated cost to implement the complete remedy as described in the ROD including design, mobilization/demobilization, construction monitoring/maintenance, and contingency is \$16.129 million.

USEPA and Alcoa are currently negotiating a Consent Decree for implementation of the ROD remedy.

Key Conditions:

dedicated landfill or CDF, dredging, natural recovery, post monitoring, tidal fluctuations, wetlands

Estimated Target Volume:

200,000 cy of sediment from the Witco Channel; also included is remediation of the Witco Marsh by either dredging or filling

Estimated Calendar Time to Implement Remedy:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: LCP CHEMICALS

SiteID: 04-07

US EPA Region: IV

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Superfund. Time Critical Removal Action pursuant to an Agreement and AOC.

Contaminants of Concern: PCBs (Aroclor 1268); mercury

Overall Status Summary: The LCP Chemicals Superfund Site near Brunswick, GA comprises about 500 acres of tidal marshland and 50 acres of industrialized upland area. An oil refinery, a paint manufacturing company, a power plant, and a chlor-alkali plant have all operated at the site over 70 years. The chlor-alkali plant ceased operations in February 1994. In April 1994, a Unilateral Administrative Order for Removal Response Activities at the LCP Site, issued by EPA Region IV, became effective calling for characterization and remediation of contaminated onsite soils, sediments, debris, surface waters, building structures, and accumulated wastewaters, and control, treatment, and disposal of elemental mercury and chlorine and associated residuals. In March 1995, Georgia designated the LCP Site as the highest priority release site in Georgia. In June 1996, the site was designated a Superfund Site. As of March 5, 1999, EPA and contractors had recovered about 400,000 pounds of mercury, treated about 55 million gallons of wastewater, and removed and disposed about 253,000 tons of RCRA Subtitle C and D wastes from the 50-acre developed portion of the site.

In an Agreement and Administrative Order on Consent for Removal Action, effective February 4, 1998, EPA Region IV called for an additional removal action from 13-acres of tidal marsh containing the most elevated levels of PCBs (Aroclor 1268) and mercury and from about one-half mile of drainage channels which originate at the 50-acre developed site, flow through marshland, and ultimately flow into Purvis Creek, a tributary of the Turtle River. This removal action was implemented from January 5, 1998 to July 17, 1999. A total of 21,523 cy of sediment were removed by wet excavation from the 13-acres of marsh area. A total of 3,511 cy of sediment were removed from 2,650 feet of drainage channels using a combination of both wet excavation and a bucket ladder dredge on a barge. The marsh area was backfilled with 21,111 cy of sand, and replanted. The removed materials were dried using cement kiln dust and quick lime and were then trucked to commercial disposal facilities in Savannah, GA and Emelle, AL.

The Removal Action Agreement and AOC provided for cost sharing, whereby the PRPs implementing the Removal Action could submit a claim against the Superfund for an amount not to exceed the lesser of \$1.7 million or 34.5% of the estimated \$4.925 million implementation cost. No ROD has yet been issued for the site.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

EPA anticipates issuing a ROD for at least one of the OUs by September 2001.

Key Conditions:

commercial landfill, habitat/streambank restoration, post monitoring, solidification / stabilization, specialty dredge, tidal fluctuations, wetlands

Estimated Target Volume:

21,457 cy from the 13-acre marsh and 2,660 cy from the drainage channels

Estimated Calendar Time to Implement Remedy:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: LIPARI LANDFILL

SiteID: 02-08

US EPA Region: II

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Superfund. Final.

Contaminants of Concern: A total of 63 organic contaminants including benzene, toluene, and xylene, and 13 inorganic contaminants including arsenic, chromium, and lead.

Overall Status Summary: Wet and dry excavation used to remove 163,000 cy, after stream and lake diversion and marsh draining was accomplished. Excavated volumes included 52,000 cy from marsh and streams (original design volume), 80,000 cy from lake, and an additional 31,000 cy from marsh (according to the PRP, as a result of inaccurate delineation by US EPA). No target cleanup level. Excavation down to natural clay, followed by placement of clean fill. No verification sampling. Thermal desorption of 83,000 cy excavated from marsh. Lake material used as daily cover at Waste Management's GROWS Landfill located in Bucks County, PA. Project completed in late 1996.

Key Conditions: commercial landfill, wetlands, solidification / stabilization, thermal desorption

Estimated Target Volume: For marsh, original estimate of 51,500 cy; for lake, 140,000 cy of dredged material reduced to 56,000 cy after dewatering; for streams, undefined.

Estimated Calendar Time to Implement Remedy:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: **LORING AIR FORCE BASE**

SiteID: 01-06

US EPA Region: I

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Superfund. Final.

Contaminants of Concern: PCBs (primarily 1260), total PAHs; also, DDT, chlordane, lead.

Overall Status Summary: Approximately one-half of the excavation work (1 mile of streams; 10 acres of wetland) was completed in 1997 resulting in the removal of about 80,000 cy of soil/sediments (primarily from stream beds and wetlands; ditches have required minimal effort); the remainder (1.5 mile of streams; 5 - 10 acres wetland) were targeted for completion in 1998 (scheduled to begin mid- to late-May); site characterization continued up until that time; PCBs are remediation drivers (i.e., highest concentrations and most widespread). Construction (removal) was completed for the site in August 1998 (total volume excavated in 1998 was 72,000 cy). A total volume of 152,328 cy of contaminated sediment and floodplain soils was removed from the FLDD Wetland, East Branch of Greenlaw Brook and Greenlaw Brook Study Areas from 1997 to 1998, at a cost of \$13,845,382. Restoration construction was completed October 1998.

Remediation target areas expanded as a result of (a) a stream PCB remediation goal of 1 ppm being applied to floodplains rather than the floodplain remediation goal of 5 ppm, to prevent aquatic exposure to floodplain soils from flooding caused by future beaver activity; and (b) most of the Remedial Investigation samples targeted sensitive aquatic receptors and were obtained from below the waterline in depositional areas of the stream itself. Pre-construction sampling in 1997 targeted depositional areas just above the waterline of the stream banks. These locations contain more vegetation and are subject to lower stream velocities. Higher PCB concentrations were typically found in these samples, giving the impression that the contamination was more widespread than previously determined. Costs remained within budget as a result of not needing to fill in excavated wetland areas as originally anticipated and a shorter than anticipated haul distance to the existing onsite RCRA Subtitle C landfill and the elimination of the requirement for offsite disposal of TSCA-regulated materials. Wetland remediation involved removing the first two feet of contaminated soils. It was found that the underlying soil was hydrogeologically sound for wetland recovery, thus eliminating the need to backfill these areas.

Key Conditions: dedicated landfill or CDF, extended (> 1 mile) river, floodplains targeted, wetlands

Estimated Target Volume: Total volume estimated at 93,090 cy; Approximate area breakdown (Source: May 1997 ROD) as follows:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

- Flightline Drainage Ditch (FLDD) (2,500' long x 20-25' wide): 8,520 cy
- FLDD Wetlands (2,000' long x 400' wide; ~15 acres): 36,100 cy
- East Branch of Greenlaw Brook (narrow, shallow stream): 38,300 cy
- Nose Dock Area Drainageways: 5,370 cy
- Drainage Ditch G06: 200 cy
- Underground Transformer Site (UST) Wetland: 4,600 cy

***Estimated Calender Time
to Implement Remedy:***

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: LOVE CANAL

SiteID: 02-13

US EPA Region: II

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Superfund. Final.

Contaminants of Concern: Dioxins (including 2,3,7,8 - TCDD)

Overall Status Summary: Encapsulation of the Love Canal on-land site was completed during 1979 and 1980. These activities included installation of a leachate collection and treatment system. Sanitary and storm sewers, including those discharging to Black and Bergholtz Creeks, were cleaned in 1986 and 1987. These sewers contained as much as 600 ng/g 2,3,7,8-TCDD in the sediments. In 1989, dioxin-contaminated sediments variously reported as totaling 17,000 - 31,000 cy were removed from Black and Bergholtz Creeks in Niagara Falls, NY (provided as 3,000 cy in 1998 ESD). The creeks flow into the Cayuga River which in turn flows into the Niagara River.

Black and Bergholtz Creeks were excavated from the point of interception of storm water drainage from the Love Canal area downstream to the junction with Cayuga Creek during 1989. The linear distance excavated was approximately 10,000 feet. Method of sediment removal was dry excavation. Dimensions of the creek from which sediments were removed are unavailable.

A 1987 ROD required all dioxin contaminated materials, regardless of concentration, to be thermally treated onsite in a thermal destruction unit to a "six nines" destruction removal efficiency and that treatment residuals be disposed in selected onsite areas. A 1989 partial consent decree changed the incineration location to Occidental Chemical Corporation's Buffalo Avenue Plant Site and the materials were relocated to that plant site and stored in a permitted storage facility. Establishment of universal treatment standards (UTSs) in 1990 allowed these wastes to be reclassified and, along with other regulatory changes, a decision was entered (ESD, 1996) which allowed those portions of the wastes which exceeded UTSs (UTS for dioxins is 1 ppb) to be incinerated commercially and those that don't to be landfilled commercially. Sampling of these materials to determine waste categorization was performed in 1997. A variance was approved by EPA (ESD, 1998) to raise the UTS for dioxins and furans from 1 ppb to 10 ppb for creek sediments and related materials from the haul roads and sediment dewatering facility. It was estimated that the variance would result in about one-third of the contaminated materials requiring incineration and two-thirds requiring landfilling, including nearly all of the creek sediments.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Between 1996 and 1999, a total of 5,234 bags were sent to Rollins/Laidlaw facilities in Deer Park, Texas and Aragonite, Utah for incineration. The remaining 10,262 bags were directly landfilled either because they qualified based on the F039 LDRs or because they qualified based on the variance. Each bag was about 2.3 tons.

Key Conditions:

commercial landfill, incineration, solidification/stabilization

Estimated Target

16,000 - 21,000 cy (ROD, 1985)

Volume:

***Estimated Calendar Time
to Implement Remedy:***

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: LOWER DUWAMISH WATERWAY

SiteID: 10-13

US EPA Region: X

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund. Final

Contaminants of Concern: arsenic, copper, lead, mercury, tributyltin, PAHs, PCBs

Overall Status Summary: Sediments in the Lower Duwamish Waterway are contaminated with arsenic, copper, lead, mercury, tributyltin, PAHs, and PCBs. The shorelines are heavily industrialized; in addition, the river is the receiving water body for discharges from over 100 storm drains, combined sewer overflows, and other outfalls. The site was added to the NPL in September 2001. The Duwamish River originates at the confluence of the Green and Black Rivers, then flows northeast for approximately 12 miles, dividing at the southern end of Harbor Island (in Seattle) to form the East and West Waterways around Harbor Island prior to discharging into Elliot Bay. The last five river miles are maintained by the Corps of Engineers as a federal navigation channel and are called the Lower Duwamish Waterway, which is the designated Superfund site.

In 2000, the Port of Seattle, King County, the City of Seattle, and the Boeing Company formed a public/private partnership, called the Lower Duwamish Waterway Group, to assess environmental conditions and evaluate cleanup options. But the partnership was unable to reach agreement with federal agencies on approach and damages, which led to the NPL listing. In December 2000, USEPA and Washington State Dept. of Ecology ("Ecology") signed an agreement with the Lower Duwamish Waterway Group calling for the group to investigate waterway contamination, assess risks, and evaluate cleanup alternatives.

As a result of its investigations, the Lower Duwamish Waterway Group prepared and issued three draft documents in January 2003, namely (a) a Phase 1 Remedial Investigation Report; (b) a technical memorandum prioritizing areas which are candidates for early cleanup actions; and (c) a technical memorandum identifying other studies that are required. The Phase 1 Remedial Investigation Report was approved and issued final in July 2003. The Phase 1 report represented the first phase of a two-phase approach and presented a data compilation and risk assessment based on what was already known from previous studies of environmental conditions in the Lower Duwamish Waterway.

Seven contaminated areas of the Lower Duwamish Waterway were proposed for early sediment cleanup and, in June 2003, four were selected for implementation by USEPA and Ecology. These were originally proposed in the aforementioned draft

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

technical memorandum and, after agency and public comments were addressed, the memo was issued as a final report (“Identification of Candidate Sites for Early Action”) in June 2003. The four areas selected for implementation are the following:

- Duwamish/Diagonal (at RM 0.5): In late 2003, cleanup was scheduled to begin for some of the contaminated sediments near the Duwamish combined sewer overflow and Diagonal Way storm drain. The sediments were to be dredged and disposed of at “an approved disposal site.” Remaining contamination would be covered with clean sediments. The target area is seven acres. Sources and source control issues specific to this target area are also being evaluated.

About 70,000 cy is estimated for removal by dredging. In August 2003, it was proposed that these sediments be disposed in the Blair Ship 1 in the Port of Tacoma, which is constructed to contain contaminated sediments from the Hylebos Waterway (Commencement Bay, Project ID 10-01) but which is expected to have excess capacity. However, because of opposition and the resultant uncertainty in obtaining approval in time, it was decided to forego this option and, instead, transport the dredged material to a commercial landfill in rural central Washington.

- Boeing Plant 2 (at RM 3.0): This early action targets contaminated sediments along the shoreline of Boeing Plant 2. EPA and Boeing are discussing the boundaries for a sediment cleanup.
- Slip 4 (at RM 2.8): Some members of the Lower Duwamish Waterway Group will study this area and propose boundaries for an early cleanup. Slip 4 is located on the east side of the waterway, just north of Boeing Plant 2.
- Terminal 117 (Malarkey): The Port of Seattle, in coordination with the City of Seattle, will study this area and propose boundaries for an early cleanup. This area is located in the west side of the waterway, just south of the 16th Avenue South bridge. Currently owned by the Port of Seattle, the upland property was formerly owned by Malarkey Asphalt. The Port removed PCB-contaminated soil from the upland property in 1999 and 2000.

A fifth area, the Norfolk Combined Sewer Overflow (at RM 5.0), will receive follow-up remedial action. This site is on the east side of the Waterway. In 1999, King County dredged contaminated sediments from two acres next to the Norfolk combined sewer overflow and capped the dredged area with clean sand. Monitoring subsequently identified recontamination at one edge of the cap. Boeing has agreed to work with Ecology to clean up about 100 cubic yards of contaminated sediments to keep them from migrating onto the cap. EPA is evaluating who is responsible for the additional work needed in this area.

Dredging at the Duwamish/Diagonal started in mid-November 2003 and has been

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

completed. A total of 66,000 cy was removed by mechanical dredging. Dredged material was transported by rail to Roosevelt Landfill in Washington State for disposal. Total cost was \$7.4 million, consisting of dredging (\$1.2 million), transport and disposal (\$3.4 million), and capping over the dredged area (\$2.8 million). Capping was required to restore the dredged area to its pre-dredging elevation. Public and agency complaints regarding "sloppy" dredging work and release of contaminants during dredging were prevalent (References D-540 and D-541).

Key Conditions:

capping, dredging, extended (>1 mile) river, navigational dredging component, rail transport for disposal, tidal fluctuations, wetlands

Estimated Target

Volume:

***Estimated Calendar Time
to Implement Remedy:***

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: LTV STEEL

SiteID: 05-09

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Clean Water Act Consent Decree (1992).

Contaminants of Concern: PAHs (oils)

Overall Status Summary: LTV is on a peninsula abutting the Indiana Harbor Ship Canal and Lake Michigan. Sediment remediation was initiated in 1994 to remove, treat, and dispose of oil-contaminated sediments located in a 3,500' intake channel between the site and the Indiana Harbor Canal. The intake channel provided process water (147 million gallons per day) and was kept operational during the entire remediation. Targeted "removal of sediment down to original lake bottom." Winter and mechanical difficulties caused delays. Completed 10 - 15% of project in 1994 using diver-assisted vacuum dredging teams. Too slow and inefficient. Completed remaining 85 - 90% in 1995 - 1996 using a hydraulic dredge. Solids dewatered and transported to a State special waste landfill; oils recovered and recycled to blast furnace. Completed late 1996. Removed 109,000 cy.

Key Conditions: commercial landfill, dredging, floating oil

Estimated Target Volume: 96,000 - 115,000 cy

Estimated Calendar Time to Implement Remedy: 18 months

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: MALLINCKRODT BAKER (formerly J.T. Baker)

SiteID: 02-15

US EPA Region: II

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Final.

Contaminants of Concern: DDT, lead, mercury, cadmium

Overall Status Summary: Environmental Site Investigation performed from 1984 to 1986 which included nearshore areas of the Delaware River; river sediments were found to be contaminated with DDT, lead, mercury, cadmium. Excavation of sediments was performed over a six-week period in 1993; a bladder-type water structure and stone dam were used to isolate the area to be excavated; a pump and piping system supplemented by 126 well points controlled the infiltration of water to the excavation area. Sediments were removed using excavators and trucked to a J.T. Baker landfill 6.5 miles from the site. Infiltration water into the excavation area was treated prior to discharge back to river. Original target was to remove sediments to 10 ppm DDT; J.T. Baker went further and removed sediments to bedrock to extent practicable.

Key Conditions: dedicated landfill or CDF

Estimated Target Volume:

Estimated Calendar Time to Implement Remedy:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: **MANISTIQUE RIVER/HARBOR**

SiteID: 05-10

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Final (CERCLA Removal Action Authority); Action Memoranda - October 1993 and June 1995 (amended October 1995 and September 1996); Removal Action Recommendation, August 1994. Fund-Lead after PRP cash-out.

Contaminants of Concern: PCBs (1248)

Overall Status Summary: The USEPA issued a Removal Action Recommendation and Action Memorandum in lieu of a ROD and the PRPs executed a buy-out for just over \$6 million in 1996. The USEPA started dredging in a backwater hot spot area in September 1995 (Area B); 10,000 cy were reportedly removed from Area B in 1995, with about 97% of the dewatered sediments sent to a non-TSCA landfill and the remaining 3% to a TSCA landfill. An additional 15,000 cy from Area B and a newly identified nearby hot spot were reportedly removed in 1996 with about 70% being sent to a non-TSCA landfill. Another 2-acre hot spot (7,000 cy) (Area C) and part of the 15-acre area in the harbor (Area D) were dredged in 1997 with about 70% of the dewatered material being sent to a non-TSCA landfill. The dredging of Harbor hot spots (Area D) resumed in May 1998 and ended in October 1998 following removal of an estimated 31,000 cy of material. Dredging continued in 1999 first in Area B, then in Area D; dredging in 2000 was performed in Area D only, beginning in May and ending on October 21. In 1999 and 2000, the percent of the dewatered sediments sent offsite to a TSCA landfill increased markedly, with 78% being sent to a TSCA landfill.

The project has been beset by numerous difficulties, some of which include:

- Difficulties in achieving the target cleanup level of 10 ppm PCBs, in part due to the inherent difficulties in achieving low cleanup levels by hydraulic dredging, in part due to the heterogeneous nature of the sediments which include layers of paper pulp and slab wood, in part due to the fact that PCB levels in some areas increase with depth with the highest levels found near the bedrock interface, and in part due to the difficulties in achieving efficient sediment removal at the irregular bedrock interface;
- Weather-related delays including a short construction season, strong winds, and wind-driven waves (which disrupt dredge positioning and barge movement); and
- On-land water handling limitations.

After completing dredging, which encompassed six years (1995-2000), cumulative

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

totals as reported in Bi-Weekly Pollution Reports are as follows:

- Dredged volume: somewhere between 93,259 cy and 178,708 cy, depending on method of calculation
- Water treated: 665 million gallons
- Dewatered TSCA sediments landfilled: 19,901 tons + 16,125 cy
- Dewatered non-TSCA sediments landfilled: 22,167 tons + 666 cy
- Clean sand (<1 ppm PCBs) separated out of dredged material and stockpiled: 4,091 tons + 3,700 cy
- Total cost: \$47.5 million

It is not entirely clear which of the volume-of-dredged-sediments totals reported above is the closest to actual. Initially, at the end of the 1998 season, the total removal volume was estimated at 118,000 cy (reported in EPA's Bi-Weekly Pollution Reports). By April 1999 (Pollution Report No. 57), EPA had adjusted the total downward to 72,000 in-situ cubic yards. The reason for the adjustment was not explained but was apparently either due to using the results of a bathymetric survey of the dredged areas or to using a revised method of calculating dredged volume (first documented in EPA's Pollution Report of September 15, 1999). In the latter instance, EPA calculated "ex-situ" volumes for 1999 by back-calculating volumes from dewatered tonnages. Thus the 25,050 cy reported for 1999 (in Pollution Report No. 70) and the 20,491 cy reported for 2000 (in Pollution Report No. 83) are ex-situ cubic yards, while the 72,000 cy reported through 1998 are defined by EPA as in-situ cubic yards.

Dredging of Harbor hot spots continued into October 2000. The EPA removal contractor continued to utilize several equipment modifications in 2000 that were successfully introduced in 1999. These, as reported by EPA, included (1) use of a "modified dredge spread" arrangement which has provided greater dredge stability in windy conditions; (2) placing a shroud around the "matchbox" design dredge head to reduce the opening and create more suction, and utilizing a water jet system within the dredge head to loosen sediment on the bedrock surface, allowing more effective removal at the bedrock interface; (3) replacing the 8-inch hydraulic pumps used to pump slurry from barges to the wastewater treatment plant (at 1,500 gpm) with higher capacity electric pumps (capable of 2,100 gpm); and (4) installing a transfer pump in the settling chambers of the wastewater treatment plant to provide greater flow through the sand and carbon filters. These modifications in 1999 reportedly resulted in an increased volume of dredged slurry generated per day. Average dredge production rates for the period September 25 to October 17,

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1999 were reported by EPA as 350-400 cubic yards of sediment per day.

Year 2000 dredging was performed during one 12-hour shift, while solids handling and water treatment were performing during two 12-hour shifts. Divers were used to direct dredging operations. As of October 21, 2000, somewhere between 24,500 cy (ex-situ) and 33,100 (in-situ) were removed for the year, resulting in a 6-year removal total of between 93,259 cy (ex-situ) and 178,708 cy (in-situ). The “ex-situ” and “in-situ” refer to two different methods of calculating removed volume. The “ex-situ” and “in-situ” methods of calculation are explained in Reference B-503 (Pollution Report No. 85) as follows:

“An “ex-situ” volume estimate of sediment removed from the North Bridge area and Harbor was calculated by START utilizing disposal data and daily volume estimates from Pad 5. Total tonnage of clean stockpiled sand, TSCA, and non-TSCA material were converted to cubic yards taking into account the volume per ton of the sand, woodchips, and cake generated within the treatment system. Approximately 24,150 cubic yards of material have been shipped offsite or stockpiled during the 2000 dredge season. An anti-fluff factor of 1.355 was used to estimate the “in-situ” volume of sediment removed from the North Bridge Area and Harbor. Results indicated that dredging activities conducted from May 2000 through November 2000 removed approximately 33,000 cubic yards of sediments from the harbor proper and North Bridge Area (24,450 ex-situ x 1.355 percent fluff = app. 33,000 cubic yards).”

“ERRS contractor . . . calculated an “in-situ” volume removed estimate for the 2000 dredge season utilizing data from the dimensions of each dredge area and the depth of sediment of each dredge area obtained from SSS grid logs. Results of the calculations indicated that dredging activities conducted from May 2000 through November 2000 removed approximately 30,300 cubic yards of sediments from the harbor proper and North Bridge Area, which is comparable to the 33,000 cubic yard estimate calculated by START.”

In certain of the Harbor hot spot areas, it became exceedingly difficult to try to achieve the targeted 10 ppm PCB cleanup level, particularly as the depth of removal increased and the bedrock interface was approached and as layers of light fluffy paper pulp or slab wood were encountered (these materials, with their high organic carbon content, preferentially adsorb PCBs). This is illustrated by the high levels of PCBs still being found in sediment confirmation samples collected in 1999, even after three years of dredging in the Harbor. For example, an average concentration of 1,200 ppm PCBs was detected in a five-foot thick layer of paper pulp (May 1999); wood chip samples as high as 3,316 ppm (June 1999); in Dredge Area 16, confirmation samples exhibited PCBs ranging from 64 to 10,042 ppm (July 1999) - - after an additional pass with the dredge, confirmation samples ranged from ND to 788 ppm; and confirmation sample results from Dredge Area 26

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exhibited PCB concentrations ranging from ND to 1,208 ppm (August 1999).

Throughout 2000, End-of-Project (EOP) confirmation sediment samples were collected from the river and harbor on a 50-foot spacing. A total of 422 locations was sampled. Samples were collected from the zero to 12 inch depth interval (or fraction thereof) at all locations and analyzed for PCBs; at some locations the 12 to 24 inch and 24 to 36 inch intervals (or fraction thereof) were also sampled. Overall arithmetic average PCB concentration in the zero to 12 inch layer was 9 ppm, with a max. discrete concentration of 884 ppm. Overall arithmetic average PCB concentration for all 583 samples analyzed was 7.9 ppm. It is important to recognize that these sample results are for the river and harbor as a whole, and are not confined just to the dredging areas.

By September 22, 2000, EPA had identified approximately 30 localized hot spots remaining to be dredged. The size and location of each hot spot were not specified; the hot spots reportedly comprised both recently identified undredged areas and previously dredged areas; both were found to contain elevated levels of PCBs (up to 3,000 ppm).

All dredging ceased at the project on October 21, 2000. Demob of equipment from the site began immediately and was completed in Spring 2001. A program of clean sand placement in the river and harbor was implemented in Fall 2000. Treated sand was to be placed over areas in the harbor with surface PCBs above 10 ppm. The first attempt caused resuspension of fine sediments and was discontinued. Subsequently, 1,400 cy of sand were broadcast into the river and were allowed to distribute naturally into the harbor.

In February 2001, EPA restated the project objective in an Action Memo as follows "...the objective of 95% removal of the total PCB mass from within the AOC and an average concentration of not more than 10 ppm throughout the sediment column shall be verified."

During May 2001, Final Sampling (FS) confirmation sediment samples were collected from the river and harbor. A total of 391 locations was sampled. Samples were collected from the zero to 12 inch interval (or fraction thereof) at all locations and analyzed for PCBs; at some locations the 12 to 24 inch and the 24 to 36 inch intervals (or fraction thereof) were also sampled. Overall arithmetic average PCB concentration in the zero to 12 inch layer was 7.3 ppm, with a max. discrete concentration of 543 ppm. Overall arithmetic average PCB concentration for all 672 samples analyzed was 7 ppm. It is important to recognize that these sample results are for the river and harbor as a whole, and are not confined just to the dredging areas. A breakdown of the PCB ranges vs. number of samples follows:

- 568 of the 672 samples (84.5%) exhibited non-detect (<1 ppm) for PCBs

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- 41 of the 672 samples (6.1%) exhibited between 1-10 ppm PCBs
- 42 of the 672 samples (6.3%) exhibited between 10-50 ppm PCBs
- 21 of the 672 samples (3.1%) exhibited greater than 50 ppm PCBs

A project completion report was issued in November 2002. Additionally, MDEQ performed caged fish studies in the harbor to assist in setting fish advisories.

Recalculated totals for the volume of sediment removed, water treated, and quantities of dewatered materials sent to landfills were presented in the November 2002 project completion report. These final reported results, for the entire project period of 1995-2001, differ from the cumulative totals in the Bi-Weekly Pollution Reports previously stated herein (and also presented in Report 04A, herein). The final reported totals are:

Dredged volume: 187,500 cy
Water treated: 673 million gallons
Total TSCA and non-TSCA solids shipped to landfills: 71,400 tons
Total cost (including mob and demob): \$48.2 million

Calculations of the total PCB mass remaining in the river and harbor were prepared and reported in the project completion report. These calculations were based on both the 2000 and 2001 confirmation sample results and an assumed range of specific gravities for the in-situ sediments. These calculations indicated that dredging achieved somewhere between 82% and 97% removal of the total PCB mass.

Key Conditions:

capping, commercial landfill, dredging, Great Lakes AOC, hydrodynamic modeling, particle separation/soil washing, post monitoring, specialty dredge, water handling limitations

Estimated Target Volume:

One 1.5-acre hot spot is to be dredged in a dead-end backwater area (Area B). Two other hot spots, one in river of 2 acres (Area C) and one in harbor of 15 acres (Area D) were to be capped, now they will be dredged. Initially targeted for removal were 97,000 cy (15-acre Harbor; Area D); 7,000 cy (2-acre Inner Harbor; Area C); and 23,000 cy (1.5 acre embayment; Area B).

Estimated Calendar Time to Implement Remedy:

Original project estimated for three years: 1995-1997.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: MANITOWOC RIVER BASIN

SiteID: 05-34

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: State-Lead

Contaminants of Concern: PCBs

Overall Status Summary: Removal actions were to begin in OU-1 by mid-November 2000. Tecumseh Products was performing the removal as a voluntary cleanup action with state oversight. Final remedial actions in the remaining OUs are not to be determined until further characterization studies are completed for each.

OU-1: Comprises upstream drainage ditches and Jordan Creek. The drainage ditches reportedly contain the highest levels of PCBs (200 ppm avg.; 2,000 ppm max.) and nearly three-quarters of the total mass of PCBs targeted at the site. To-date the drainage ditches have been well characterized and a remedial plan is in place to remove PCB-contaminated sediment and bank soils. Three hundred sediment and bank and floodplain soil samples were recently collected to further characterize areas in and around Jordan Creek. Removal in the western portion of OU-1 drainage ditches was scheduled to begin in November 2000. An estimated 6,100 cy of ditch sediment and bank and floodplain soils were targeted for removal, of which about half was expected to contain PCBs at levels of 50 ppm or greater. Maximum PCB levels in ditch sediment have been found to exceed 2,000 ppm. Removal was to be by dry excavation to a depth target varying from one to five feet. Removal from the bottom of the ditches will be to a change in soil characterization; depth of removal in floodplains will vary between one and four feet with a few areas reaching a depth of five feet; and banks will be removed to a one foot horizontal depth. TSCA material will be determined at the time of removal using a 25 ppm isopleth on a concentration contour map. Reportedly, remediation in OU-1 will remove approximately one-third of the total PCB mass attributed to the site.

TSCA material (material containing >25 ppm PCBs and targeted using a concentration contour map 25 ppm isopleth) is to be disposed of at the Lone Mountain, OK TSCA landfill operated by Safety-Kleen. Non-TSCA material will be sent to local landfills in WI. Removed material will be allowed to gravity dewater and then be stabilized (fly ash or lime) prior to disposal. Sediment transport will be by rail from the Tecumseh Products facility. Transport and disposal costs are: \$109 per ton TSCA; \$50 per ton non-TSCA.

OUs-2, -3, and -4: The areas encompassed by these OUs are to be subjected to

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

further characterization studies prior to determining an appropriate remedial alternative. Reportedly, initial estimates of the total removal volume (~ 210,000 cy) of PCB-contaminated sediment from the Manitowoc River Basin may be high by a factor of two or more as determined by more recent characterization studies. Draining and dry excavation is one of the remedial options being considered for Hayton Millpond (OU-4).

Key Conditions:

commercial landfill, floodplains targeted, solidification/stabilization

Estimated Target

OU-1: 6,100 cy. Estimates for removal of PCB-contaminated sediment from the Manitowoc River Basin are as high as 210,000 cy.

Volume:

Estimated Calendar Time to Implement Remedy:

Begin OU-1 in November 2000.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: **MARATHON BATTERY**

SiteID: 02-09

US EPA Region: II

Status (Active, Complete, or Monitoring Only): Complete. Site delisted from NPL in October 1996.

Type of Regulatory Action: Superfund. Final.

Contaminants of Concern: metals (primarily Cd; also Ni and Co)

Overall Status Summary: Completed in early 1995. Approximately 77,000 cy material dredged from cove and pond areas, dewatered, chemically fixated, transported by rail, and disposed in Michigan landfill. An additional 23,000 cy was dry-excavated from a marsh area and handled and disposed in the same manner. Natural recovery (slow burial by deposition of clean sediments) was the selected remedy in 400-plus acres of marsh and open cove area. Site now delisted from the NPL (October 1996).

As of April 2001, restoration at East Foundry Cove - Constitution Marsh has been ongoing for five years. Some early setbacks (e.g., geese predation, extreme ice flow conditions) made it difficult to reestablish native plant species (primarily cattails) to the marsh area. As reported in November 1998, about 60% of the required 85% vegetative coverage had been established and muskrats had recently been observed, a positive sign that they are reestablishing in the area.

Key Conditions: commercial landfill, dredging, habitat/streambank restoration, more-harm-than-good, natural recovery, post monitoring, rail transport for disposal, solidification/stabilization, tidal fluctuations, water handling limitations, wetlands

Estimated Target Volume: Area I: Approximately 30,000 cy sediments, East Foundry Cove Marsh (ROD, 1986).

- Hydraulic dredging of sediments containing greater than 100 ppm of cadmium from the East Foundry Cove Marsh (EFCM) of Area I (ROD, 1986).

Area III: Approximately 56,000 cy sediments, East Foundry Cove/Pond, and Cold Spring pier (ROD, 1989).

- Dredging one foot of sediments to achieve a 95% removal of cadmium from the East Foundry Cove/Pond (EFC) and Hudson River in the vicinity of the Village of Cold Spring pier (Area III) (ROD, 1989).

Estimated Calendar Time to Implement Remedy:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: ***McCORMICK and BAXTER (Portland Plant)***

SiteID: 10-04

US EPA Region: X

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund. Final. Oregon DEQ lead.

Contaminants of Concern: PAHs

Overall Status Summary: The ROD proposes capping 15 acres of nearshore PAH-contaminated sediment in the Willamette River. The cap is to be a minimum three feet of sand, armored as necessary. Cap design was on hold indefinitely until after implementation of an onsite groundwater remedy to determine if NAPL seepage from the site into nearshore sediments is stopped. USEPA and Oregon DEQ have agreed to install a subsurface barrier wall to eliminate the flow of NAPL to the Willamette River. A ROD ESD for the barrier wall was released in August 2002 and construction of the barrier was completed in 2003. The design of the sediment cap is complete and installation of the cap began in July 2004. The cap is to consist primarily of sand covered with rock-and-concrete-block armoring and will cover 23 acres of river bottom and banks. In December 2003, USEPA provided an additional \$12 million in funding for all capping to proceed in 2004.

Key Conditions: capping, natural recovery, wetlands

Estimated Target Volume: N/A; capping remedy

Estimated Calendar Time to Implement Remedy: N/A

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: ***McCORMICK and BAXTER (Stockton Plant)***

SiteID: 09-04

US EPA Region: IX

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund. Final. Fund-Lead.

Contaminants of Concern: dioxin/furans; PAHs

Overall Status Summary: The USEPA proposes capping of most sediment in the Old Mormon Slough using a minimum of two feet of sand, armored as necessary. Certain areas of the slough not capped will have institutional controls implemented. Once sediments are capped, long-term operation and maintenance activities are to be implemented for at least a 30-year period. In addition, the remedial action will be reanalyzed following selection of a final groundwater remedy to determine if the remedies are consistent. A ROD addressing the entire site was signed in April 1999.

Design of the sediment cap is being performed by the USACE, Albuquerque, NM office and has been delayed for as long as another year. Cap construction is targeted to begin in July 2003.

Key Conditions: capping, natural recovery, post-monitoring

Estimated Target Volume: 70,600 cy of contaminated sediment. Cap will be 2 ft. thick and cover ~8.8 acre of the slough (requiring 28,400 cy of sand).

Estimated Calendar Time to Implement Remedy:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: ***MENOMINEE RIVER***

SiteID: 05-24

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: RCRA Consent Agreement (for arsenic contamination) between Ansul Fire Protection Company, the State of Wisconsin, and US EPA. This includes an Interim Measures Agreement signed between US EPA and Ansul on September 28, 1998.

Contaminants of Concern: arsenic; also, other heavy metals, PCBs, PAHs, oil and grease

Overall Status Summary: Pollutants such as heavy metals, PCBs, and PAHs have resulted in impaired beneficial uses in the Menominee River AOC. However, one of the primary reasons the Menominee River is classified as an AOC is because of the arsenic contamination in the turning basin and in sediments in the Eighth Street Slip and along the right bank of the river below the Ansul Fire Protection Company, which is located on the Wisconsin side of the river.

From 1957-1977, Ansul produced agricultural herbicides. Manufacturing of these herbicides produced a salt by-product that was 2% arsenic by weight and stored in uncovered, unlined waste piles. Over the years of operations, arsenic escaped into or was discharged into the river. In 1981, to comply with a Consent Order issued by WDNR, Ansul pumped 16 million gallons of arsenic contaminated ground water from the company's property. This action removed an estimated 95% of the arsenic from a sand layer 15 to 30 feet beneath the surface.

A RCRA Consent Agreement between Ansul Fire Protection Company, the State of Wisconsin and the US EPA was initiated in 1990. On July 1, 1997, US EPA ordered Ansul to remove as much as 15,000 cy of contaminated sediment from the Eighth Street boat slip located adjacent to its facility. In September 1998, an Interim Measures Agreement was incorporated into the existing Consent Order. The interim measures consist of removal of arsenic contaminated sediments in the Eighth Street Slip area, construction of a barrier system to prevent the continued migration of arsenic contaminated groundwater into the Menominee River, and additional investigation and implementation of remedial measures for the Menominee River Turning Basin.

Ansul began on-site construction of the barrier system in October 1998 to control the migration of contaminated groundwater off-site into the Menominee River. The barrier system was completed in December 1998. On-site groundwater contains arsenic at concentrations up to 8,530 ppm and exceeds the MCL for arsenic in drinking water of 0.05 ppm. The barrier encompasses the most highly contaminated

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

areas on-site and provides preliminary protection to fish and benthic life in the river as well as potential reduction of human exposures through drinking water or recreational activities.

As part of the Interim Measures Agreement, Ansul commenced dredging of arsenic-contaminated soft sediment from the Eighth Street Slip area on June 15, 1999 and was scheduled to finish by the end of 1999. Sediments in the slip were reported to contain arsenic at concentrations up to 22,000 ppm. Also as part of the Agreement, Ansul was to conduct additional investigations of soft sediments and subsoils in the Turning Basin and subsoils in the Eighth Street Slip. Ansul was to submit a work plan to the agencies by March 15, 1999 that detailed the investigation to determine the extent of contamination and complete development of proposed interim measures for these areas. Ansul originally planned to submit the work plan on February 1, 1999; the delay was due to a problem with the selected laboratory.

Dredging of the Eighth Street Slip was completed in mid-September 1999. The target cleanup level was 4.8 ppm arsenic. Approximately 12,400 cy of sediment were removed from the slip. The slip remains isolated from the river and was used as the discharge location for water generated during dredging and dewatering operations. It was stipulated that Ansul had up to two years to treat the water to acceptable levels (arsenic) for discharge back to the river. Sediment was dewatered, mixed with stabilizing agents, and disposed of in a Subtitle D landfill located in Michigan.

Water within the Eighth Street Slip was treated using reverse osmosis and ultra filtration, and discharged to the river. The slip was filled with sand and gravel as water was removed. The operation was completed in September 2002. Although work on the Eighth Street Slip was part of an Interim Measures Agreement, EPA now intends to make it the permanent remedy. A permanent cap was also installed over the Salt Vault area of river bank near the Eighth Street Slip and a contractor continues to perform sampling to characterize the sediments in the Menominee River Turning Basin.

<i>Key Conditions:</i>	capping, commercial landfill, dredging, Great Lakes AOC, solidification/stabilization
<i>Estimated Target Volume:</i>	10,000 - 15,000 cy
<i>Estimated Calendar Time to Implement Remedy:</i>	On July 1, 1997, EPA ordered Ansul to remove sediment from the Eighth Street Slip Area. Target date to begin dredging is June 15, 1999 with completion by the end of 1999.

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Site Name: **MILLTOWN RESERVOIR**

SiteID: 08-02

US EPA Region: VIII

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund. Final. USEPA-Lead.

Contaminants of Concern: Heavy metals, primarily arsenic, cadmium, copper, lead, and zinc

Overall Status Summary: The Milltown Reservoir, created by a dam built in 1907, has historically acted as a repository for mining wastes washed down from upstream mining operations at Butte and Anaconda. The reservoir currently contains an estimated 6.6 million cy of heavy metals-contaminated sediment. The reservoir and 120 miles of upstream Clark Fork River were added to the NPL in 1983, primarily based on elevated levels of arsenic found in Milltown public drinking water wells. The Superfund site has been divided into three OUs: Clark Fork River, Milltown Water Supply, and Milltown Reservoir Sediments. Risk to human health was determined to be primarily from the consumption of arsenic-contaminated drinking water. An alternative source of drinking water was provided to Milltown residences in 1985 to address the groundwater OU, although the groundwater continues to be contaminated with arsenic, the primary source of which is believed to be contaminated sediments within the reservoir. Ecological risks have been determined to be primarily from elevated copper concentrations in sediment washed downstream due to ice scour and high flows.

Investigations have been performed at the site since 1982 ending in the issuance of a Remedial Investigation report in 1995. A draft Feasibility Study was completed by ARCO in 1996 but was never finalized due to new concerns over copper concentrations in surface water. A Focused Feasibility Study was issued in June 2001 and a Combined Feasibility Study based on both previous studies was issued in Summer 2002.

A Proposed Plan was released in April 2003. In response to comments received, a revised Proposed Plan was issued in May 2004. The ROD is expected to be issued in 2004. The preferred remedy requires removal of about 2.6 million cy of the most highly contaminated sediment from the lower reservoir, followed by removal of the dam. Implementation of the remedy is anticipated to begin in 2006 and take five years to complete. Total cost is estimated at \$106 million.

The following remedial approach is described in the revised Proposed Plan:
(1) Sediments would be excavated using conventional mechanical excavation equipment instead of hydraulic cutterhead dredges.

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(2) Removed sediments would be taken 90 miles away by rail to Opportunity Ponds near Anaconda for disposal, rather than placing the materials in a repository at the Bandman Flats.

(3) A bypass channel will be constructed on the Clark Fork River arm of the reservoir. This will be done before the dam is removed, to isolate the sediments from the active river and eliminate significant scouring and downstream discharge of contaminated sediment from this portion of the reservoir.

(4) The reservoir pool level will be lowered to the lowest possible level during removal of the sediments. This is in contrast to conducting the removal at full pool levels proposed in the initial plan.

Key Conditions:

Estimated Target Volume:

Estimated Calendar Time to Implement Remedy:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: *MOSS-AMERICAN (Kerr-McGee Oil Co.)*

SiteID: 05-42

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund. Final.

Contaminants of Concern: PAHs

Overall Status Summary: As described in the 1990 ROD: “The eighty-eight acre Moss-American Site includes the former location of the Moss-American creosoting facility, five miles of the Little Menomonee River, a portion of which flows through the eastern half of the site, and the adjacent floodplain soils. The site is located in the northwestern section of the City of Milwaukee . . . Sixty-five acres of the site are undeveloped Milwaukee County park land. Twenty-three acres are owned by the Chicago and Northwestern Railroad and used as an automobile loading and storage area.”

“In 1921, the T.J. Moss Tie Company established a wood preserving facility on twenty-three acres of the site west of the Little Menomonee River. The plant preserved railroad ties, poles, and fence posts with creosote . . . From 1921 to 1971, the facility discharged wastes to settling ponds that ultimately discharged to the Little Menomonee River. These discharges ceased in 1971 when, in response to a City of Milwaukee order, Moss-American diverted its process water discharge to the Milwaukee sanitary sewerage system. The facility closed in 1976.”

Creosote was discovered in the Little Menomonee River by the public in 1971, about three miles downstream from the site.

As reported in the 1990 ROD: “Subsequently, under a Wisconsin Department of Natural Resources order, Kerr-McGee cleaned the eight settling ponds and dredged about 1,700 feet of river to remove creosote-contaminated soil and sediment. The settling ponds were filled with clean soil, the discharge pipe to the Little Menomonee River was removed and a twelve foot deep underground clay retaining wall was constructed between the ponds and the river, adjacent to the facility. In 1973, U.S. EPA financed the dredging of approximately 5,000 feet of river between the site and Bradley Road . . . most of the dredged sediments were contained on site in the Northeast Landfill area and along the west bank of the river.”

The site was placed on the NPL in 1984. An RI/FS was completed in 1990. A ROD was issued in 1990, an Explanation of Significant Difference in 1997, and a ROD Amendment in 1998. A Consent Decree signed by EPA, the State of Wisconsin, and Kerr-McGee was entered by Federal District Court in 1996 calling for implementation of the design and remedy by Kerr-McGee.

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The selected remedy is to:

- Re-route 5-6 miles of the Little Menomonee River to a new channel; excavate “highly contaminated” (apparently >15 ppm CPAHs) PAH contaminated sediment from the old channel; and re-fill and bury the old channel with the soil from the new channel;
- Treat the excavated contaminated sediment onsite (along with excavated contaminated onsite soils) by thermal desorption to achieve a cleanup level range of 0.5-20 ppm of CPAHs;
- Restore and mitigate the disturbed river corridor, habitat, wetland, and woodland areas;
- Contain onsite the soils/sediments treated by thermal desorption, along with additional onsite soils excavated from the floodplain (estimated at 210,000 cy), and cover the contained materials with an impermeable cap; and
- Collect and treat contaminated groundwater, including by free-product recovery as well as by an in-situ funnel and gate system.

Remediation has been implemented in stages, starting in 1995. During the 1995-1997 operating seasons, about 10,000 gallons of free product creosote and associated wastewater were collected and disposed. Construction of the funnel and gate system was begun in 1999 and completed in July 2000. Soil excavation and treatment by low-temperature thermal desorption (LTTD) were performed in 2001 and 2002 and resulted in treatment of 137,200 tons of soil. The first sediment remedial work began in Fall 2002 and involved the re-routing of a 1.2 mile segment of the Little Menomonee River to a new channel, the first of five segments to be re-routed.

Segment 1, from Brown Deer Road to Bradley Road, was completed in 2003. The construction contractor is North Star. About 30,000 cy of soils were excavated to create the new channel for Segment 1. About 10,000 cy of contaminated sediments and 1,000 cy of floodplain soils were removed from Segment 1 and stockpiled onsite, pending treatment and disposal. The remediated Segment 1 has been backfilled with clean fill, using a combination of clean soil from the new channel excavation and surplus LTTD-treated surface soils from former site production areas.

The cleanup methodology for Segments 2 and 3 was designed while the cleanup of Segment 1 was underway. Excavation of the new channel for Segments 2 and 3 is underway and is expected to be completed in Spring 2004. During the period of

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Summer 2004 into Spring 2005, the existing Segments 2 and 3 are scheduled to be drained and the flow rerouted to the new channel, followed by excavation of contaminated sediments and backfilling and grading.

As Segments 2 and 3 are being rerouted, the cleanup methodology for Segments 4 and 5 will be developed. Cleanup of Segment 4, from Mill Road to Silver Spring Road, and Segment 5, from Silver Spring Road to Hampton Road, could start in late 2005.

Key Conditions:

dedicated landfill or CDF, dredge spoil reuse/fill, extended (>1 mile) river, floating oil, floodplains targeted, habitat/streambank restoration, property access issues, thermal desorption, wetlands

Estimated Target Volume:

Not defined for sediment. Five to six miles of the Little Menomonee River will be re-routed and the old channel buried. The ROD implies that "highly-contaminated" sediment will be removed from the old channel before burial and treated onsite by thermal desorption (a volume estimated at 5,200 cy in the 1990 ROD).

Estimated Calendar Time to Implement Remedy:

Not provided

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Site Name: NATIONAL ZINC

SiteID: 06-02

US EPA Region: VI

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Memo of understanding between EPA and OK DEQ to conduct a “national pilot project” and complete a CERCLA-quality investigation and remediation under state authority, in lieu of an NPL listing.

Contaminants of Concern: heavy metals (Cd, Pb, Se, Zn)

Overall Status Summary: Based on a 1996 Oklahoma State ROD, 3,000 cy of metals-contaminated sediments were targeted for dry excavation from about 3,600 linear feet of tributaries upstream of Eliza Creek, followed by stabilization and onsite burial; to be followed by replacement with clean fill. Destruction of stream habitat vs. pros/cons of removal and natural recovery were evaluated during the remedial design phase. Ecological-based cleanup levels were set for cadmium, lead, selenium, and zinc.

Removal was accomplished by dry excavation in December 1997, and January and February 1998. The great majority of the removed sediments failed TCLP testing for cadmium which altered plans for onsite disposal. Subsequently, it was determined that the 208 cy removed from the upper tributary (upper reach) did not require stabilization; 9,800 cy removed from the lower reach did. Stabilization was accomplished by addition of dolomitic quicklime and sodium sulfide. All sediments were disposed at an in-state commercial landfill.

The ROD requirement for backfilling after sediment removal was waived.

Key Conditions: commercial landfill, fish spawning limitations, more-harm-than-good, natural recovery, property access issues, solidification/stabilization

Estimated Target Volume: 3,000 cy (1996 ROD); 208 cy from upper reach and 3,600 cy from lower reach (1997 and 1998 Remediation Plans)

Estimated Calendar Time to Implement Remedy:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: NATURAL GAS COMPRESSOR STATION

SiteID: 04-01

US EPA Region: IV

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: US EPA Consent Decree.

Contaminants of Concern: PCBs (1242)

Overall Status Summary: PCBs originated in lubricating oils used in natural gas pipeline compressors. PCB emissions led to contamination levels above cleanup criteria in an earthen disposal pit, site soils, drainage ditches, and nearby Little Conehoma Creek and its floodplains. The response and remediation requirements for this and other of the company's natural gas pipeline compressor stations were defined in a 1989 consent decree with EPA.

Removal of sediments in the Little Conehoma Creek was accomplished in the dry using conventional earth-moving equipment. The removal was from 26 discrete sediment areas over a two-mile stretch immediately downstream of the compressor station. The creek flow was diverted by pumping to a nearby tributary to allow dry excavation. The cleanup criterion in the creek was 1 ppm PCBs. Floodplains were also remediated in 31 discrete areas by excavation to 5 ppm or less PCBs. A total of 51,432 cy of stream sediments and 8,290 cy of floodplain soils were removed. Disposal was at a TSCA-permitted landfill in Emelle, AL. Another 23,883 cy of material were excavated from an earthen pit, surface soils, and drainage ditches and disposed in the same manner.

Excavated floodplain areas were backfilled to original grade with clean fill. Stream sections were restored, to the extent practical, to their pre-remediation hydraulic characteristics by the placement and grading of clean backfill, seeding, and the installation of erosion control matting.

The work was accomplished from April 1996 through September 1997.

Key Conditions: commercial landfill, floodplains targeted, property access issues

Estimated Target Volume:

Estimated Calendar Time to Implement Remedy:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: NEW BEDFORD HARBOR - PROJECT 1 (Hot Spots)

SiteID: 01-02

US EPA Region: I

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Superfund. Interim Remedial Action. Fund-Lead.

Contaminants of Concern: PCBs (1016/1242/1254); heavy metals

Overall Status Summary: Dredging of five acres of hot spots (OU-2) was performed from April 1994 to September 1995, taking 16.5 months to remove 14,000 cy of sediment. The dredged materials were stored in a nearshore confined disposal facility (CDF) pending selection of a remedial alternative. (Originally, onsite incineration was planned, but was canceled by EPA in 1993 due to, "... a vehement and Congressional supported reversal in public support for the incineration component of the cleanup plan at about the time the incinerator was being mobilized." (Source: Reference A-438) In 1993, the New Bedford Harbor Superfund Site Community Forum was created to develop a replacement consensus-based cleanup plan. From 1994-1998, the Community Forum, with regulatory assistance, evaluated eleven different disposal alternatives and included pilot-scale demonstration projects for three treatment systems: (1) combined solvent extraction and solid phase dechlorination, (2) combined thermal desorption and gas phase chemical destruction, and (3) staged vitrification. All three treatment systems were rejected by the Community Forum primarily as too costly and too time consuming, although strong opposition was provided by residents living near the existing CDF regarding, "... concerns about the possibility of air emissions or other problems occurring during implementation of the separation technologies as well as concerns about noise, lights, and dust caused by the 24-hour per day operations." (Source: Reference A-438) As a result, a proposed ROD Amendment issued for public comment in August 1998 rejected treatment as an option for the 14,000 cy of contained (in a temporary CDF) sediments and instead selected dewatering, followed by disposal at an offsite permitted hazardous waste landfill.

A final draft of the ROD Amendment was issued in April 1999, reiterating the selected disposal option as dewatering followed by offsite disposal at a TSCA-permitted landfill.

The final disposal was by off-site landfilling at Model City, NY from December 1999 – April 2000. The total cost for the disposal, as well as the dewatering and water treatment and solidification, of the 14,000 cy (20,000 tons) was \$8 million.

Key Conditions: commercial landfill, confined disposal facility, dredging, floating oil, hydrodynamic modeling, post monitoring, tidal fluctuations, water handling limitations

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Estimated Target Volume: 10,000 cy

Estimated Calender Time to Implement Remedy: One year

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: NEW BEDFORD HARBOR - PROJECT 2 (Harbor/Upper Bay)

SiteID: 01-08

US EPA Region: I

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund. Final. Fund-Lead.

Contaminants of Concern: PCBs (1016/1242/1254); metals

Overall Status Summary: USEPA originally issued a proposed plan and addendum for the Upper and Lower Harbor (OU-1) in January and May 1992 (References A-110 and A-113), respectively. In response to comments received on those two documents, as well as extensive local dialogue, USEPA issued a new proposed plan in October 1996 (Reference A-330) for cleanup of the Upper and Lower Harbor. The public comment period ended February 3, 1997 and the ROD (Reference A-363) was issued on September 25, 1998.

The 1998 ROD calls for dredging 433,000 cy from the Upper Harbor to <10 ppm PCBs and 17,000 cy from the Lower Harbor and Bay, combined, to <50 ppm PCBs. In addition, areas of public access and where residences abut the harbor would be dredged to <25 ppm and <1 ppm, respectively. The removed material would be deposited into four new nearshore confined disposal facilities (CDFs) totaling 43 acres. The remedial plan would take an estimated ten years to complete, two years for design and CDF construction, and eight years for removal using two dredges simultaneously. USEPA estimates it would take another ten years following remediation until PCB levels in fish are reduced to below site-specific risk levels and fish advisories can be lifted.

The status and schedule of the project as of April 2001 was as follows:

- The Corps of Engineers and USEPA signed an interagency agreement for the Corps to provide management and oversight for the project. The Corps subsequently contracted with Foster-Wheeler Environmental Corporation to implement the work.
- The majority of work in 1999 was design, survey, and engineering associated with defining CDF footprints and approaches for relocating CSOs and utilities that interfere with the CDF areas; this work is continuing. Also, effort is ongoing regarding access agreements and easements for the land for the four CDFs.
- Construction on the first of the four CDFs was originally targeted to start in June 2000, but was delayed until 2001. This would be the CDF closest to Sawyer Street. Re-evaluation of the number and configuration of the CDFs is ongoing.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

- Dredging would begin following completion of the first CDF. Dredging will start at the most upstream location in the Upper Harbor and proceed downstream. At this time (April 2001), dredging was targeted to begin in 2002.
- The existing WWTP (350 gpm) would be used to support dredging; in addition, at least one more WWTP would be built, or the existing WWTP would be upgraded to increase capacity. In this regard, the Corps, USEPA, and Foster-Wheeler were continuing to review dredging technologies in an attempt to identify more efficient and less-water-producing technologies than hydraulic dredging.

In late Summer 2000, a dredge evaluation program (officially: Pre-Design Field Test Dredge Technology Evaluation [PDFT]) was implemented at the site at an estimated cost of \$1.5 to 2 million. The purpose of the PDFT was to select the optimum dredge for performing the New Bedford Harbor remediation. The Corps of Engineers provided oversight during implementation of the program. The primary impetus for the program was reportedly to evaluate the ability of removal technologies to minimize the volume of water generated during dredging and to determine the impact of each on the disposal capacity provided by the four proposed CDFs. Additionally, the program was designed to evaluate the efficiency of various dredging technologies to remove contaminated sediment from pre-selected test areas within the Upper Harbor using a common set of criteria, such as: 1) dredging accuracy to close tolerances, 2) reduced water content of dredged material, and 3) control of resuspension during dredge operation. Ultimately, a single hybrid dredge system, a Bean hydraulic excavator with slurry processing unit, was evaluated. This system combines mechanical removal with hydraulic transport and is similar in function to the dredge Bonacavor used by Bean at Bayou Bonfouca (Project 06-01).

Two other dredge technologies originally selected for evaluation during the study were the Canada-built Normrock Industries Amphibex Amphibious Excavator (a combination mechanical/hydraulic dredge specially designed for work in intertidal and shallow water areas) and the Ellicott 370 HP Dragon Series hydraulic cutterhead dredge. It was decided during the design phase of the program that the Amphibex would not participate in the evaluation because of the potential that operating a dredge with a foreign-made hull in U.S. waters would violate the Jones Act. The Ellicott 370 Series cutterhead dredge was not evaluated reportedly because sufficient operational and performance data were already available as a result of its previous use during both a 1988-89 Pilot Study and also for the 1994-95 Hot Spot dredging project (MCSS Database Project ID 01-02).

Results from implementation of the PDFT for the Bean dredge system are summarized below:

PDFT OVERVIEW

- Dredging occurred over a five-day period (August 14-18, 2000).
- The primary performance areas evaluated as part of the PDFT were:
 - Percent solids concentration in the dredge slurry and slurry pumping capabilities;
 - Horizontal and vertical dredging accuracy;
 - Dredge production rates in shallow water and for sediment with debris;
 - Removal of contaminated sediments to a specified depth;
 - Impacts to water quality; and
 - Impacts to air quality.

A secondary goal specified for the PDFT was to evaluate the effectiveness of the hybrid technology to achieve the site-specific cleanup level of 10 ppm PCBs in surface sediment.

- Dredging activities were performed in a single test cell in an area of the Upper Harbor approximately 3,700 ft. north of the Coggeshall Street Bridge. The test cell measured approximately 100 feet (north-south) by 550 feet (east-west), and was located about 2,800 feet from the existing Sawyer Street confined disposal facility (CDF), into which sediments were discharged. Water depth within the test area varied from approximately 0 to 5 feet mean lower low water and water depth changes averaged 3.7 feet over each tide cycle. The test cell was divided into smaller dredge cut lanes of approximately 100 feet long by 30 feet wide.
- Pre-dredge sediment PCB concentrations in the upper one-foot of sediment of the test cell ranged from 1.6 ppm to 2,700 ppm and averaged 857 ppm. The pre-dredge sediment PCB concentration in the one- to two-foot, and two- to three-foot horizons ranged from ND to 830 ppm and ND to 260 ppm, respectively. Sediment containing 10 ppm PCBs or greater would be removed to a depth of one to four feet using one-foot lifts and bucket overlaps ranging from 2 to 5 feet. The actual depth of removal across all areas ranged from 1.7 to 4.0 feet. The dredged sediment, totaling approximately 2,300 cy, was discharged as a slurry via floating pipeline to the Sawyer Street CDF. The CDF had previously been used by USEPA to receive and store sediments from the 1995 Hot Spot removal project and 1989 Pilot Dredging project.
- The hybrid dredge system selected for evaluation comprises a 4.5 cy Horizontal Profiling Grab (HPG) bucket, the Bean patented Slurry Processing Unit (SPU), and a Crane Monitoring System (CMS). The HPG is a fully-enclosed mechanical clamshell bucket mounted to a hydraulic excavator by a 360° horizontal rotor. The SPU was used to slurry and transport the dredged sediment to the CDF via hydraulic pipeline and was also equipped with a system to re-circulate hydraulic

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

transport water from the CDF back to the SPU as a source of make-up water. The make-up water was pumped from the CDF to the SPU through a second eight-inch HDPE pipeline. The recirculation system was intended to minimize the quantity of water requiring treatment prior to discharge back to the harbor. The CMS is a computerized positioning system used by the dredge operator during dredging for real-time monitoring of bucket position and for permanently recording dredge movements.

- The PDFT activities were implemented over about 44 days: 1) 20 days for mobilization of equipment, 2) three days for setup and calibration, 3) four days for trial dredging, 4) five days for the actual dredge test, and 5) 12 days for demobilization. The weather during this period was reported as predominantly clear and sunny with intermittent periods of light rain, temperatures between 68° to 81°F, and wind speeds between 7 and 18 miles per hour.

DREDGE REMOVAL EFFICIENCY

- Dredge removal efficiency was evaluated based on: 1) the percentage of total PCB mass removed, and 2) the post-dredge residual PCB concentration in a composite upper one-foot sediment core interval. Reportedly, an estimated mass removal of 97% and a reduction in the average PCB concentration from 857 ppm (pre-dredge) to 29 ppm (post-dredge) in the upper one-foot sediment core interval were achieved. Percent mass removal was calculated by comparing the estimated mass of PCBs in the top three feet of sediment before dredging (1,539 kg) to the estimated mass of PCBs in the top one-foot sediment interval following dredging (44 kg). The average PCB concentrations in the upper one-foot of sediment were estimated using an inverse distance weighting (IDW) approach. Pre-dredge surface sediment data are limited to composite samples of the upper one-foot core interval. However, post-dredge grab samples were collected for the upper two centimeters of sediment with results ranging from 0.47 ppm to 470 ppm and averaging 185 ppm PCBs. The elevated surface sediment PCB concentrations reportedly may have resulted from PCB-containing sediment migrating into the test area following dredging. Mechanisms possibly contributing to this migration included bucket impact on the bottom, loss through the water column, anchor wire/spud repositioning, loosened material sloughing down a dredged side slope, tidal currents, and/or wind actions.

Note: This appears to be the first time that one-foot composite core samples have been utilized for pre- and post-dredging sediment characterization at NBH. By example, the 1998 NBH ROD Responsiveness Summary states, “Also, although not specifically described in the Proposed Plan, EPA does plan to institute a conformational sampling program as part of the ROD 2 dredging program. This program, which would be similar to the one used by EPA during the hot spot dredging program ...” In an April 19, 1995 memo to USEPA (Reference B-203)

regarding New Bedford Harbor Hot Spot post-dredging sediment sampling, it is stated, "The areas are then sampled when dredging is completed with composite samples analyzed for PCBs. The results represent conditions in the top 6 inches of sediment." Additionally, long-term monitoring of sediment in NBH began with a sampling program in 1993 to determine baseline conditions. The resulting report, "New Bedford Harbor Long-Term Monitoring Assessment Report: Baseline Sampling," dated October 1996, states, "Only the top 2 cm of these grabs were used in the composite for chemical analysis in this monitoring program, even though greater concentrations of contaminants may have been present deeper in the sediments. The rationale for using just the top 2 cm is that this program is designed to quantify changes over a 30-year time-frame, especially changes resulting from remedial activities. Because the upper 2 cm are most reflective of current sediment, including the older, deeper sediments could produce a distorted interpretation of current conditions." Contrary to this, the most recent long-term monitoring report, "Final New Bedford Harbor Long Term Monitoring Survey III: Summary Report," dated March 2001, presents PCB sediment concentration results for samples collected from the top four centimeters of sediment.

DREDGE PRODUCTION RATES DURING PDFT

- Final production rates were calculated based on the volume of material dredged as defined by the variance between pre- and post-dredge surveys and the net operational (effective) hours of the dredge. The average hourly production rate for the dredge was 80.3 cy/hr.

Note: This production is based on the rate of material removed during the time the dredge was operating and does not include down time for such non-operational activities as repairs, repositioning of the dredge, start up and shut down, crew mobilization to the dredge, and refueling. If these typical non-operational activities are considered, the average dredge production rate is significantly lower, 41 cy/hr once daily dredge operation began and 32 cy/hr if the total crew day (typically 13-14 hours) is utilized. Over the four days of test dredging, dredging only occurred an estimated 48% of the time the dredge was manned. The remaining 52% of the time was consumed with the non-operational activities listed above, plus back washing, flushing the pipeline, clearing obstructions, and other activities associated with operation of the SPU. An estimated production rate of 106.1 cy/hr reportedly achieved on the final day of dredging was calculated based on the total volume of sediment removed and only during the time of active dredging. This production rate is also confounded due to a significant amount of over-dredging performed on the last day.

- Nine percent (1.85 hours of 21.5 hours total) of dredge down time was associated with the removal and handling of debris.

Note: Modified operational procedures and project design are suggested by the dredge evaluation study design team if dredging to a final sediment concentration of 10 ppm in the Upper Harbor is to be attained. Operational modifications suggested include performing return sweeps, tighter overlap bucket grabs, and slower retrieval of final bucket grabs that combined would likely result in reduced amounts of residual material on the bottom following dredging and reduced sloughing of adjacent areas. These modifications could be implemented, however, most likely at the expense of production rate. A larger bucket could be used to maintain production rates while implementing the above operational modifications. However, this would require the use of a larger excavator and barge system, increasing the required draft for the equipment to operate. Because of the constraints posed by the shallow water conditions of the Upper Harbor, this option would likely be difficult to implement.

WATER QUALITY IMPACTS DURING PDFT

- Water column monitoring data show that the dredging increased the water column particulate and dissolved PCB levels by about 50 percent. Moreover, the data show that the impact on dissolved PCB levels persisted to the most down-current sampling locations, despite the return of suspended solids to baseline levels. Finally, the impacts observed are lower than would be seen at other sites because the high baseline levels of PCBs probably limited the extent of desorption from resuspended dredged material.
- The water quality monitoring program was reportedly designed to assess the magnitude and down-current extent of elevated PCB levels attributable to the PDFT dredging activities. Water samples were collected at a reference location 1,000 ft up-current of the dredging site and from three to four locations in the dredging-induced turbidity plume at down-current distances of 50 to 1,000 ft. The samples were analyzed for TSS, filterable (“dissolved”) PCBs, and non-filterable (“particulate”) PCBs. Because the program was restricted to a single along-current transect, it did not provide information sufficient to estimate the mass of PCBs released to the water column and transported downstream.
- Both dissolved and particulate PCB levels in the turbidity plume were elevated in comparison to baseline levels. The increase was approximately 50 percent for both PCB components, 63 to 90 ppm for the particulate component and 470 to 730 ng/L for the dissolved component. Further, the dissolved concentrations remained elevated at the most downstream station in the plume, averaging 720 ng/L. The single sample taken during dredging from inside the dredging area had a dissolved PCB level ten times higher than the baseline level. The particulate PCB concentration exceeded the baseline level by about a factor of three.

AIR QUALITY IMPACTS DURING PDFT

- Twenty eight ambient air samples collected during the study indicated that the discharge of PCB-contaminated sediment slurry to the CDF resulted in emissions of volatile PCBs above background levels in and around the CDF. Three 24-hour ambient air samples each were collected from six sampling station locations: four located around the perimeter of the Sawyer Street CDF, one located upwind and north of the CDF across the cove, and one located across the harbor and just east of the dredge test cell. Additionally, one duplicate sample was collected during each event.

Note: The observed ambient air PCB concentrations may be biased low and may not be directly applicable to full-scale operations. The ambient air samples were collected over a 24-hour period, while dredging typically occurred for periods of only 5 to 6 hours each day. Although most likely not significantly affecting the stations located upwind or adjacent to the dredge, PCB emissions from the CDF would likely be much higher due to the continuous discharge of greater volumes of sediment over a much greater percentage of the 24-hour sample collection period.

END OF PDFT OVERVIEW

Planning for full-scale dredging in the harbor continues. One of the construction activities that required completion before dredging could begin included work to relocate underwater electric cables, which was accomplished in 2001.

Construction of the first full-scale CDF was to begin in Spring 2002 and construction of a second, larger CDF was to begin in Fall 2002. In addition to the construction of berms, the full capacity of this CDF was reportedly to be developed by removing base materials from inside the bermed foot print of the CDF. The upper layer of base materials in the area where the CDF was to be built were known to be contaminated with PCBs and would be disposed of in the first CDF; it was hoped that deeper sediments would be “clean,” allowing for offsite disposal of this material as “clean” fill, saving the remaining capacity in the first CDF for disposal of dredged sediment.

Originally four CDFs were considered necessary to provide sufficient design disposal capacity for the full-scale dredging project. However, two were to be built only if needed depending on the final depth, and therefore volume, of the larger CDF and if any capacity remained in the first CDF following construction of the second CDF.

In September 2001, USEPA issued an ESD for five modifications to the cleanup plan as follows:

- Added the use of mechanical dewatering to reduce the volume of sediment

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

requiring disposal. This was estimated to reduce the number of CDFs required from four to two.

- Revised the wall design for the largest of the four proposed CDFs (CDF D).
- Added the construction of a rail spur from the New Bedford rail depot to the CDF D area to facilitate removal of soft sediment from the area and delivery of rock and fill during construction of the CDF.
- Included removal of additional intertidal sediments found to be contaminated above action levels at a small residential area along the Acushnet River in Acushnet and an area along River Road in New Bedford where River Road Park is to be constructed. (Note: USEPA, as part of its Early Action Program as described in the 1998 ROD, removed 2,500 cy of sediment from a residential area along the Acushnet River in 2001.) No specific volume increase has been provided, but most of the material would be removed during full-scale remedial activities.
- Included the use of the existing Sawyer Street CDF as a temporary TSCA facility to store dewatered sediment. The decision to make the facility permanent would be made in the future.

By November 2001, USACE had issued a proposal and received contractor responses for a \$240 million unrestricted total environmental restoration contract (TERC) to remediate New Bedford Harbor. The contract includes a five-year base with option extensions for a potential length of ten years.

On April 5, 2002, USACE awarded the TERC contract that includes dredging of New Bedford Harbor. A protest was lodged in 2002 regarding the award of the TERC Contract, a protest that was not resolved until the end of 2003. Also in April, Foster Wheeler and subcontractor MAT Marine began removing partially sunken ships from the Former Hermen Melville Shipyard in the area of proposed CDF C to allow access to the contaminated sediment beneath. This work was completed by the end of June 2002.

In August 2002, USEPA issued a second ESD that described further changes to the Harbor Cleanup Plan that would eliminate the use of CDF D as a disposal option and for the removed sediment to instead be sent to an offsite landfill for disposal. The remaining three CDFs may still be used but that decision is to be made at a later date. Reasons provided by USEPA for proposing the change include:

- The difficulty and cost of designing and building CDFs in the soft sediments common in the Upper Harbor;
- Elimination of possible project delays due to construction of the CDFs;

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

- Reduced environmental impacts to the harbor, now requiring that only two acres of tidelands be filled in for construction of a dewatering facility instead of the original 17 acres that were required for CDF D;
- A reduction in impact to local businesses and infrastructure;
- Better land use options following project completion; and
- The offsite disposal option is now estimated to be slightly less expensive than the CDF disposal option.

The 2002 ESD describes elements of the project design as follows:

- Sediment previously identified to contain greater than 50 ppm PCBs in situ will be dredged and sent to the Sawyer Street location for mechanical coarse material separation. The separated coarse fraction will be sampled, and if less than 50 ppm PCBs, sent to an offsite non-TSCA landfill for disposal. Material greater than 50 ppm PCBs will require offsite disposal at a TSCA landfill. The removed water will be treated and released back to the harbor.
- Following coarse material separation, the finer grained, organic fraction will be piped approximately 5,000 feet via double-walled underwater pipes to a dewatering facility located at Hervey Tichon Avenue where it will be dewatered using filter presses. The dewatering facility is being constructed on two of the 17 acres originally proposed for CDF D. The sediment filter cake will be sent offsite to a TSCA landfill, or to CDFs A, B, or C if determined appropriate, for disposal. The removed water will be returned to the Sawyer Street facility for treatment.
- Sediment previously identified to contain less than 50 ppm PCBs in situ will be dredged separately and processed similar to the other sediment. If confirmatory samples indicate the filter cake contains less than 50 ppm PCBs, the material will be sent for offsite disposal at a non-TSCA landfill.
- The estimated cost for the removal project is \$317 million based on removal of 507,100 cy (\$625/cy).

During the period November 2002 into March 2003, USEPA completed an accelerated cleanup of 15,500 cy of contaminated sediment in a 6.5-acre area of the Acushnet River, in the Wood Street Bridge area at the northern tip of the Upper Harbor. PCB levels in these sediments were estimated to be as high as 46,000 ppm. Temporary dams were used to bypass river flow into the Upper Harbor target area and sediment was removed by dry excavation. Most of the removed sediment was temporarily disposed at the Sawyer Street facility where these

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

sediments will reportedly be used to start-up and debug the full-scale mechanical dewatering plant at Harvey Tichon Avenue. About 2,600 tons of "vegetated" material not appropriate for dewatering were sent to Model City for disposal. Total cost for this 15,500 cy removal project to-date is \$5.96 million.

In August 2003, USEPA began dredging an estimated 4,500 cy of sediment from an area of the harbor in the vicinity of the Herman Melville Shipyard. This work was to allow relocation of a local marine transport company to this area of the harbor to allow sufficient room for construction of a dewatering facility at the company's original location. The removed sediment is being stored at USEPA's Sawyer Street facility for processing once full-scale dredging begins.

As of June 2004, the primary contractor and dredging contractor are onsite continuing construction activities necessary to dredge a now estimated 867,000 cy of sediment from the harbor. The construction activities include: (1) completion of the 55,000 ft² dewatering building; it will be ready in July to accept dewatering equipment; (2) the start of construction of an underwater pipe and pump system to transport dredge slurry between the desanding facility, located at USEPA's Sawyer Street facility, and the dewatering facility; (3) near complete construction of the desanding facility; and (4) the start of construction of a rail spur to be used for transporting removed sediment for final disposal. The rail spur may not be ready to use in 2004 because of needed bridge repairs that are the responsibility of the affected rail companies; the sediment will be trucked if the rail spur is not ready in time.

Dredging is anticipated to begin in September 2004. A dredging work plan is currently being prepared by the dredging contractor. It will likely propose using three horizontal auger dredges, two actively dredging and one on standby. Discharge lines from all three dredges will be connected to a booster pump system located on shore which will then feed the dredge slurry through two pipelines to the desanding facility. Silt curtains will be the primary method used to control turbidity; sheetpile may be used in mudflat areas. The dredge area has been divided into about 40 Dredge Management Units, about five acres each, to control dredging. Resuspension will be monitored during dredging through use of turbidity monitoring at several locations related to the position of the dredges and through water quality monitoring and toxicity testing.

Verification sampling procedures have yet to be finalized. USEPA is planning to regularly collect sediment "progress samples" to monitor the effectiveness of the dredge in removing the targeted sediment. However, "official verification samples" will likely not be collected until a significant area of the harbor has been dredged. This will result in a larger data set for statistical comparison to the target cleanup level of 10 ppm PCBs in the top six inches of sediment.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

The total cost of the dredging project is now estimated at \$400 million (\$461/cy based on removing 867,000 cy). This compares to the estimated \$120 to \$130 million present worth cost presented in the 1998 ROD. Dredging is targeted to begin in September 2004.

Key Conditions:

commercial landfill, confined disposal facility, dredging, floating oil, hydrodynamic modeling, pilot/demonstration test, post monitoring, rail transport for disposal, specialty dredge, tidal fluctuations, wetlands

Estimated Target

450,000 cy

Volume:

Estimated Calendar Time to Implement Remedy:

Ten years, including eight years for removal.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: NEWBURGH LAKE

SiteID: 05-11

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Federal Grant. Final.

Contaminants of Concern: PCBs (1260)

Overall Status Summary: Sediment studies and remedial efforts in the Rouge River were funded from a several hundred million dollar grant in federal funds to Wayne County, MI. No consent decree. Cleanup of PCB-contaminated sediments in an impoundment opposite the defunct Evans Products facility was completed in April 1997; 1,800 cy of TSCA material was removed from a ditch and very small stream and 10,000 cy non-TSCA from a floodplain at a cost of \$500 K; was a source to Newburgh Lake. Draining of the lake was completed in May 1997 and took about one month. Due to elevated fish levels, an intentional fish kill was done in June in the portion of the lake through which the Middle Branch of the Rouge River continued to flow. Sediment removal was by use of a cutterhead dredge in the flooded (river) sector, a dragline 500 feet upstream into the Middle Branch, and earth moving equipment in the dry lake bottom. PCB levels were 1-10 ppm; the target was removal of PCBs to non-detect (0.3 ppm) and restoration/rehab of the lake depth. All removed material was transported by truck and disposed at a BFI landfill several miles away. Removals were completed in mid-September 1998, refilling of the lake commenced on September 18, and the lake was re-opened on October 16. A total of 588,000 cy was removed and landfilled. Total cost was about \$12.6 million.

Key Conditions: commercial landfill, dredging, fish harvesting

Estimated Target Volume: Remove 400,000 cy from Newburgh Lake; also remediate 500 yards of the Middle Rouge at point it discharges into Newburgh Lake back upstream to Evans Products.

Estimated Calendar Time to Implement Remedy: about 15 months

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: NORTH HOLLYWOOD DUMP

SiteID: 04-02

US EPA Region: IV

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Superfund. Final.

Contaminants of Concern: pesticides; metals; pesticides include heptachlor, heptachlor epoxide, chlordane, chlordene, lindane, DDT, and dieldrin

Overall Status Summary: The target was a 40-acre lake created from decades of excavation/dredging for sand and gravel. The lake is charged by groundwater, runoff, and Wolf River flooding. Resident fish were all harvested using Rotenone prior to remediation. 40,000 cy (3' depth) of pesticide contaminated sediments were hydraulically dredged from the shallow center of the lake and disposed in a closed oxbow bend of the Wolf River. Additional center portion materials were dredged and distributed onto the deeper and more contaminated east and west portions of the lake. Additionally, 70,000 cy of imported sand were distributed over the lake bottom as a 3' minimum cap. Completed March 1996.

Key Conditions: capping, dredge spoil reuse/fill, dredging, fish harvesting, post monitoring

Estimated Target Volume: None. Selected remedy involves containment of contaminated sediment using "hydraulic fill."

Estimated Calendar Time to Implement Remedy: Two years

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: NYANZA CHEMICAL WASTE DUMP

SiteID: 01-03

US EPA Region: I

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund. Final.

Contaminants of Concern: mercury; other heavy metals and organics

Overall Status Summary: The Nyanza Chemical Waste Dump Site (Nyanza) is the former location of several textile dye production companies near the Sudbury River in Ashland, Massachusetts west of Boston. Mercury and chromium were used as catalysts in the production of textile dyes from 1917 to 1978. Approximately 2.3 metric tons of mercury were used per year from 1940 to 1970 with approximately 45 to 57 metric tons of mercury released to the Sudbury River during this period. From 1970 until the facility closed in 1978, wastes were treated on site and wastewater was discharged to Ashland's town sewer system. These changes in waste management practices reduced the amounts of mercury released to the Sudbury River to between 23 and 30 kg per year. Since dye production stopped in 1978, the property has been leased to various light industries and commercial companies (Reference M-44). The site was placed on the NPL in 1983.

Design of OU-3 was by the Corps of Engineers, and targeted removal of an estimated 17,330 cy of sediment from source areas comprising 6.8 acres of onsite wetlands and drainageways. The 17,330 cy would be dewatered and then consolidated under the onsite cap installed for OU-1. Target level is 1 ppm of mercury in sediments. Construction started in March 1999.

The wetland excavation part of the OU-3 remedy was accomplished in June through October 1999. A portion of the targeted drainageways were excavated in October and November 1999. Construction activities for OU-3 were put on standby in December 1999 and resumed in April 2000. OU-3 work done in 2000 included completing excavations in drainageways, Outfall Creek, and the Lower Raceway, permanent landfill closure, and starting restoration activities. Restoration activities were completed in 2001. About 19,000 cy were removed in 1999 and 26,500 cy in 2000 for a total of 45,500 cy. Total cost was \$12 million.

Characterization, risk assessment, and modeling of the river is in-progress, and has been in progress for several years. This risk assessment process is complicated in that the 26 mile length of river has been divided into ten reaches, and the EPA initially was attempting to develop ecological risk assessments applicable for each specific reach. Several prior studies (References C-818, C-819, and C-820) performed by various governmental agencies are also being evaluated and the

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

results are being incorporated in the risk assessment as appropriate. Currently, it appears that up to four ecological risk assessments may be developed, potentially focusing on the reservoirs, the flowing river sections, and Reach 8 (the Great Meadows National Wildlife Refuge).

Work on the FS for the river won't start until the risk assessments are completed -- 2004 at earliest. No Proposed Plan for OU-4, which involves the 26 miles of contaminated river sediments, is expected until 2005 (earliest).

Key Conditions:

dedicated landfill or CDF, extended (> 1 mile) river, habitat/streambank restoration, hydrodynamic modeling, wetlands

Estimated Target Volume:

17,330 cy for OU-3 (14,500 cy at one foot depth from 5.5 acres of wetland; 530 cy from Trolley Brook; 2300 cy from Outfall Creek)

Estimated Calendar Time to Implement Remedy:

1999 (OU-3)

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: ONONDAGA LAKE

SiteID: 02-23

US EPA Region: II

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund. Interim. State-Lead.

Contaminants of Concern: mercury and other heavy metals; PCBs; pesticides; creosotes; PAHs; VOCs

Overall Status Summary:

Onondaga Lake is a federal Superfund Site (Final date; 12/16/94) located northwest of and adjacent to Syracuse, NY. The lake has a surface area of approximately 4.5 square miles, a drainage basin of about 233 square miles, and it discharges to the northwest into the Seneca River. The lake is located in a heavily industrialized area and has historically received direct industrial wastewater and municipal wastewater treatment discharges and indirect discharges from surface runoff. One nearby facility, the now defunct Willis Avenue Plant (previously owned and operated by Allied Signal, now Honeywell), is believed to have discharged up to 20 pounds of mercury per day into Onondaga Lake from a chlorine manufacturing process. Present discharges of concern to the lake are from the Metropolitan Syracuse Sewage Treatment Plant, located in the southeastern corner of the lake and from about 20 combined sewer overflows. Surface water is contaminated primarily with mercury. Sediments are contaminated with PCBs, pesticides, creosotes, heavy metals (Pb, Co, and Hg), PAHs, and VOCs. In addition, groundwater at the Willis Avenue Plant is reportedly contaminated with a DNAPL that has migrated northeastward to the lake. As a result of elevated levels of mercury measured in lake fish, public fishing was banned in 1970, although a catch and release program was instituted in 1986. Fish advisories are currently in place due to continuing elevated levels of mercury in fish tissue. All species except walleye are recommended not to be eaten more than once per month; walleye is recommended not to be eaten at all.

The site is presently being addressed by a long-term remedial phase focusing on source control efforts at identified sub-sites around the lake (identified sub-sites become part of the Onondaga Lake Superfund site). On January 20, 1998, an Amended Consent Judgment for the lake was signed that included a schedule for construction activities to address discharges from the Metropolitan Syracuse Sewage Treatment Plant and the Ley Creek PCB Dredgings sub-site for which a remedy was implemented in 1999 and 2000. NYS continues to pursue investigations and implementation of remedial actions at other sub-sites. By the end of 2001, a ROD was issued for the LCP Bridge Street sub-site, an RI/FS was complete for the Semet Residue Ponds sub-site (the ROD was subsequently finalized for the Semet Residue Ponds sub-site in March 2002), and RI/FSs were underway at eight other sub-sites: Inland Fisher Guide (General Motors), Onondaga

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Lake Bottoms, Salina Town Landfill, Geddes Brook/Ninemile Creek, Niagara Mohawk (Erie Boulevard), Niagara Mohawk (Hiawatha Boulevard), Maestri 2, and Willis Avenue. The RI/FSs for these sub-sites are scheduled for completion by 2003. Negotiations are currently underway with the respective PRPs for conducting RI/FSs at the American Bag and Metal and Lockheed Martin-Electronics Park (Bloody Brook) sub-sites. Additionally, Honeywell (merged with Allied Signal in 1999) signed a consent order with NYSDEC in February 2000 to begin addressing contamination at the 25-acre Willis Avenue Plant. The company was expected to submit a work plan to New York State by May 2000 and complete a cleanup at the site within a year after receiving an approved work plan (the current status of this work is unknown). A system of recovery wells installed at the Willis Avenue sub-site are being used to remediate contaminated groundwater. Reportedly, at least 20,000 gallons of chlorobenzene-contaminated DNAPL have been recovered to-date from the wells.

The lake is not considered by either USEPA or New York State to pose an immediate threat to human health or the environment and both agencies plan to continue focusing on eliminating sources of contamination to the lake for the near-term. Honeywell was to begin an FS for the lake in Summer 2001 but the current status of that effort is unknown.

Key Conditions:

natural recovery, wetlands

Estimated Target

Volume:

***Estimated Calendar Time
to Implement Remedy:***

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: OTTAWA RIVER - PROJECT 1 (Capping with AquaBlok™)

SiteID: 05-19

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Final. Demonstration project, funded by a grant.

Contaminants of Concern: PCBs, PAHs, heavy metals

Overall Status Summary: The demonstration project was funded by a grant from the Ohio Lake Erie Commission to the City of Toledo. The project consisted of installing sediment caps (barriers) in three contiguous sections totaling approximately 2.5 acres in the Ottawa River, just outside the mouth of the now-remediated Unnamed Tributary. The principal material used in cap construction was the AquaBlok™ composite aggregate particle system. AquaBlok™ is a clay mineral-based technology developed for in-situ capping of contaminated sediments. When deployed through the water column, AquaBlok™ settles across the sediment surface, hydrates and expands, and ultimately transforms from a layer of discrete particles into a homogeneous and cohesive, erosion-resistant mass atop the sediments. The plan included installation of a different cap design within each of the three river sections: the first cap comprising only AquaBlok™, the second cap comprising AquaBlok™ plus a geotextile, and the third cap comprising AquaBlok™, geotextile, and a protective surface layer of rock (one-inch diameter stone); total cap thicknesses were typically to range from about 5 to 8 inches, depending on cap design. Based on pre-capping field observations, the different cap designs would be exposed to spatially and temporally variable currents, scour patterns, bankslope conditions, and sediment thicknesses. For demonstration purposes, different air-, barge-, and shore-based cap deployment methods were to be used; air-based application would occur using a helicopter while barge- and/or shore-based applications would be performed using a telescoping conveyor system or clamshell bucket. A USACE permit was issued to the City of Toledo to conduct the project, which, after several delays, was set for early September 1999 (following collection of pre-capping benthic data by Ohio EPA). The estimated cost of the project was \$230,000.

Application of the AquaBlok™ capping system to the Ottawa River was subsequently performed over a 3-week period in September 1999. Three sections of the river, designated as Sections A, B, and C, were capped, each using a unique cap design as described above. Three methods of application were used to apply the AquaBlok™ and armoring stone: (1) a conveyor (or telebelt), using both barge- and shore-based deployment methods; (2) a helicopter equipped with specially designed drop bags; and (3) a shore-based dragline (AquaBlok™ only) method. The target application rate for AquaBlok™ was 8.5 lbs per square foot of sediment surface area for an anticipated hydrated cap thickness of 5 to 6 inches.

Evaluation of the cap following installation included obtaining river-bottom elevations and comparing them with pre-application elevations at 297 survey points along 13 cross-river transects to verify the application thickness of the cap materials. In Sections A and B, 28 of 187 survey points exhibited a net negative change in river-bottom elevation, ranging from -1.34 feet to -0.01 feet (the most highly negative numbers being attributable to barge bottom dragging). The average cap thickness exhibited by the remaining 159 survey points was 4.9 inches. None of the 110 survey points measured in Section C exhibited a net negative change in elevation, and exhibited an average cap thickness of 5.7 inches. Manual probing of the capped areas using a piece of conduit indicated that AquaBlok™ was present at 91% of the 187 survey locations in Sections A and B, and at 98% of the 110 survey locations in Section C. In addition, river-bottom core samples were collected from Sections A and B in November 1999 to assist in post-capping evaluations. Forty-eight core samples were collected from 9 transect locations that reportedly showed little mixing of AquaBlok™ and sediment at their respective interface, a favorable outcome. Unit costs for each method of application, excluding peripheral and post-monitoring costs, are reportedly: shore-based conveyor: \$0.80 per ft²; barge-based conveyor: \$1.04 per ft²; shore-based drag line: \$0.89 per ft²; and helicopter: \$1.20 per ft².

A monitoring program was performed for all three application areas that continued over a one-year period to evaluate and compare the integrity of the three cap designs. As described in Reference A-798:

“Survey results summarized for cap Sections A and B tend to indicate that estimated cap thickness one year after cap construction is slightly less than that estimated shortly after construction, and also somewhat below the targeted cap-thickness range for these sections. Qualitative probing across these cap sections indicated that AquaBlok™ was present within 103 of the 146 locations tested. Collectively, these results seem to imply some erosional loss of capping materials from some localized areas, particularly portions of Sections A and B that may be most influenced by high-flow conditions related to periodic discharges from the canal and/or culvert located at the west end of Section A.”

“In apparent contrast to results for cap Sections A and B, survey results for Section C tend to indicate that estimated cap thickness one year after cap construction remains more-or-less consistent with that estimated shortly after construction, and also comparable with the targeted cap-thickness range for this section; average cap thickness for Section C also remains greater than that for Sections A and B, as expected. Additionally, qualitative probing across Section C indicates the continued presence of stone and/or AquaBlok™ in all but one of the 59 survey locations probed. Collectively, these results indicate that: periodic high flow from the distal canal and culvert have minimal effect on this downstream cap section, the presence

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

of the surficial stone layer minimized potential erosional losses from Section C, or both.”

Studies are continuing to assess benthic colonization in the test areas over time. Post-capping macroinvertebrate data were collected in 2001 and will be collected again in 2004 for comparison with pre-capping benthic data.

Key Conditions:

capping, Great Lakes AOC, pilot/demonstration test

Estimated Target

Sediment removal will not be performed as part of this demonstration project.

Volume:

Capping of three contiguous acres in the Ottawa River will be accomplished with AquaBlok™. Hydrated thicknesses in the 4 to 6 inch range and application rates of 14-16 pounds per square foot are anticipated.

Estimated Calendar Time to Implement Remedy:

Anticipated to start in mid-June 1999; revised to early September 1999.

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Site Name: OTTAWA RIVER - PROJECT 2 (Removal from Unnamed Tributary)

SiteID: 05-21

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: "Partnership" between the City of Toledo, Ohio EPA, U.S. EPA, US Fish and Wildlife Service, and GenCorp, Inc.

Contaminants of Concern: PCBs

Overall Status Summary: Remediation of the 975-foot long Unnamed Tributary began in January 1998 and targeted the removal of 6,500 cy of sediment and 1,800 cy of soil. The target cleanup level was 50 ppm PCBs. The tributary conveyed stormwater to the Ottawa River. The targeted area was first hydraulically isolated by sheetpiling/earthen berms, water was pumped out and treated onsite, and 8,039 cy of sediments were removed by dry excavation, as well as 1,653 cy of soil from an adjacent low-lying area. Final verification samples from the excavated areas ranged from ND to 38 ppm PCBs. Removed materials were dewatered by gravity, stabilized with Pozzament 100, and disposed at off-site landfills - - 14,975 tons as TSCA waste and 881 tons of soil as non-hazardous waste. The excavated areas were backfilled with 5 to 15 feet of clean fill material obtained from onsite areas. Completion was in June 1998.

Key Conditions: commercial landfill, Great Lakes AOC

Estimated Target Volume: Removal of 6,500 cy of sediment (Unnamed Tributary) and 1,800 cy of soil (low-lying area).

Estimated Calendar Time to Implement Remedy: Removal to be performed during the winter months when impacts from the seiche (flow reversal) events are minimized.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: *OUTBOARD MARINE*

SiteID: 05-12

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Superfund. Final.

Contaminants of Concern: PCBs (1242 and 1248)

Overall Status Summary: The remediation project was completed in late 1994. A total of 50,000 cy of PCB-containing soils and sediments was remediated including 6,300 cy dredged from Slip #3 and 32,000 cy of sediment dredged from the Upper Harbor in late 1991 and early 1992. Slip #3, an abandoned boat slip, was prepared as a permanent containment cell. The 6,300 cy was treated by thermal desorption and returned to the cell. The 32,000 cy was pumped directly to the cell. The cell was capped and grassed-over after a 2.5-year settling period. Reassessment fish sampling was performed annually from 1993 to 1996 and a fish consumption ban was partially lifted in January 1997, leaving only a no-consumption advisory for common carp taken from the harbor. Reportedly, very few fish species other than the common carp routinely inhabit the harbor and therefore the collection and consumption of these other fish species from the harbor was expected to be sufficiently low to allow the lifting of the ban on their consumption.

EPA completed a five-year review in December 1997 and concluded that “the containment cells have been effective, and pumping, treating, and discharging of treated groundwater is continuing.”

Additional fish sampling (common carp only) has been performed annually by Illinois EPA since 1997, with the most recent data being from 2001. Prior to 1999, fish fillet samples were grouped by fish length, and each group of fillets was then composited and analyzed for PCBs and pesticides as a single sample. Since 1999, fillets from individual fish have been composited and analyzed. Results for 1999 through 2001 are: (1999) number of samples – 11, avg. fish length – 21.6 inches, and min., max., and avg. PCB concentrations – 0.29 ppm, 83.8 ppm, and 9.7 ppm, respectively; (2000) number of samples – 24, avg. fish length – 22.9 inches, and min., max., and avg. PCB concentrations – 0.1 ppm (MDL), 40 ppm, and 4.5 ppm, respectively; and (2001) number of samples – 12, avg. fish length – 25 inches, and min., max., and avg. PCB concentrations – 0.9 ppm, 15 ppm, and 4.7 ppm, respectively.

The maximum PCB concentrations recorded in 1999 and 2000, 83.8 ppm and 40 ppm, respectively, were considerably elevated when compared to results from previous years and to fish of similar size. To-date (April 2002), Illinois EPA

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

reportedly believes these results are anomalies and will continue to collect annual fish samples for analysis, to compare vs. prior results and to evaluate if additional remedial actions are warranted in the harbor.

In assessing these annual fish results, it is important to recognize that a specific reduction in PCB levels in fish was not defined as a goal prior to remediation. The goal was to achieve a PCB cleanup level of 50 ppm or less in sediment, which was a level that modeling predicted would result in a negligible flux of PCBs from the harbor into Lake Michigan.

The harbor's navigational channel is currently undergoing evaluation by the USACE for a deepening project to increase the depth of the navigational channel from about 19 feet to 23 feet. The increase in channel depth is necessary to allow access to the harbor by larger ships and because of historically low water levels currently being experienced throughout the Great Lakes region. The USACE originally proposed removing 300,000 cy of sediment identified as contaminated, based on 1994 sediment data from the harbor. Recent sediment samples show average PCB concentrations to be about 0.05 ppm in the harbor. Using the more recent sediment PCB data, the local community action group convinced the USACE to change the plan to remove only the sediment necessary to deepen the navigational channel, approximately 30,000 cy. Dredging is currently being held up awaiting the City of Waukegan to relocate a water main that crosses the navigational channel within the area to be dredged. The methods for sediment removal or disposal have yet to be determined.

Key Conditions:

confined disposal facility, dredging, Great Lakes AOC, hydrodynamic modeling, water handling limitations, thermal desorption

Estimated Target

Volume:

10,900 cy of sediment exceeding 500 ppm PCBs in Slip #3; and 35,700 cy of Upper Harbor sediments, with PCB concentrations of 50-500 ppm.

Estimated Calendar Time to Implement Remedy:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: **PACIFIC SOUND RESOURCES**

SiteID: 10-14

US EPA Region: X

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund. Final

Contaminants of Concern: PAHs, pentachlorophenol, metals, PCBs

Overall Status Summary: The Pacific Sound Resources (PSR) site, which borders Elliott Bay on Puget Sound, is a Superfund Site divided into two operable units - - a Groundwater (upland) unit and a Marine Sediment (offshore) unit. Wood treating operations were conducted at the 25-acre upland site from 1909 to 1994.

As described in Reference A-849: "EPA conducted two phases of early cleanup actions on the upland portion of the site. The first phase focused on site stabilization and demolition of onsite structures. The second phase focused on controlling on-going sources to Elliott Bay, addressing contaminated soil, and preparing the site for reuse by the Port. During the first phase, in 1995, the entire wood treatment facility was demolished and approximately 4,000 cubic yards of highly contaminated soil and process sludge were removed from the site. During the second phase, which began in 1996, a slurry wall was installed to prevent light non-aqueous phase liquid (LNAPL) migration to Elliott Bay and to reduce the influence of tidal fluctuation at the site. The slurry wall is 1,200 feet in length and it extends from the ground surface to a depth that averages 40 feet below ground surface. An LNAPL recovery trench was installed in conjunction with the barrier wall to intercept LNAPL before it can reach Elliott Bay. Also, a low-permeability asphalt cap was constructed over a layer of clean fill placed at the site. This cap was designed to prevent direct soil exposure to onsite workers, prevent runoff of contaminated soil to Elliott Bay, and minimize infiltration of storm water to groundwater. The cap was completed in 1998."

"Other early actions taken at the site included clean out of the Longfellow Creek overflow channel and marine outfall (along the western border of the site), and collection and disposal of the dense non-aqueous phase liquid (DNAPL) that accumulates in onsite monitoring wells. Twenty five cubic yards of PCB contaminated sediments were removed from the Longfellow Creek outfall area by the Port as part of their terminal development work, and approximately 1,500 gallons of DNAPL have been recovered from onsite wells and treated through incineration over the last three years."

Contaminants of concern are PAHs, pentachlorophenol, heavy metals, and PCBs. Marine sediments are contaminated primarily with PAHs and PCBs. The marine

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

sediment area of concern is about 100 acres extending about 1,200 feet from the shoreline, with the first 400 feet sloping at 20%.

A ROD for the Marine Sediment unit was issued in September 1999. The selected remedy is containment of the contaminated sediments that exceed cleanup goals, by capping 50 acres with a minimum three feet of clean material. An estimated volume of 363,000 cy of clean material will be used for the capping (which calculates to an average depth of 4.5 feet - - to ensure a minimum depth of three feet is attained). In one part of the 50-acre area, the Crowley Marine Services area immediately west of the PSR upland site, 3,500 cy of contaminated sediment will have to be dredged before capping, to maintain navigational depth. The dredged material will be disposed in an upland disposal site. (In mid-2003, it was reported that the volume of contaminated sediment dredged would be 10,000 cy, and would be preceded by removal of an interfering pier structure and 700 wood pilings.)

The design of the cap is expected to be challenging and must address issues such as (a) preventing the cap from sliding in the bottom area that slopes about 20%; (b) effectively capping certain non-uniform bottom areas in which the existing sediment has mounded; (c) placing the cap in deep waters (>70 feet deep); and (d) minimizing resuspension of the soft contaminated bottom sediments.

EPA estimates the in-water capping time at 11 months, but expects the project to take four years calendar time since the volume of clean material required for capping will become available only over time. EPA expects that the extended capping period will allow for testing of placement techniques and on-going evaluation of effectiveness.

The estimated cost for the remedy is \$8.1 million. Design commenced in 2000. Construction of the marine cap is expected to start in late 2003 or early 2004.

Key Conditions:

capping, dredging, fish spawning limitations, natural recovery, tidal fluctuations

Estimated Target Volume:

50 acres of marine sediments to be capped with 363,000 cy of clean material; also, 3,500 cy to be removed by dredging.

Estimated Calendar Time to Implement Remedy:

4 years

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: *PALOS VERDES SHELF*

SiteID: 09-01

US EPA Region: IX

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: CERCLA investigation by EPA Region IX, started in 1996.

Contaminants of Concern: DDT; PCBs

Overall Status Summary: A natural resources damage suit against Montrose Chemical and six other firms was dismissed by a federal judge in early 1995 (the suit was subsequently reinstated). An EPA decision was made in 1996 to investigate these coastal waters under CERCLA as an extension of response actions at the Montrose site. The EPA decision was influenced by federal and state natural resource trustees. Highest contaminant levels of DDT and PCBs are reportedly in a 3 square mile area of sediments on the Palos Verdes Shelf. Capping is being evaluated. A fish consumption ban is in effect based on DDT and PCBs. Tests at Michigan State University in 1998 using marine sediments from the Palos Verdes Shelf have demonstrated biodegradation of DDT, suggesting a possible natural remedy.

In a June 7, 1999 presentation to the National Research Council (Reference E-113), a consultant for the PRPs described (1) the primary issues regarding the Palos Verdes Shelf, (2) EPA's position on characterization and remediation, (3) EPA's proposed capping remedy, and (4) the results of the PRPs analysis, as follows:

Primary Issues

- Fate and transport of organo-chlorine compounds (PCB and DDT metabolites) now located on the Palos Verdes Shelf;
- Human health and ecological risks associated with these compounds;
- Actions proposed by EPA to deal with these perceived risks; and
- Risks associated with EPA's proposed actions.

EPA's Position

- DDT and PCB compounds are leaking from the sediments;
- Fish (white croaker) eat benthic creatures that contain DDT and PCBs;
- Allegedly high ecological and human health risks; and
- Sediments on the Palos Verdes Shelf should be capped to reduce risks.

EPA's Proposed Capping Remedy

Discharging clean sediments from barges:

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- in up to 200 ft of water;
- over an operating ocean outfall;
- on bottom slopes much steeper than any previous capping effort; and
- within a few minutes so as to achieve placement.

PRPs Analysis

- Negligible DDT is leaking from the sediments;
- DDT and PCBs are biodegrading in situ;
- Human health risk is actually insignificant;
- Studies show no sediment toxicity due to DDT;
- Steep bottom slopes make capping extremely risky; and
- Program is not in conformity with stated EPA policy.

Developments in the Year 2000 have included:

- In March 2000, EPA completed an Engineering Evaluation/Cost Analysis (EE/CA) for the Palos Verdes Shelf. As part of the EE/CA, EPA proposed a three-prong strategy of short-term actions to limit consumption of fish containing elevated levels of DDT and PCBs, including (1) enforcement of the commercial fishing ban and recreational catch limit for white croaker along the Palos Verdes coast, (2) educating people about fish consumption advisories, and (3) monitoring contaminant levels in commercially sold fish to evaluate the effectiveness of enforcement measures.
- In August 2000, EPA began a pilot in-situ capping project on an area of the Palos Verdes Shelf. Clean sediment was deposited, to provide a thin-layer cap to isolate the contaminants and reduce the amount of DDT and PCBs transferred to the water and marine life. The pilot project included evaluation of short-term results and cap placement methods. The EPA will use the data from this project, along with other relevant information, to decide whether to propose full-scale capping as a remedy for the Palos Verdes Shelf site.
- The first load of capping material was placed on August 2, 2000 and all cap placement activity was completed by September 14, 2000. Three discrete areas, or "cells," were capped. The field work for the baseline monitoring in the pilot capping cells was started in mid-May 2000, and the final post-cap monitoring activity was completed September 15th, shortly after the last load was placed. Analysis of data is still underway. A final report is expected in Summer 2001.

The three capping cells covered a total area of 135 acres (45 acres per cell). Water depths ranged from 150-200 feet. Projected cap thicknesses are 6 to 18 inches (measurements of actual post-placement thicknesses achieved are still being

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interpreted). About 135,000 cubic yards were placed, transported in 102 loads. Placement was by an 85 meter long split hull hopper dredge. The great majority of the material used for capping came from an on-going navigational dredging project in Long Beach Harbor, about one mile away from the capping areas. One of the three cells received 91,314 cy in an attempt to cover the cell completely with a cap of uniform thickness. The other cells were only partially capped in the center portions, receiving 13,895 cy and 29,834 cy respectively.

EPA reports that the following specific objectives are being addressed by this pilot project:

- Evaluating cap construction methodologies using two different cap materials;
- Evaluating related short-term impacts on the marine environment;
- Determining the effects of cap material, bottom slope, water depth, and placement method (e.g., conventional versus spreading) on displacement and/or resuspension of the in-place contaminated sediment; and
- Demonstrating the ability to monitor operations and assess cap placement impacts.

Upcoming activities in 2001 and beyond include (a) performance of supplemental coring activities on the in-place cap, b) long-term monitoring, c) issuance of a construction report by the Corps of Engineers and a construction monitoring report by the oversight contractor, d) updating the EE/CA by the regulatory agency, and e) completing ecorisk studies.

Ultimately, 3-4 additional square miles of shelf may be a candidate for capping. Much of the shelf, however, may not be amenable to capping due to its slope.

- On December 19, 2000, the U.S. Dept. of Justice and the California Attorney General announced a settlement of the natural resources damages suit with Montrose Chemical Corporation of California, Aventis CropScience USA Inc., Chris-Craft Industries Inc., and Atkemix Thirty-Seven Inc., for \$73 million. Approximately \$30 million from the settlement, filed in U.S. District Court in Los Angeles, is targeted for restoration of natural resources, and reportedly is the largest sum ever paid for environmental injuries resulting from pollution other than oil. Another \$43 million from the settlement will reportedly be available to remediate the offshore contamination. Montrose, at one time the world's largest manufacturer of DDT, was owned and operated by the predecessor to Aventis CropScience USA Inc., and by Chris-Craft Industries Inc. and its predecessors. Atkemix Thirty-Seven currently owns the property where the now-defunct DDT plant is located.

The United States and California previously had reached similar settlements totaling \$64.5 million with County Sanitation District No. 2 of Los Angeles, which operated the sewers that conveyed the DDT to the ocean; about 150 municipalities that

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

discharged other substances through the sewers; and three other corporate defendants – Potlach, Simpson, and CBS/Westinghouse – that allegedly discharged PCBs through the sewers and into the ocean.

Key Conditions:

capping, hydrodynamic modeling, natural recovery, navigational dredging component, pilot/demonstration test, post monitoring, tidal fluctuations

Estimated Target

N/A

Volume:

***Estimated Calendar Time
to Implement Remedy:***

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: **PASSAIC RIVER**

SiteID: 02-20

US EPA Region: II

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund.

Contaminants of Concern: PCBs, PAHs, heavy metals, dioxins

Overall Status Summary: The Diamond Alkali Superfund Site includes the former pesticides manufacturing facility and surrounding properties at 80 and 120 Lister Avenue in Newark, New Jersey, and the adjoining six mile reach of the Passaic River.

In 1984, the State and Diamond Shamrock Chemicals Company entered into two Administrative Consent Orders, the first for the investigations and immediate response work at 80 Lister Avenue and the second for investigations and immediate response actions at other properties including 120 Lister Avenue. A Consent Decree was filed in 1989 between Occidental Chemical Corporation (OCC), the State, and EPA requiring OCC to undertake cleanup activities at the site. The U.S. District Court approved the Consent Decree in November 1990. The work was initiated in April 2000 and is currently being conducted under EPA oversight.

Chemical Land Holdings, Inc., on behalf of OCC, under an Administrative Order on Consent executed on April 20, 1994, is conducting a Remedial Investigation/Feasibility Study to define the extent of contamination in the Passaic River. A six mile stretch of the Passaic River has been identified as the Study Area. The objectives of the Remedial Investigation are to determine: (1) the spatial distribution and concentration of dioxins, furans, PCBs, PAHs, pesticides and metals, both horizontally and vertically in the Passaic River sediments; (2) the primary human and ecological receptors of contaminated sediments; and (3) the transport mechanisms for contaminated sediment within the Study Area.

Seven separate preliminary sampling programs were conducted in the river during the period 1990-1995, generating analytical data for upwards of 66 surface sediment samples and 166 sediment core samples (Reference P-9). Subsequently, in 1995 and 1997 sampling programs, a total of 540 samples was collected and analyzed from 93 sediment borings (Reference C-814).

The RI field work required under the Administrative Order on Consent is in progress. Sampling programs were conducted in 1999 and 2000. An additional investigation and sampling program for 30 combined sewer overflows (CSOs) has been added to the RI. A reconnaissance and trial run has been implemented. Full scale implementation is pending. Also, planning/coordination is underway with the

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

U.S. Army Corps of Engineers (USACE) regarding their upcoming work on the Lower Passaic River pursuant to the Water Resources Development Act (Reference E-163).

The three components of the Remedial Investigation, which are (1) Sediment Characterization; (2) Human and Ecological Risk Assessment; and (3) Sediment Mobility Study include the following sub-tasks (Reference E-171):

(1) Sediment Characterization:

- chemistry (dioxin/furans, metals, PAHs, DDT, PCBs);
- radiochemical dating; and
- geotechnical.

(2) Human and Ecological Risk Assessment

- screening-level human and ecological risk assessment (with endpoints of interest for “safe” sediment levels for benthic organisms vs. measured; “safe” fish/crab tissue concentrations vs. modeled; and “safe” fish/crab doses to humans vs. modeled;
- fill data gaps (e.g., whole body tissue data for multiple species; spatial sediment toxicity data; exposure areas for ecological receptors; data for bird risk assessment; and influence of CSOs on ecological receptors); and
- ecological sampling plan (includes tissue and sediment chemistry, creel/angler survey, and inputs from CSOs). (The creel/angler survey was a PRP initiative, not approved by EPA.)

(3) Sediment Mobility Study

- physical measurements (such as bathymetry, tides, freshwater inflows, currents, and water properties); and
- numerical modeling.

From these investigations, EPA will issue several reports. The Remedial Investigation Report will identify the locations, movement, and quantity of contaminated sediments in the Passaic River Study Area. The Feasibility Study Report will document the examination of cleanup options for the Passaic River Study Area by defining, comparing, and evaluating different cleanup options. The Human and Ecological Risk Assessment Report will identify risks caused by the

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

contaminated sediments to humans, animals, and the ecosystem in the Passaic River Study Area. When the RI/FS and Human and Ecological Risk Assessment Reports have been completed, EPA will propose a plan for the cleanup of contaminated sediments.

No completion dates for these three reports have been determined.

In early 2004, EPA and OCC agreed to conduct an investigation in Newark Bay (into which the Passaic River flows) to characterize contamination in Bay sediment and develop an appropriate cleanup plan. Subsequently, in May 2004, EPA announced that it had reached agreement with 31 companies (including OCC) to provide funding to continue with the RI/FS portion of the Lower Passaic River Restoration Project. The Restoration Project is a collaboration among EPA, USACE, and New Jersey DOT to produce a plan to cleanup and restore the 17-mile tidal stretch of the Passaic River from Dundee Dam to Newark Bay.

A dredging pilot study targeting 5,000 cy in the Passaic River is scheduled for 2005, which will also include technology testing of the dredged sediments (including the Cement-Lock and Bio-Genesis processes).

Key Conditions:

extended (> 1 mile) river, hydrodynamic modeling, pilot/demonstration test, tidal fluctuations

Estimated Target

Volume:

Estimated Calendar Time to Implement Remedy:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: ***PETTIT CREEK FLUME***

SiteID: 02-10

US EPA Region: II

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: NYS Consent Order

Contaminants of Concern: DNAPLs (VOCs and semi-volatiles)

Overall Status Summary: After diversion of the Pettit Creek Flume Storm Sewer, diver-assisted removal of 2,000 cy of DNAPL-contaminated sediments was performed in 1993-1994 from a one-acre nearshore cove in the Little Niagara River. The great majority of the material is stored onsite pending a disposal decision. The cove is reportedly partially refilled, replanted, and restored. No cost data. Lawsuit between PRP and first contractor (OHM).

Key Conditions: Great Lakes AOC

Estimated Target Volume:

Estimated Calendar Time to Implement Remedy:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: ***PINE STREET CANAL***

SiteID: 01-04

US EPA Region: I

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund. Final.

Contaminants of Concern: PAHs; VOCs (including benzene, toluene, and xylenes); heavy metals

Overall Status Summary: The Pine Street Canal study area in Burlington, VT has been the site of commercial and industrial activity since prior to the Civil War. The barge canal and turning basin were constructed in the mid-1800s to provide access to several sawmills, lumberyards, a boat builder, and a coal yard. The site lies in a topographically low area and includes an abandoned barge canal; a barge turning basin; adjacent filled-in boat slips; and about 21 acres of vegetated wetlands south, east, and west of the canal. The canal is hydrologically connected to Lake Champlain through a partially restricted inlet/outlet under an active portion of Vermont Railroad track.

The source of contamination is a manufactured gas plant, which operated on the Pine Street Canal Site from 1895 to 1966. The source of the contamination (PAHs, VOCs, and heavy metals) was coal gasification wastes.

In 1993, EPA was forced to abandon a proposed dredge and landfill plan due to a strong negative reaction and lack of support from the public and PRPs. That plan was estimated to cost \$14 million (construction cost) and would have involved dredging 1,300 feet of canal (80 feet wide) to a depth of 20 feet and placing the dredged material into a 13-acre dedicated landfill constructed on contaminated wetlands, and then capped. The proposed remedy was dropped by EPA in May 1993 and was declared too intrusive and too destructive of wetlands.

In 1993, representatives of environmental groups, local citizens, the PRPs, EPA, the VT Dept. of Environmental Conservation, and the City of Burlington all joined together to form the "Pine Street Coordinating Council." This group was created with the support of EPA to design studies to fill data gaps regarding the site and consider potential cleanup technologies, and ultimately to develop a consensus on a cleanup proposal in a manner acceptable to the community. The Pine Street Canal Site is one of the first in the country where a public consensus group has been used to develop and recommend a Superfund remedy.

A new FS in 1997 favored in-situ bioremediation or capping remedies. The current proposed remedy, proposed in May 1998, includes covering 5-6 acres of contaminated canal sediments in Subareas 1, 2, and 8 that pose the highest risk to the environment with a subaqueous sand/silt cap. Contaminated wetlands areas

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

(emergent wetlands) near the canal totaling 2-3 acres in Subareas 3 and 7 will also be covered with a sand/silt cap. In addition, a 100 feet by 100 feet area in the uplands/wetlands area found to contain elevated levels of COCs will be covered with topsoil (depth not specified) to reduce exposure. The public comment period on the proposed plan closed July 8, 1998; EPA issued the ROD for the capping remedy on September 29, 1998. Design work was originally scheduled for completion in 1999 and field work was to begin in 2000. This was delayed; design completion and start of field work was re-scheduled for Fall 2001, with field work scheduled for completion by 2003.

In essence, a fund-lead RI/FS and proposed plan were determined to be scientifically indefensible and data-deficient; more than four years and numerous field studies later a new and different remedy was developed by the Coordinating Council and accepted by the EPA.

The Coordinating Council is no longer functioning. It ceased operation once it satisfied its goal of selecting and recommending a publicly acceptable remedy to the EPA. The remedy is being implemented and funded by certain of the PRPs (not yet identified) pursuant to a September 1999 Consent Order. Previously, 17 landowners settled with the major PRPs in an indemnification deal, which is confidential between the landowners and the major PRPs.

Status of field work as of July 2002: Construction of an outlet weir was completed in October 2001 (Phase 1A). Construction of Phase 1B is scheduled to be accomplished from July to November 2002 which will include installation of a sand and topsoil cap in selected wetlands areas, and modifying storm sewer outfalls (Phase 1B). Phase 2, which includes installing a sand cap in the canal and turning basin, is scheduled to start in Spring 2003.

Key Conditions:

capping, more-harm-than-good, wetlands

Estimated Target

N/A (planning to cap 5 - 6 acres of contaminated canal sediments and 2 - 3 acres of contaminated wetlands near the canal)

Volume:

Estimated Calendar Time to Implement Remedy:

2001-03 (design 1999 and 2000; construction start 2001)

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: ***PIONEER LAKE***

SiteID: 05-28

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Removal action. Final. Funded through the US Coast Guard to US EPA under the Oil Pollution Act of 1990.

Contaminants of Concern: VOCs; PAHs; coal tar

Overall Status Summary: The Pioneer Lake site consisted of coal-tar contaminated sediment in a one-acre target area in the southern portion of the 65-acre lake. A removal action was funded through the US Coast Guard to US EPA under the Oil Pollution Act of 1990. Removal was accomplished by hydraulic cutterhead dredging in two phases. In Phase I, conducted from August through November 1996, 2,100 in situ cy of sediment were removed. In Phase II, conducted from April through October 1997, about 4,500 in situ cy of sediment were removed (final bathymetry information was not reported; the 4,500 cy for Phase II is back-estimated from waste disposal quantities). Dredged slurry was pumped to a new 2.2 million gallon earthen settling basin, lined with PVC. Two one million gallon treated water holding basins were also constructed. Target cleanup levels for VOCs and PAHs were established by a risk assessment prepared by the Ohio EPA, and achievement of these levels was verified by collection of confirmation samples from the dredged areas. Total project cost was about \$2.5 million.

Key Conditions: commercial landfill, dredging, floating oil, water handling limitations

Estimated Target Volume: 1,800 cy

Estimated Calendar Time to Implement Remedy: Unknown

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: **PORTLAND HARBOR**

SiteID: 10-16

US EPA Region: X

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund. Final. Combined fund- and PRP lead.

Contaminants of Concern: Petroleum products; PAHs and other SVOCs, e.g., phthalates, pentachlorophenol; PCBs; organic solvents; perchlorate; pesticides; herbicides; dioxins/furans; metals; antifouling agents, e.g., butyltins

Overall Status Summary: Portland Harbor is a heavily industrialized area within the Lower Willamette River defined by the presence of an approximately 11-mile long federal navigational channel. Numerous possible sources of sediment contamination exist both in the harbor and also from the typically extensive marine traffic.

USEPA sampled sediment within the harbor in 1997 at the request of the Oregon DEQ and found the sediment to contain elevated levels of a variety of contaminants including pesticide DDT, PCBs, heavy metals, and PAHs. USEPA used this information to determine if the harbor was eligible for the NPL. In December 2000, USEPA added Portland Harbor to the NPL. In February 2001, a Memorandum of Understanding (MOU) was signed by eleven governmental agencies to provide a framework for addressing sediment contamination within the harbor. Primarily, the MOU formalized that USEPA and Oregon DEQ would jointly manage the investigation and cleanup of Portland Harbor with USEPA taking the lead on addressing contaminated sediment issues and Oregon DEQ taking the lead on addressing upland sites identified as past or present sources of contamination to the harbor. Also in December 2000, USEPA notified 69 PRPs of their potential liability in the cleanup of the harbor.

In September 2001, USEPA entered into an Administrative Order on Consent with nine PRPs that agreed to perform an RI/FS of the harbor, as well as pay for USEPA involvement in the RI/FS process. The City of Portland has also agreed to assist with the RI/FS as well -- the nine PRPs plus the City of Portland are collectively known as The Lower Willamette Group (LWG).

In Summer and Fall 2002, LWG performed exploratory sediment and biota sampling to begin to define areas for further sampling as part of the RI/FS process. In early 2004, USEPA approved field sampling plans for a second round of sampling that was to begin in Summer 2004. At least one more round of sampling is anticipated to meet the data needs of the RI/FS process. In June 2004, USEPA approved a programmatic work plan that will be used to guide the RI/FS process.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

As of August 2004, two early action remedial projects targeting contaminated sediments have been agreed to by the respective PRPs. One is a non-time-critical removal action at the Marine Terminal 4 (T4) site. The Port of Portland has agreed through an Administrative Order on Consent (AOC) signed in October 2003 with USEPA to perform an early action to assess and eventually remediate contaminated river sediment associated with the terminal. Areas to be addressed are Slips 1 and 3, as well as submerged lands between the slips. Sediment within these areas are contaminated with petroleum products, metals, pesticides, and PCBs. The Port of Portland intends to address surface and groundwater that may be contributing to sediment contamination prior to remediating the sediment. In February 2004, LWG issued an EE/CA report for remediating T4 in which it explains the various cleanup methods and options that may apply for the target sediments.

The second early action is a time-critical removal action planned for the former Portland Gas and Coke Company (GASCO) site that is now owned by Northwest Natural. In April 2004, Northwest Natural and USEPA signed an AOC for performing the cleanup. The AOC committed Northwest Natural to complete a work plan within 30 days and to take no longer than six months to begin work. The plan currently calls for the removal of approximately 30,000 cy yards of PAH-contaminated soil and sediment and disposal of the material at an approved offsite hazardous waste landfill. The cost for implementing the remedy is estimated at between \$1.5 million and \$7 million.

Key Conditions:

commercial landfill, dredging, extended (>1 mile) river, fish spawning limitations, floating oil, floodplains targeted, habitat/streambank restoration, natural recovery, tidal fluctuations

Estimated Target

Volume:

Estimated Calendar Time to Implement Remedy:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: ***QUEENSBURY NMPC SITE***

SiteID: 02-14

US EPA Region: II

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: NYSDEC Listed Hazardous Waste Disposal Site. State-Lead.

Contaminants of Concern: PCBs (1242)

Overall Status Summary:

The Niagara Mohawk Power Corporation (NMPC) owns a one-half acre site located on Corinth Road, Town of Queensbury, Warren County, New York, on the north bank of the Upper Hudson River, about five miles west of Glens Falls. This property is a former campsite that Niagara Mohawk and its predecessor leased from the 1940s to the 1980s. It is believed that a lessee released PCB-containing fluids or cooling oil on this site, resulting in the introduction of PCBs to the soils and subsequently, by runoff, into the river. This project is part of the New York State Hazardous Waste Remediation Program. In 1995, following a public comment period, the project was divided into two separate units: the upland and nearshore soils area (OP Unit 1) and the deep river sediment area (OP Unit 2).

In 1996, NMPC performed the OP Unit 1 remediation. The cleanup work was approved by NYSDEC and the NY State Department of Health (NYSDOH). The remediation included (1) clearing the river bank of trees and shrubs, (2) lowering the water level in the river by four feet using controls at the Sherman Island Dam to expose the targeted river bank and nearshore sediments, (3) removing about 4,500-5,000 cy of bank soils and nearshore sediments in-the-dry and disposing of these at an offsite commercial landfill, (4) replacing the excavated areas with backfill, topsoil, and rip-rap, and (5) seeding the upland portion of the site and planting 1,200 trees and shrubs. Total cost was about \$3.5 million. (It was subsequently determined that PCBs were located beneath a county road at the site; these were removed in a Phase II effort.)

NMPC, along with NYSDEC and NYSDOH, performed a five-year fish monitoring program beginning in 1995 and is continuing to research appropriate alternatives for addressing the contamination in the deep river sediments (OP Unit 2). The original proposed plan to remove these deep water sediments along with the nearshore sediments had been put aside for at least five years based on comments from the public and town officials, in favor of five more years of monitoring the trends of PCB levels in fish.

The five-year fish monitoring program employed six sampling stations, including one at the OP Unit 1 remediation location. Fish monitoring continued in 2001 at two of the stations - - at the OP Unit 1 location and also across the river from that

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

location. Work on a Supplemental Feasibility Study for OP Unit 2 (offshore sediments) has been underway since September 2001.

Key Conditions: commercial landfill, post monitoring

Estimated Target Volume: 5,200 cy

Estimated Calendar Time to Implement Remedy: one year

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: *REYNOLDS METALS (Massena)*

SiteID: 02-11

US EPA Region: II

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: UAO under CERCLA; for plant site, NYSDEC consent orders.

Contaminants of Concern: PCBs (1254); PAHs; total dibenzofurans (TCDFs)

Overall Status Summary:

A 1993 EPA Decision Document (like a ROD) stipulated a remedy for the 30-acre nearshore target area which called for (1) dredging 51,600 cy of sediments exceeding 1 ppm PCBs; (2) treating dredged sediments exceeding 25 ppm by onsite thermal desorption; and (3) consolidating dredged sediments of 25 ppm PCBs or less into a former disposal pit on the plant site, and capping. In a Post-Decision Proposed Plan issued for comment in July 1998 and confirmed in an Amended Decision Document issued in September 1998, EPA proposed a modified remedy which includes (1) dredging 77,600 cy of sediments exceeding 1 ppm PCBs, 10 ppm total PAHs, or 1 ppb dibenzofurans; (2) treating dredged sediments containing greater than 500 ppm PCBs at an approved offsite facility; (3) disposing dredged sediments containing 50 ppm or greater PCBs and less than 500 ppm PCBs at offsite commercial facilities; and (4) disposing dredged sediments of less than 50 ppm PCBs into an onsite landfill. The increased volume estimate resulted from an additional sediment characterization program; the decision to increase the maximum allowable PCB concentration for onsite disposal from 25 ppm to 50 ppm was made to be consistent with a recently released amendment to the NYSDEC ROD that addresses land-based contamination at the site; the decision regarding offsite disposal resulted from the substantially lower costs for offsite disposal as compared to 1993 and the excessive cost and time (years) estimated for implementing onsite thermal desorption.

The remedial dredging project was performed in 2001 in the 30-acre nearshore target area in the St. Lawrence River. Bechtel Environmental, Inc. provided construction oversight and project management for Alcoa, Metcalf & Eddy (M&E) provided design and construction oversight for dredging and sheetpile installation, Faust Corporation performed dredging and sheetpile installation, and Parras Environmental and Construction performed the land-based operations (barge offloading, solids handling, and transportation to the landfill). Project oversight was performed by the U.S. Army Corps of Engineers-NY District Office and TAMS Consultants (representing USEPA). Independent oversight of the project was performed by NYSDEC, the St. Regis Mohawk Tribe, and the Canadian Government. Additionally, Alcoa maintained a full-time independent QA Officer onsite. At its peak the project maintained a staff of about 130, approximately 40 being M&E employees and another 78 being union labor.

Sheetpile installation began April 13 and ended June 7. A total length of about 3,800 feet was installed that completely isolated the work area from the river. The use of union labor unskilled at sheetpile installation slowed initial installation efforts. Following sheetpile installation, a combination of the herbicide Aquathol and the aquatic non-crop herbicide Reward was applied within the sheetpiled area for vegetation suppression.

Dredging began on June 15 and ended on October 16, 2001 (98 days of active dredging). The dredge area was divided into four subareas, Areas A, B, C, and D, each defined according to sediment PCB levels found in pre-dredge core samples. Area C was delineated based on sediment containing 50 ppm or greater PCBs and contained all areas (8 – 10 grids) with sediment containing 500 ppm or greater PCBs. Areas A and D were delineated based on sediment containing 1 ppm to less than 50 ppm PCBs. Area B was designated as clean and encompassed areas of sediment containing 1 ppm PCBs or less.

Area C was physically separated from the other dredge areas using a combination of silt and air curtains. The air curtains reportedly allowed equipment movement into and out of Area C while still containing resuspended material within the area.

Dredging was performed using three Cable Arm environmental buckets (two 5 ½ cy and one 2 ½ cy). Equipment for each dredge operation included a derrick barge with a fixed boom-mounted crane for bucket operation and the GPS positioning software WINOPS. The 5 ½ cy buckets were typically used for initial sediment removal and the 2 ½ cy bucket for cleanup passes. Dredging was to a uniform design depth established from the pre-dredge cores collected from the center of each grid cell. Design removal depth was constant over an entire grid cell. Over-dredging of 3 to 6 inches was required by the design specifications. Dredging was performed over two 10-hour shifts per day, six days per week. All three dredges operated during day shift while one operated during second shift. The limited pool of experienced crane operators from the local union resulted in significant time and effort expended to increase the competency of the crane operators with the dredging and positioning equipment, as well as the procedures for environmental dredging. Additionally, a small amount of sediment and riverbank soils was removed from Area C using a land-based excavator (CAT 350).

Dredged material was deposited into scows for transport to an offloading dock. Loading of the larger scows was limited to less than total volume due to draft limitations within the work area. The scows were each fitted at both ends with a gravity filtration system to treat excess water from the dredging operation. Water released from the filtration system was monitored for a visual plume only as a guide for determining when the sand media required cleaning. The filters failed to operate as designed, primarily due to poorer than anticipated dewatering characteristics of

the dredged sediments.

Water column monitoring was performed inside and outside the sheetpile and inside the silt curtain (Area C). Turbidity measurements were obtained outside the sheetpile wall every two hours adjacent to, 100 ft. upstream, and 100 ft. and 350 ft. downstream of each dredge. Additionally, water samples for PCB, PAH, and other parameter analyses were collected outside the sheetpile six hours into each shift. Water column samples were also collected inside the sheetpile and silt curtain once each week for analysis.

The land-based operations were located directly adjacent to the dredging area on Alcoa property. The extent of the land-base operations was relatively unrestricted with approximately seven acres used for barge unloading, laydown space, equipment staging, and project trailers. An additional one-acre area containing four small holding cells built in 1993-94 was used for dewatering and storage of sediment containing 500 ppm or greater PCBs.

Offloading of most dredged material was from a dock built specifically for the project and located at the eastern end of the sheetpiled area (Area A). The exception was sediment from Area C characterized to contain 500 ppm or greater PCBs. This material was offloaded at a small existing dock at the western end of the work area due to the close proximity of the dock to the small, pre-existing holding cells designated for this material.

Offloading was able to occur simultaneously from two scows (one 1,200 cy and one 800 cy) and was performed by two excavators, one per barge, that transferred the material to 30-ton dump trucks. The barges and trucks were marked with colored flags to indicate the three different levels of possible PCB contamination (1 ppm to less than 50 ppm; 50 ppm to less than 500 ppm; and 500 ppm or greater). Excess water from the barges was suctioned off using a vacuum truck prior to offloading sediment. The excess water was placed into one of the four existing holding cells to allow solids to settle out prior to treatment.

The dredged sediment was transported to either the onsite landfill (less than 50 ppm) for solidification and disposal or to the solids handling area (50 ppm to less than 500 ppm) for dewatering and solidification prior to offsite disposal. The onsite landfill was within one mile of the offloading dock. Solidification was achieved by mechanically mixing the Portland cement with the sediment using an excavator until compaction requirements were met. At the solids handling area, the material was placed into holding cells and allowed to gravity dewater for one to two days. Portland cement was added to further solidify the material prior to shipment for offsite disposal.

The solids handling area (including the unloading dock) was 2 - 3 acres in size

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

located adjacent to the eastern dock. The cells were sized to hold about 500 cy of piled consolidated sediment. However, due to higher than anticipated water content, the volume of sediment placed in each cell was limited to about 200 cy.

Prior to offsite disposal, PCB content of the material was determined by collecting a composite sample from each holding cell for analysis. Composite samples of the sediment believed to contain 500 ppm or greater PCBs showed that nearly all contained less than 500 ppm PCBs. EPA waived the requirement that material containing 500 ppm or greater PCBs be sent offsite for thermal treatment. This material was eventually treated using solidification and shipped offsite for disposal. A total of 85,600 cy of sediment was removed. Of this, an estimated 69,000 cy were disposed in the onsite landfill and the remaining 16,600 cy were sent for disposal at Model City, NY.

Decant water from gravity dewatering of the sediment and rainwater runoff from the material handling area was treated at a 150 gpm onsite water treatment system. Because the sediment did not gravity dewater as efficiently as anticipated, the water treatment system was only required to operate during rain events. Discharge from the system was to the in-water work area under a NYSDEC discharge permit.

Verification samples were collected using a Ponar grab sampler or, if insufficient sediment existed, by split-spoon sampling techniques. Removal verification was accomplished through a series of iterative steps that first required that a design depth be reached across each grid cell, and then verification that the target level of less than 1 ppm PCBs in surface sediment was met. Design depth was determined using pre- and post-dredging surveys. Because of the large amount of rock within the dredge areas, operation of the Cable Arm bucket was altered to allow working around large rocks, boulders or other obstructions unable to be removed by the bucket. Following the completion of all dredging, final verification sample results for the 268 dredge cells were: less than 1 ppm PCBs, 185 cells; between 1 and 2 ppm PCBs, 51 cells; between 2 and 5 ppm PCBs, 16 cells; between 5 and 10 ppm PCBs, four cells; and greater than 10 ppm PCBs, 12 cells (of these, one was greater than 100 ppm). All three bucket types were used to reduce PCB levels in the 12 cells containing greater than 10 ppm PCBs. These efforts were ultimately unsuccessful and the cells, along with three adjacent cells, were temporarily capped with 6- to 12-inches of clean gravel until they could be evaluated for further action.

In May 2002, Alcoa began efforts to have equipment mobilized to the site to complete installation of an engineered cap over the 15 dredge cells that had been temporarily capped. During this same time, NYSDEC was continuing review of the selected cap design and USEPA was reviewing a draft project completion report. Based on its review, NYSDEC concluded that the cap design may not be adequately protective of the local biological community and requested that the cap be redesigned. Because of this, Alcoa canceled equipment mobilization to the site

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

until a final cap design could be agreed upon. As of July 22, 2002, US EPA, NYSDEC, and Alcoa were continuing negotiations on an agreement to finalize the cap design. Additionally, Alcoa and USEPA were continuing to work to resolve issues regarding the method for completing the dredging as documented in the draft completion report.

In Spring 2004, USEPA requested that Alcoa perform additional dredging to remove elevated levels of PAHs found within previously dredged areas. Sixty-eight of the originally targeted 268 dredge cells are being targeted for further dredging. Alcoa previously collected 0 to 8 inch sediment samples from the target areas and as of June 2004 was preparing a sampling plan to collect core samples from the same areas. It is unclear how additional dredging would be implemented since the sheetpile wall used to isolate the original dredge area from the rest of the St. Lawrence River was removed and the facility landfill used to dispose of sediment containing low-level PCBs is now closed.

Key Conditions:

capping, commercial landfill, dedicated landfill or CDF, dredging, Great Lakes AOC, hydrodynamic modeling, incineration, post monitoring, solidification/stabilization

Estimated Target Volume:

77,600 cy

Estimated Calendar Time to Implement Remedy:

Possibly starting in 2001.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: ***RUCK POND (Cedar Creek)***

SiteID: 05-13

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: State-lead (Wisconsin). Final.

Contaminants of Concern: PCBs (1248/1260)

Overall Status Summary: Completed 1994. Approximately 1000' section of creek drained after temporary dam installed and flow bypassed by a four-barrel siphon. Removed 7,730 cy (12,300 tons) of sediments and minimal soil by dry excavation over a 5-month period. Approximately 30% disposed at TSCA landfill, 70% at non-TSCA landfill.

Key Conditions: commercial landfill, hydrodynamic modeling, post monitoring, rail transport for disposal

Estimated Target Volume: Removal of all soft sediment to the extent practicable (7,500 cy as determined by BBL probing). Note: WDNR originally estimated 3,000 ± 500 cy of sediment present in Ruck Pond. (Reference: Final Draft of Cedar Creek Mass Balance Report, June 18, 1993).

Estimated Calendar Time to Implement Remedy:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: SAGINAW RIVER/BAY

SiteID: 05-23

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Consent Judgment pursuant to CERCLA.

Contaminants of Concern: PCBs; DDT; TCDD; TCDF; PAHs; heavy metals

Overall Status Summary: In 1994, the U.S. Fish and Wildlife Service (FWS) and the State of Michigan (co-trustees) sued General Motors Corp., the City of Saginaw, and Bay City over the PCB contamination in the Saginaw River. The Saginaw Chippew Indian Tribe eventually joined in the suit as a co-trustee.

From Reference M-98 (1997): “The Natural Resource Trustees (both federal and state) are completing an agreement with the PRPs to settle a natural resource damage claim, which will include the removal of approximately 170,100 cy of PCB-contaminated sediment. An Agreement-in-Principle was reached with the PRPs in February 1997 which has allowed certain options to be exercised for the purchase of lands for habitat enhancement and restoration. The planning and design phase for the sediment remediation project is underway. Dredging is expected to begin in 1998. The US EPA conducted several contaminated sediment studies and a pilot-scale demonstration of a treatment technology under the ARCS program. Legal complexities and arguments have delayed cleanup for at least three years.”

Negotiation of technical and legal issues between the PRPs and the co-trustees culminated in the Saginaw River and Bay Natural Resource Damage Assessment settlement and the signing of a Consent Judgment, effective Nov. 24, 1998. The \$28.2 million settlement includes \$10.64 million for a dredging project, \$3 million for future monitoring, and the remaining \$14.5 million for resource restoration projects.

The Corps of Engineers Detroit Office is managing the dredging project with oversight being provided by FWS, MI DEQ, and USEPA. The Corps of Engineers developed the dredging plan and bid package. The bids were originally due on March 18, 1999. The bid package defined five areas for dredging, totaling 320,000 cy. An optional sixth area was also included totaling 29,000 cy. This optional area was subsequently added to the contract. The EPA provided a written opinion to the Corps to the effect that “. . . the sediments identified for removal pursuant to the . . . settlement are not regulated under TSCA for disposal.” As a result, the bid package specified that dredged material would be placed into the existing Saginaw Bay Confined Disposal Facility (CDF).

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Bidding was temporarily suspended for several months pending a court review/approval. When bidding resumed, the completion of work specification was modified to require completion of work by November 1, 2000 if the notice to proceed was received by September 30, 1999. Failure to complete in the specified time-period would make the contractor liable for liquidated damages of \$2,492 per day.

Five bids were received, for five primary target areas, ranging from \$6.464 million to \$11.442 million (median \$8.047 million). The work was awarded to the low bidder, Luedtke Engineering Company, on September 21, 1999 for \$6.464 million. The cost did not include the cost of disposal into the CDF or the cost for dredging an optional sixth area.

Dredging began in mid-April 2000 and continued in year 2000 until the river iced over. Dredging in 2000 was performed with one clamshell dredge on a 24 hour per day, 6 day per week basis. No verification sampling to determine residual PCB concentrations was specified or performed. Dredging was to a depth target only.

Previously unidentified debris and a hard sand layer were encountered in the largest area, Area 2, including large numbers of submerged pilings. As many as 50 pilings were removed one day. The Cable Arm clamshell, the specified bucket, was less effective for removing the pilings than a conventional clamshell due to its lighter weight and lack of teeth for gripping the wood. For these reasons a conventional clamshell bucket was used for piling removal.

Areas of hard sand encountered in Area 2 also limited the effectiveness of the Cable Arm clamshell. As a result, the Corps agreed to allow the dredge contractor to discontinue use of the Cable Arm bucket in areas where they were unable to remove sufficient sediment to fill the bucket to at least one-half capacity. The contractor would then switch to a conventional clamshell bucket to complete dredging in those areas. One rig was used for dredging in year 2000, with six different bucket sizes. An overall average bucket size was 7 cy, calculated from the percentage of time each of the six different size buckets was used.

The contractual completion date for the five primary target areas (Areas 1-5) was originally November 1, 2000 with a penalty of \$2,492 per day for late completion. The Corps ultimately agreed that only Areas 1-3 could be completed by that time and that Areas 4 and 5 (and 6 which was subsequently added to the contract) would have to be completed in 2001. The Corps and Luedtke held discussions on how the new schedule would impact the original contract. In part, Luedtke claimed lost time due to weather (particularly wind) which prevented scow movement to the CDF which was located on an island in the Bay about 2 miles distance. Information is not available on how these claims were resolved.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Total sediment removal in year 2000 based on final soundings was 200,478 cy that included 24,842 cy from Area 1 and 4,150 cy from Area 3, both completed. A total of 171,486 cy were removed from Area 2 with about 5,000 cy remaining. The year 2000 effort took 35 calendar weeks, with dredging scheduled 24-hour per day, except Sundays and holidays (209 dredging days). Dredge up-time was 49.5%. The overall average removal rate per day averaged 981 cy/day (41 cy/hr), based on 24 work hours per day. By late November, cold weather resulted in ice formation on the river (3-4" in some areas) hampering the movement of scows to and from the CDF. As a result, the contractor ceased first-year operations in early December of 2000.

The contractor began the second year of dredging on April 11, 2001 and the construction project was completed on July 22, 2001. In year 2001, 141,840 cy of sediment were removed, as determined from soundings, including 3,824 cy to complete Area 2 and 138,002 cy to complete Areas 4, 5, and 6. The year 2001 effort took 14.5 calendar weeks, with dredging scheduled 24 hours per day, including some Sundays and holidays (95 dredging days). Dredge up-time in 2001 was 57.1%. The overall average removal rate per day averaged 1,493 cy/day (58.7 cy/hr), based on 24 work hours per day. One rig was used for dredging 70% of the time, and for the other 30% of the time two rigs were used to dredge simultaneously in separate target areas. Five different capacity buckets were used; overall average bucket size was 6.3 cy.

A total of 342,304 cy of sediment was removed from six targeted areas over 49.5 calendar weeks of three-shift per day operations (304 dredging days). Total cost was about \$8.9 million (including a reported disposal cost at the CDF of \$1.54 per cy, a cost retro to the 1977 CDF construction cost).

Key Conditions:

confined disposal facility, dredging, extended (> 1 mile) river, Great Lakes AOC, hydrodynamic modeling, wetlands

Estimated Target Volume:

320,000 cy (from five hot spots totaling 52.7 acres). The areas are: "Dredging Area One (across from WWTP)" (23,000 cy); "Dredging Area Two (Bay City WWTP)" (171,000 cy); "Dredging Area Three (Outfall Area)" (4500 cy); "Dredging Area Four (Upstream from Essexville)" (64,000 cy); and "Dredging Area Five (Downstream from Essexville)" (57,500 cy).

Estimated Calendar Time to Implement Remedy:

Summer 1999 estimated earliest start date.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: SANGAMO-WESTON

SiteID: 04-04

US EPA Region: IV

Status (Active, Complete, or Monitoring Only): Monitoring Only

Type of Regulatory Action: Superfund. Final. Fund-Lead.

Contaminants of Concern: PCBs (1016/1242/1254)

Overall Status Summary: USEPA-lead RI/FS. In 1994, natural recovery supplemented by institutional controls was selected as the only remedy. A cleanup level of 1 ppm PCBs (4.7 million cy) was judged to be technically infeasible to achieve. Natural recovery to below the FDA action level of 2 ppm PCBs was predicted, by modeling, to occur in largemouth bass in Hartwell Lake within 12 years (from 1992).

Both the USEPA and the public rejected as too costly (\$500 million minimum) remedies associated with removal, treatment, and disposal of an estimated 4.7 million cubic yards of PCB-contaminated sediment that is spread over approximately 730 acres. USEPA also rejected alternatives that involved aggressive engineering controls to contain or remove and dispose of PCB-contaminated sediment as being too costly (\$30-50 million) and not providing a significant reduction in overall risk. Firm public opposition also caused EPA to reject installation of a fishery isolation barrier (fence) to prohibit movement of migratory fish into or out of the area of Hartwell Lake with the highest PCB concentrations in sediment.

The South Carolina Department of Health and Environmental Control has been performing annual studies of PCB levels in fish since 1976. In June 1994, the Final Record of Decision was issued for the site that required aquatic biota monitoring (primarily a comprehensive fish tissue study) and sediment sampling. Annually from 1995 to present, fish and sediment sampling and a bioaccumulation study using the Asian clam (*Corbicula fluminea*), have been performed. The general trend, when samples collected as recently as 1998 and 1999, are compared to samples collected in 1990, show that PCB levels in fish and sediment have reduced significantly and are continuing to go down.

Upon resolution of outstanding cost issues at the site, USEPA Region IV issued a Unilateral Administrative Order (UAO) on September 25, 1998, which required the PRP to implement a fish consumption advisory and public education program, to perform annual aquatic biota and sediment monitoring to determine PCB levels in fish and other aquatic life, and to periodically flush sediments from behind the three small hydroelectric dams to facilitate burial of PCB-impacted sediments further downstream.

USEPA is presently performing a 5-year review of the site required as part of the UAO natural recovery selection. To-date, the reduction of PCB levels in fish is progressing at a rate considered satisfactory to USEPA. One type of fish, a bass hybrid, appears to be remaining above the FDA recommended limit of 2 ppm PCBs in all areas of the lake, potentially impacting the ability to eliminate fish advisories from areas of the lake where other species of fish have consistently shown to have recovered to below the FDA limit. The bass hybrid tends to be very mobile and apparently consistently ranges over the entire lake, resulting in comparative PCB tissue levels regardless of the location of capture. In contrast, other fish tend to have a more limited range. PCB levels in tissue samples from these fish tend to reflect the relative concentration of PCBs in sediment in and around the area of capture. Because the hybrid bass is considered an important sports fish in the area and because the fish is a hybrid and cannot naturally reproduce, the fish is periodically restocked in Hartwell Lake to maintain a viable sports fishing population. USEPA has attempted to have the stocking of the hybrid bass discontinued in the lake, however this has been soundly rejected by the South Carolina State Fish Commission, citing potentially negative economic impact on the local sports fishing industry.

As part of the 5-year review, USEPA is evaluating methods to improve the ability to release trapped sediment from behind two of the three hydroelectric dams located on Twelvemile Creek. As part of the UAO, clean sediment trapped behind the dams is to be periodically flushed from behind the dams for transport downstream to promote the burial of sediments containing elevated levels of PCBs with clean sediments in areas of lower Twelvemile Creek and Hartwell Lake. This process is anticipated to facilitate the natural recovery process by burying the contaminated sediments beneath clean sediments.

Low-flow sluice gates presently installed in the dams are proving inadequate to effectively flush the sediment from behind the dams as a result of being limited to operation during low-flow conditions. Flushing during low-flow conditions results in incomplete removal of sediment from behind the dams and inadequate water flow to transport the sediment to the desired depositional areas. Hydraulic dredging from behind the dam and discharging the slurry to the creek downstream of the dam has been performed successfully during periods of high creek flow. However, this option has been rejected as a long term solution due to the dependence on dredge availability, the need to mobilize the dredge from dam to dam, and the difficulty in maneuvering the dredge behind the dam. USEPA is presently working with the PRP on a plan to install high-flow sluice gates in each of the dams to allow for more effective sediment flushing, and, in turn increase the amount of clean sediment deposited in downstream areas containing contaminated sediments.

No further remedial actions are being considered for the site at this time.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Key Conditions: extended (> 1 mile) river, hydrodynamic modeling, more-harm-than-good, natural recovery

Estimated Target Volume: 730 acres at >1 ppm PCBs

Estimated Calendar Time to Implement Remedy: 12 years, 1992 - 2004; natural recovery to FDA fish levels predicted.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: SAUGET AREA 1 (Dead Creek)

SiteID: 05-35

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Interim. Unilateral Administrative Order for a time critical removal action. EPA-lead.

Contaminants of Concern: PCBs; VOCs; metals

Overall Status Summary: The Sauget Area 1 Superfund Site includes 3.5-mile long Dead Creek, three hazardous waste disposal landfills, a formerly used waste impoundment, and two abandoned gravel pits. For investigative purposes, Dead Creek has been divided into six segments, CS-A through -F, totaling 15,000 feet in length. Sauget Area 1 was proposed for inclusion on the NPL in June of 1996 but has yet to be finalized. A second area, Sauget Area 2, is located adjacent to Sauget Area 1 and is being addressed separately under Superfund.

The area surrounding Dead Creek has historically comprised mostly heavy industry intermixed with smaller residential areas. The creek was used extensively as a conveyance to the Mississippi River for wastewater discharges from a variety of industrial and municipal sources. As a result, sediment and surface water in Dead Creek have been found to contain high levels of organic and inorganic contaminants (e.g., PCB levels in CS-B were measured as high as 10,000 ppm). Backfilled and/or plugged culverts between creek sectors have resulted in the flooding of low lying areas and the spread of contaminated sediment to these floodplain areas. In 1990, Cerro Copper excavated and disposed offsite 27,000 cy of sediment from river segment CS-A, the farthest upstream and most contaminated sector of Dead Creek. As part of the remedy, CS-A was filled with stone and paved over. Discharges to Dead Creek from this area are now the result of surface water runoff only. Multiple PRPs have been identified for both Sauget Areas 1 and 2, including Solutia, Inc., formerly part of Monsanto Company, as a result of PCB contamination found in Dead Creek.

In May 2000, the USEPA issued a Unilateral Administrative Order (UAO) for remediating the remaining five river segments along with Site M, a backwater area hydraulically connected to Dead Creek and historically used as a sand borrow pit. The UAO required that 50,000 cy of contaminated sediment and soil be removed from Segments B thru F of the creek, select bank and floodplain areas, and Site M as a time-critical removal action (TCRA). Solutia volunteered to implement the remedy.

The remedy was completed in 2002 and included by-passing creek flow to below

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

the affected creek sectors and removal of about 50,000 cy of sediment and select floodplain and bank soils by dry excavation. The sediment was dewatered using solidification, gravity dewatering, or both, and disposed in a new onsite RCRA-compliant containment cell located adjacent to the creek. Sediment removal began near the end of May 2001, and prior to starting construction of the containment cell. Dewatered sediment was stockpiled on-site until it could be disposed of in the containment cell. The removal was estimated to cost between \$2.0 and \$2.5 million (actual cost not yet obtained).

Key Conditions:

dedicated landfill or CDF, floodplains targeted, solidification/stabilization

Estimated Target

50,000 cy of impacted sediment and soil. CS-B includes sediment and creek bed and floodplain soils (~18,500 cy); CS-C, -D, and -E are sediment only (~24,400 cy); and Site M includes sediment and pond bottom soils (~7,000 cy).

Volume:

Estimated Calendar Time to Implement Remedy:

Spring to Fall 2001

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

<i>Site Name:</i>	<i>SCUFFLETOWN CREEK</i>
<i>SiteID:</i>	03-04
<i>US EPA Region:</i>	III
<i>Status (Active, Complete, or Monitoring Only):</i>	Active
<i>Type of Regulatory Action:</i>	Interim. Part of a joint government/private initiative for a site-wide remedy for the Elizabeth River and Chesapeake Bay watershed
<i>Contaminants of Concern:</i>	PAHs (creosote); heavy metals (including lead, zinc, and chromium)
<i>Overall Status Summary:</i>	<p>In January 1999 EA Engineering, Science, and Technology, Inc. was contracted to perform sediment evaluations at four Elizabeth River sites. Two sites were located in the Southern Branch, and one each in the Eastern Branch and Scotts Creek. Selected for the most intense study was an area of the Southern Branch near Scuffletown Creek because of its proximity to known sources of contamination (primarily the Creosote Atlantic Wood Industries Superfund site and Wycoff Pipe and Creosote), its location adjacent to a public park, and other nearby, ongoing restoration efforts.</p> <p>The idea to remove sediment from Scuffletown Creek was initiated by a local community group, the Elizabeth River Project, following reports showing high levels of PAH contaminants in sediment and reportedly high numbers of cancers and lesions on fish collected from the creek. The USACE Norfolk District has agreed to perform the work which will include removal of about 60,000 cy of sediment at a proposed cost of \$6 million.. Sixty-five percent of the funding will be from federal sources and the remaining will be from the cities of Norfolk, Portsmouth, Virginia Beach and Chesapeake and the Commonwealth of Virginia. The project is being labeled as a demonstration project to establish a precedent for future larger environmental dredging projects in the Chesapeake Bay watershed.</p> <p>The USACE Norfolk District completed a Draft Feasibility Study in March 2001 and anticipates issuing a final report in June 2001. Reportedly, the primary issue yet to be resolved is how and where to dispose of the removed sediment. Dredging could start as early as 2003.</p>
<i>Key Conditions:</i>	wetlands
<i>Estimated Target Volume:</i>	60,270 cubic yards of sediment.
<i>Estimated Calendar Time to Implement Remedy:</i>	2002-2003: Preconstruction Engineering and Design to be completed. 2003-2004: Dredging of sediment from Scuffletown Creek and wetland restoration (National Ecosystem Restoration Plan) to be implemented

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: SELBY SLAG

SiteID: 09-05

US EPA Region: IX

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Interim Remedial Measures approved by the California EPA's Department of Toxic Substances Control

Contaminants of Concern: lead

Overall Status Summary: A nearshore marine area of about 17 acres in the Carquinez Strait (California) adjacent to the Selby Slag site was mechanically dredged in late 1991 as an Interim Remedial Measure. A volume variously reported as between 92,500 and 110,000 cubic yards was removed, deposited onsite, spread and dried, and incorporated into a site-wide cap. The contaminants of concern were metals originating from onsite slag waste. The dredging was accomplished to pre-designated depths based on characterization data, with the intent of achieving lead levels of less than 50 ppm.

Key Conditions: dredge spoil reuse/fill, dredging, specialty dredge, tidal fluctuations

Estimated Target Volume: 70,000 cy (Reference A-464)

Estimated Calendar Time to Implement Remedy:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: ***SHEBOYGAN RIVER/HARBOR - PROJECT 1 (Pilot Study)***

SiteID: 05-14

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Complete.

Type of Regulatory Action: Superfund. Interim Pilot Study and Removal Action under Superfund.

Contaminants of Concern: PCBs (1248/1254); metals; PAHs. PCBs throughout the Pilot study area; metals and PAHs primarily lower river and harbor only.

Overall Status Summary: From 1989 to 1991, pilot study work was performed under a USEPA Administrative Order by Consent. Sediment removal was by mechanical dredging of 3,800 in-situ cy during a Pilot Study and a Removal Action. Removed Pilot Study sediment was placed in a Confined Treatment Facility (CTF) for biodegradation study purposes, and Removal Action sediment was placed in a Sediment Management Facility (SMF), both on PRP property, until a final disposal location could be identified. Also, nine discrete sediment areas totaling 1,200 square yards were capped/armored during the Pilot Study. Five of the nine areas were capped/armored only and the remaining four areas were totally or partially capped/armored following removal, due to elevated post-removal PCB concentrations.

A revised FS submitted in April 1998 has been accepted by the Agency. The full-site ROD was released in May 2000 (see Project ID 05-30 for details).

Key Conditions: capping, dredging, extended (> 1 mile) river, Great Lakes AOC, hydrodynamic modeling, pilot/demonstration test, post monitoring, property access issues

Estimated Target Volume: Approximately 2,600 cy (1989-90 Pilot Study). Note: areas actually removed/capped were different than outlined in Final ASRI Work Plan (7/90); approximately 2,500-3,000 cy (1991 Removal Action).

Estimated Calendar Time to Implement Remedy:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: SHEBOYGAN RIVER/HARBOR - PROJECT 2 (River/Harbor)

SiteID: 05-30

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund. Final.

Contaminants of Concern: PCBs (1248/1254); metals; PAHs. PCBs throughout; metals and PAHs primarily in the lower river and harbor, only.

Overall Status Summary: Pilot Study and Removal Action work were implemented in 1989-1991. Removal was by mechanical dredging of 3,800 in-situ cy. Removed Pilot Study sediment was placed in a Confined Treatment Facility (CTF) for biodegradation study purposes, and Removal Action sediment was placed in a Sediment Management Facility (SMF), both on PRP property, until a final disposal location was identified. In 2001, the CTF and SMF sediments were removed and transported to a TSCA landfill in Oklahoma. Also, nine discrete sediment areas totaling 1,200 square yards were capped/armored during the Pilot Study. This Pilot Study and Removal Action work is described in Project ID 05-14.

The revised FS submitted in April 1998 was accepted by the Agency. A Proposed Remedial Action Plan (PRAP) was issued for public comment in May 1999. The public comment period ended July 30, 1999. The PRAP defined the primary health concern as consumption of PCB-contaminated fish containing levels of 1 ppm PCBs or higher. USEPA's cleanup goal is to remove enough contaminated sediment to reach an average river PCB sediment concentration of 1 ppm in soft sediment within 30 years. Further, USEPA concluded that this cleanup goal, along with a cleanup goal of 10 ppm in floodplain soil, would adequately protect fish and wildlife.

A ROD was released in May 2000 which describes five separate remedial components: 1) Upper River sediment; 2) Middle River sediment; 3) Lower River and Harbor sediment; 4) floodplain soil adjacent to the river; and 5) groundwater near the Tecumseh plant site. The selected remedy includes:

- Upper River sediment: Recharacterize, remove, and dispose offsite 20,774 cy of sediment to achieve a soft sediment surface-weighted average concentration (SWAC) of 0.5 ppm, such that the entire river will achieve an average PCB concentration of 0.5 ppm or less (vs. the 1 ppm noted in the PRAP) over time. Long-term monitoring (30 years) consisting of annual fish sampling and sediment sampling every five years. (Total Present Value: \$23.8 million)
- Middle River sediment: Recharacterize and remove sediment if necessary to achieve a soft sediment SWAC of 0.5 ppm in the Middle River and fish and

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

sediment sampling to document natural processes and ensure that over time the entire river will reach an average PCB sediment concentration of 0.5 ppm or less. Long-term monitoring (30 years) consisting of annual fish sampling and sediment sampling every five years. (Total Present Value: \$2.0 million)

- Lower River and Inner Harbor sediment: Lower River and Inner Harbor sediment will be recharacterized and sediment with PCB concentrations greater than 26 ppm within the top foot will be removed where water depths are greater than five feet and within the top two feet will be removed where water depths are less than five feet. These sediments are considered likely to impair this portion of the River and Harbor from achieving a PCB soft sediment SWAC of 0.5 ppm, or less, over time. Pending further characterization, USEPA estimates that approximately 53,000 cy of sediment will require removal from the Inner Harbor to achieve an average PCB concentration of 0.5 ppm, or less, in these sections of the River and Harbor. Areas where sediment is removed will be backfilled with clean sediment.

A 30 year long-term monitoring program will be implemented and will consist of the annual collection of fish samples until fish consumption advisories are lifted. Sediment samples will be taken at least once every five years to document natural processes and ensure that over time the Lower River and Inner Harbor reach an average PCB sediment concentration of 0.5 ppm, or less. Fish and waterfowl consumption advisories will remain in place until monitoring indicates that they can be dropped. The outer harbor breakwalls will be maintained to keep contaminated sediments at depth. (Total Present Value: \$10.0 million)

- Floodplain soil: Remove soil containing PCBs > 10 ppm and dispose offsite. However, in some areas, contaminated soil with more than 10 ppm PCBs may be left in place to prevent negative impacts to high-quality habitat. Areas of excavation will be revegetated. Long-term (30 years) monitoring also will be performed (not specified). (Total Present Value: \$4.5 million)
- Tecumseh plant site groundwater: Investigation/Source Identification and Control/Natural Attenuation. (Total Present Value: \$594,000) If natural attenuation is determined to be inappropriate to cleanup groundwater, a collection trench will be installed and the collected groundwater will be treated in the existing water treatment system on-site for an additional cost.

In May 2003, a Consent Decree was signed by USEPA, U.S. Department of Justice, and Tecumseh Products Company. The Consent Decree requires Tecumseh to implement the remedial actions specified in the 2000 ROD for the Upper River. Separate agreements will be issued for the Middle River and Lower River Harbor. Actions to be taken include (1) ground water and additional source control at the Tecumseh site; (2) soft sediment removal; (3) floodplain soil removal and (4) fish monitoring. As of May 2003, a proposed schedule included:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

- submitting a work plan to USEPA - Fall 2003
- selecting contractors - Fall 2003
- starting pre-design work - Winter 2003-04
- submittal of final design document to USEPA - Winter 2003-04
- beginning cleanup - Summer 2004

As of August 2004, work is targeted to commence in September 2004 on cleanup of contaminated soil, floodplain soil, and groundwater at the former Tecumseh facility in an effort to control sources of PCBs to the river prior to beginning in-water work. Work on upper river sediments is scheduled to start in 2005. Subsequent phases to clean up the middle river, lower river, and inner harbor will be implemented separately in an upstream-to-downstream fashion.

Key Conditions:

commercial landfill, dredging, extended (>1 mile) river, floodplains targeted, Great Lakes AOC, more-harm-than-good, natural recovery, navigational dredging component, post monitoring, property access issues

Estimated Target Volume:

Based on May 2000 ROD: Upper River: 20,774 cy; Middle River: Monitoring (volume based on sediment recharacterization); Lower River and Inner Harbor: 53,000 cy (volume could change based on sediment recharacterization); Floodplain Soil: not defined.

Estimated Calendar Time to Implement Remedy:

2002-2010

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: **SHIAWASSEE RIVER**

SiteID: 05-15

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund. Final. Originally State-Lead; EPA-Lead as of 1999.

Contaminants of Concern: PCBs (1242/1248/1254)

Overall Status Summary:

The site comprises the former Cast Forge Company (CFC) aluminum die-cast facility and 8 miles of the South Branch Shiawassee River. A Consent Judgment in 1981 led to a removal action in the river with a cleanup goal of 10 ppm PCBs. The removal action was stopped at the end of 1982 due to exhaustion of funds and the presence of PCB contamination extending further downstream than anticipated. The removal action was accomplished by use of a dragline and by vacuuming by divers and resulted in removal of 1,805 cy of sediments over a 1.5 mile stretch. The removed sediments which exceeded 50 ppm PCBs (260 cy) were disposed at the CECOS landfill in Williamston, OH. The remainder of the removed sediments were disposed at the Granger Landfill near Lansing, MI. A University of Michigan follow-up study (Reference C-324) showed an increase in the bioavailability of PCBs following the removal action.

The site became an NPL site in 1983. The MDEQ acted as the lead agency in managing the RI/FS. The RI was completed in 1992 and the FS in 1997. A Proposed Plan for both the plant facility and the river was issued by the MDEQ for public comment in August 1998. The proposed remedy was to remove soils and sediments from wetlands, floodplains, and 8 miles of river which exceed 10 ppm PCBs and dispose of removed materials at offsite commercial facilities. The basis for selecting a 10 ppm PCBs cleanup level was not clearly explained in the Proposed Plan. However, it was proposed that at each location requiring removal, the ecological impacts of the removal would be evaluated and removal would be implemented only at locations where ecological harm is judged to be not excessive.

In response to a February 1999 inquiry regarding the status of the Proposed Plan, the MDEQ advised that a number of issues had developed which would require substantial time to resolve. As a result, the MDEQ advised, a response to public comments and a ROD would be indefinitely delayed. Subsequently, a July 1999 Information Bulletin (Reference B-4) clarified the status of the proposed remedy as follows:

"The MDEQ, acting as the lead agency, had proposed a remedy to the public in September 1998, and had hoped to make a decision on the best approach to clean up the river and issue a Record of Decision for the site early in 1999. The MDEQ

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

felt the existing data about the site was adequate to demonstrate that a cleanup was needed, and that the existing RI/FS provided a foundation for the cleanup concept proposed in September. The MDEQ proposal was to address, in some manner, site soils and sediments at locations where they were concentrated at high levels. The EPA agreed with that at the time, and supported the cleanup proposal that the MDEQ presented to the public. The MDEQ was aware, and acknowledged at the public meeting, that additional and more current site information would be needed prior to actual implementation of a clean up action, but had planned to obtain the additional data during the predesign phase - after an appropriate remedy had been selected. However, due primarily to comments submitted by various parties during the public comment period on the proposed plan, the EPA now feels further study is necessary to update and confirm the extent of contamination before a cleanup plan can be selected. The comments generally questioned the site data and the risks posed by the site, and the need for, and cost of, the proposed remedy. While the MDEQ was prepared to respond to the comments, the EPA felt that new studies were needed. Therefore, a final decision on a remedy has been postponed until further investigation is done and the cleanup options are reevaluated."

"For the MDEQ to undertake the additional work, it would be necessary to amend our Cooperative Agreement with the EPA, wait for the funding to be approved, and then initiate the state procurement process to obtain a contractor. Due to the time frame for these things to occur, it is unlikely that the additional studies could have been done this year. Because the EPA is able to directly assign a contractor and start work immediately, the lead management role for the site has been returned to the EPA."

The US EPA performed additional sediment and floodplain sampling in November 1999 through April 2000. These data were reported in May 2000 (Data Evaluation Report). A Supplemental FS was completed in February 2001. A Proposed Plan was issued in July 2001. The ROD was issued in September 2001.

The selected remedy is excavation of an estimated 1,755 cy of floodplain soil to meet a 10 ppm PCB cleanup criterion and an estimated 1,590 cy of river sediment in the first mile below the CFC site to meet a 5 ppm PCB criterion. Excavated material would be disposed at offsite commercial landfills. The estimated cost is \$517,000. The EPA calculates that removal of this volume of river sediment from the one mile stretch of river would reduce the overall Surface Weighted Average Concentration (SWAC) for the first five miles of the river (downstream from the CFC site) from 3 ppm PCBs to 1.06 ppm PCBs. As stated in the ROD, "U.S. EPA is relying on monitored natural recovery to reduce the SWAC to within the (calculated, protective) range of 0.003 to 0.2 ppm after active remediation of the sediments to 5 ppm for the first river mile." Reduction to the protective range is calculated to take 18 and 7 years, respectively, following remediation, and is based on reaching the long term total PCB Preliminary Remedial Goal (PRG) range of

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

0.002 to 0.3 ppm for mink..

The Remedial Design/Remedial Action Work plan was approved by the USEPA on August 20, 2002. Sediments will be removed by dry excavation using PortaDam™ structures to divert water flow. Remedial construction is scheduled to start in Fall 2002.

Key Conditions:

commercial landfill, extended (> 1 mile) river, floodplains targeted, more-harm-than-good, natural recovery, property access issues, wetlands

Estimated Target Volume:

1,755 cy floodplain soils; 1,590 cy sediments (2001 ROD)

Estimated Calendar Time to Implement Remedy:

Undefined

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: **SILVER BOW CREEK**

SiteID: 08-01

US EPA Region: VIII

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund. Final.

Contaminants of Concern: Metals (arsenic, cadmium, copper, lead, mercury, zinc)

Overall Status Summary: The Silver Bow Creek Site in Montana was listed on the NPL in 1983 and is one of four Superfund sites known as the Clark Fork River Basin sites; the Basin is one of the largest geographic areas in the nation being addressed under Superfund. Contaminants of concern are arsenic, cadmium, copper, lead, mercury, and zinc. The 1995 ROD specified a large mass removal project requiring soil excavation and dry excavation for removal of 1,550,000 cy of metals-contaminated tailing/soils from the 100-year floodplain and removal of about 1,450,000 cy of in-stream sediment. Disposal would be in local repositories constructed outside the 100-year floodplain.

The 1995 ROD remedy "broke-down" once additional data collection and remedial design efforts were implemented by the PRP (ARCO). ARCO stopped work in April 1997 over conflicts regarding cleanup issues. The agency picked-up the work and used the new data and issues to justify and expand an already huge mass removal effort. This resulted in the agency issuing an ESD in 1998 to explain a 50% increase in targeted floodplain volumes, a doubling of the construction period (from 4 - 6 years to 12 years), a more than doubling of the estimated cost, a redefinition of the sediment target, and substantial changes to the approach for rehabilitating remediated stream and floodplain areas and for constructing secure waste disposal repositories (cells).

The 1998 ESD defined remedy anticipates removal of 2,325,000 cy of metals-contaminated tailings/soils in the 100-year floodplain along 24 miles of Silver Bow Creek and disposal in new, local repositories (cells); in-situ lime-stabilization of an additional 1,425,000 cy of these materials; and removal or burial of an indeterminate volume of contaminated instream sediments along with re-routing or re-building stream channels and re-building impacted stream banks.

An Agreement-In-Principal was reached with ARCO in June 1998 and a Consent Decree was finalized with ARCO in April 1999. As part of these agreements, ARCO will not get re-involved in design and remediation efforts (i.e., a "buy-out" has been negotiated) – the State has assumed responsibility for these activities.

Litigation has continued for several years regarding natural resource damages

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

(NRD) associated with the four Superfund sites in the Clark Fork River Basin. ARCO is PRP at all four. In 1993, the State of Montana, as the trustee, brought suit against ARCO, claiming NRD costs of \$800 million. The suit was divided into five phases and went to trial in March 1997 for three of the phases: (1) liability for injuries to fish and surface water; (2) groundwater; and (3) wildlife, vegetation, and soil. The remaining two phases, monetary compensation for restoration costs and for lost use of resources, were not tried because they were covered by the trial settlement. The trial settlement, \$215 million, was reached with ARCO following about a year of litigation and resolved most outstanding NRD issues. The settlement required ARCO: (1) to pay \$118 million for the NRD portion of the settlement for the restoration of lost or damaged resources in the Clark Fork Basin; (2) to pay \$80 million for the clean up portion of the settlement in the Silver Bow area south of Butte; (3) to pay \$15 million to reimburse the State for its damage assessment and litigation costs through January 1, 1998; and (4) to transfer property owned by ARCO and valued at \$2 million in the Consent Decree to the State of Montana.

After the agencies finalized the design and permitting requirements for remediation of Subarea 1, field work for the first one and one-quarter mile segment (Reach A) was targeted to begin in 1999. Concurrently, remedial design for the remaining 4.2 miles of Subarea 1 was ongoing. Subarea 1 Reach A was to be completed first, followed by Reach B (targeted for Summer-Fall 2000), and then Reaches C, D, and E (targeted for 2001)

Preparation activities for implementation of the Subarea 1 Reach A remedy began in Fall 1999 with construction of roadways and access points. The Reach A remedy required that the first 800 ft. of streambed be diverted by building a sump area and pumping the water to a rock-lined ditch located outside the floodplain area; diversion of the remaining streambed would be directly to the diversion ditch. Streambed and floodplain excavation depths were to range between two and seven feet, with over-excavation of six inches to meet the targeted order-of-magnitude reductions in contamination levels.

Prior to excavation, floodplain soil would be dewatered in-situ using a series of trenches dug in the floodplain material and the collected water would be pumped from the trenches to the diversion ditch. Materials excavated from Reach A would be deposited in an area known as the Mine Waste Relocation Repository located adjacent to the Reach A floodplain. Following excavation, the streambed channel and floodplain would be restored and revegetated. The diversion of stream flow was anticipated to continue one or more years following restoration to allow full establishment of vegetative cover.

The following summarizes remediation performed in 1999, 2000, and 2001, and part of 2002:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Years 1999 and 2000:

- The creek flow in Reach A was diverted to a temporary channel outside the floodplain; the diversion will be maintained at least through 2001 (and possibly longer) to allow reestablishment of vegetation in the areas remediated. In Reach A, the creek is 13-15 feet wide with a nominal 30 cfs flow rate.
- Removal in Reach A plus two areas extending into Reach B (Mile 2) started and was completed in Year 2000 and resulted in removal of about 167,000 cy of creek bed sediment and floodplain soils from approximately 36.6 acres. Cost was \$3.254 million.
- Removed material was deposited in an adjacent, prepared repository known as the Mine Waste Relocation Repository where it was mixed with powdered lime for stabilization.
- No breakdown is available of volumes of sediment vs. floodplain soils removed, but a large majority of the removal is being performed in the floodplain.
- Verification sampling of surface soils (0-4 inch grabs) was performed on a 150-foot grid to verify meeting an Order-of-Magnitude reduction acceptance criteria. The criteria for acceptance specifies that 90% of the area remediated must result in an order-of-magnitude reduction for four to six of the six targeted elements (arsenic, cadmium, copper, lead, mercury, and zinc) at a 95% or greater confidence interval. Reportedly, of the 92 verification samples collected within Reach A, 60 of the samples, or 65.2%, met the acceptance criteria. This was greater than the expected rate of acceptance of 62.9%. For Year 2001, the overcut was increased from six inches to nine inches to reduce the likelihood of not meeting the criteria. (Per the ESD, this will result in the removal of an additional 60,000 cy of material.)
- The contractor was local – Jordan Contracting. (Construction work is re-bid each year.)
- In addition to sediment removal, the contractor built a new bridge due to undermining of existing bridge supports during the remediation. The bridge was completed in late December 2000.
- At peak periods, approximately 60 individuals were working in the field on the project.
- Revegetation of Reach A was completed in Spring 2001.
- A completion report is to be written for each creek segment as it is completed (anticipated to be annually). The completion report for Reach A is complete and

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

available (Reference A-608).

Year 2001:

- Montana DEQ returned to Silver Bow Creek in April 2001 to remediate the remaining areas of Reach B (Mile 2) and all of Reach C (Mile 3).
- Montana DEQ required that creek diversion only need occur during active remediation and not for the entire period necessary for complete vegetation recovery as was required for Reach A. This method of stream diversion is to be evaluated following Year 2001 remediation to determine its applicability to other reaches.
- Removed creek sediment and floodplain soils were disposed of in Opportunity Ponds (which cover 5 sq. miles) located near Opportunity, Montana at the farthest downstream location of the 24-mile target area. The removed material was shipped by rail to the ponds and did not require stabilization for either shipping or disposal purposes. Reportedly, a rail spur extends from the main rail line directly to one of the ponds. For Reaches B and C, three loading areas spaced intermittently along the length of the removal area were built and one unloading area near the ponds existed and was available for use by the contractor. The contractor determined the method of loading and unloading of the rail cars (long-reach excavators).
- By the end of the 2001 construction season, Reaches B and C were about 75% complete. About 300,000 cy of creek and floodplain soil were removed and deposited in Opportunity Ponds.

Year 2002 (as of June 11, 2002):

- Diversion of stream flow to the rock-lined ditch was abandoned and instead flow is being temporarily diverted by rechannelizing the streambed around areas of contamination. Following removal of contaminated material, stream flow is redirected back to the original channel.
- Reaches B and C are estimated to be about 85% complete (~350,000 cy of material having been removed)
- The contractor is able to load about 48 gondola railcars per day for transport of excavated material to Opportunity Ponds for disposal. The Silver Bow Creek project is the sole customer for the existing commercial rail line that runs along the creek.
- A field crew of approximately 25-30 individuals is working on the project at any given time. The contractor is working 10-hour days, 5-6 days per week.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

- Heavy spring rains in 2002 have hampered progress to-date.

After 3.5 years of removal activities, approximately 517,000 cy of streambed sediments and floodplain soils along Miles 1, 2, and 3 had been removed and disposed locally.

As of the end of 2003, project status was as follows:

- Volume removed and disposed in 2002 and 2003 was approximately 320,000 cy.
- From the start of remediation in Fall 1999 to the end of 2003, 5.25 miles of stream and floodplain have been remediated, plus an additional 70 acres of floodplain in Subarea 4 in the western extent of the operable unit.
- Removed material has been disposed in the former tailings impoundments of the Anaconda Copper Mining Co. at Opportunity, MT.
- Work in Subarea 1 is complete. Work in Subareas 2 and 4 will take place in 2004. Work in Subarea 3 will start after Subarea 2 is completed.

Key Conditions:

capping, confined disposal facility, extended (> 1 mile) river, floodplains targeted, habitat/streambank restoration, pilot/demonstration test, post monitoring, property access issues, rail transport for disposal

Estimated Target Volume:

Removal volume of sediments undefined; 3,750,000 cy of tailings/soils targeted in floodplains; 2,325,000 cy to be removed, lime-stabilized, and placed in local repositories; 1,425,000 cy to be lime-stabilized in-situ.

Estimated Calendar Time to Implement Remedy:

1999 - 2010

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: *St. LOUIS RIVER/INTERLAKE/DULUTH TAR*

SiteID: 05-31

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund. Final. Pursuant to an agreement of June 20, 1995 between US EPA and the Minnesota Pollution Control Agency (MPCA), the MPCA assumed full responsibility for investigation and cleanup of this and 12 other State-enforcement lead sites.

Contaminants of Concern: PAHs; mercury; heavy metals (non-mercury)

Overall Status Summary: This Superfund site is within the West Duluth neighborhood of the city of Duluth, on the north bank of the St. Louis River, approximately four river miles upstream of Lake Superior. Targeted sediment areas (the Sediment Operable Unit) are Stryker Embayment, a 35-acre shallow water embayment with emergent wetlands at the north end of the embayment; Boat Slip 6, a 23-acre deep water environment, actively used for loading and unloading ships; and Keene Creek Bay/Boat Slip 7, 27 acres of emergent wetlands and shallow water environment grading into deep water environment.

A pig iron plant and tar and chemical companies were located on the land portions of the site and have been shut down for decades. The contamination on the land portion of the site was found as tar seeping at the ground surface, tar deposits within the fill material, tar impacted soil and fill, and solid wastes such as coal and coke particles, ash, and slag. Similar contaminants were also found in the river sediments and in floating slicks on the surface water. An estimated 286,000 cubic yards of sediment is contaminated at levels exceeding the Remediation Requirements of 6 ppm total carcinogenic PAHs and 40 ppm total PAHs. The 286,000 cy estimate breaks down into 135,000 cy in Stryker Embayment, 48,000 cy in Boat Slip 6, and 103,000 cy in Keene Creek Bay/Boat Slip 7.

A cooperative agreement between the Minnesota Pollution Control Agency (MPCA) and the U.S. Environmental Protection Agency (EPA) was approved in January 1986. Under this agreement, federal Superfund money was given to the MPCA to hire a state contractor to implement a preliminary remedial investigation of the Site. Phase I activities were initiated in August 1987. Phase II activities were initiated in June 1989. The remedial investigation report was completed in January 1990. The EPA and MPCA issued a ROD for one of the two land-based operable units in 1990. The remedy was implemented from 1992-1994 and included excavation of the tar seep wastes and transportation of the wastes to be burned off-site for energy recovery. In 1995, the ROD for the second land-based operable unit was issued. The remedy was implemented in 1996 and 1997 and included

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

excavation of contaminated soil, treatment by thermal desorption, and landfilling.

In November 1998, the MPCA presented, for public comment, a proposed plan for the Sediment Operable Unit. The selected remedy was presented by the MPCA in a ROD issued October 26, 1999. The MPCA Citizen's Board accepted the ROD on December 14, 1999. The selected remedy for sediments was as follows:

- Phase I. Dredge layers 101, 102, and 103 from Stryker Embayment and contain them in a CAD/CDF in Boat Slip 6. The Owner/Operator of Boat Slip 6 would be relocated. An estimated 135,000 cy of contaminated sediments would be removed from Stryker Embayment. Removal depth would average 2.4 feet. Phase I is estimated to take as many as three years to complete.
- Phase II. Evaluate the remaining capacity of the Boat Slip 6 CAD/CDF, after completion of Phase I, to determine if it can accommodate all the contaminated sediments from Keene Creek Bay/Boat Slip 7, estimated at 103,000 cy. If so, contaminated sediments will be dredged and placed in Boat Slip 6. If it is determined that Boat Slip 6 cannot accommodate contaminated sediments from the Boat Slip 7 shallows and transition zone, the sediments will be reconfigured and placed under an engineered cap and wetland or will be consolidated and placed within a CAD/CDF constructed within Keene Creek Bay/Boat Slip 7.

During preparation and presentation of the selected sediment remedy, an extensive debate and dialogue ensued between the PRPs and the MPCA regarding the efficacy of removal vs. capping. The PRPs favored a capping remedy. Specifically, the PRPs favored Alternative 3 in the FS comprising selective dredging with capping (6-12 inches) of undredged areas. After Alternative 3 was rejected by the MPCA, the PRPs presented a new Thick Cap Alternative in June 1999 - - an alternative consisting of placement of a 2 to 3 foot cap over the contaminated areas creating wetlands in the entire Stryker Embayment as well as other shallow areas adjacent to the boat slips. Ultimately, the proposed capping remedies were rejected by the MPCA in favor of the above recommended removal remedy.

In a mid-December 1999 development, the MPCA agreed to delay the effective date of the ROD for the Sediment Operable Unit until March 1, 2000. The delay was for the purpose of providing the MPCA and the PRPs time to negotiate a contract that will lead to resolution of outstanding differences regarding remedy and cost-allocation.

On February 22, 2000, the MPCA Citizen's Board voted to sign an agreement between the MPCA and the Interlake Corporation (now XIX Corporation), Honeywell International Inc., and Domtar Inc (the three participating PRPs) providing for the setting aside of the 1999 ROD and the re-opening of the Remedial

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Investigation/Feasibility Study, and selection of a remedy. Approval of this agreement rendered ineffective the MPCA Board's December 14, 1999 decision adopting the October 15, 1999 Record of Decision to dredge and contain contaminated sediments in Hallett Boat Slip and the Board's December 14, 1999 decision adopting the Findings of Fact supporting adoption of the Record of Decision.

Some of the key features of the terms and conditions of the Agreement are:

- Payment by the PRPs of all past unreimbursed MPCA costs.
- Installation, by the PRPs, of signs within the site informing the public that the sediments are contaminated.
- Establishment of a fund, in the amount of \$200,000, which will be used to finance environmental improvement projects in the vicinity of the site.
- A commitment by all parties to the Agreement as to the manner in which the re-opened Remedial Investigation and Feasibility Study process will proceed toward remedy selection.
- Establishment of a peer review group of experts who will aid in the identification of data gaps and will review the re-opened Feasibility Study and will comment on the advantages and disadvantages of each of the alternative remedies.
- A commitment by the PRPs to implement the remedy selected by the MPCA.
- An agreement by the PRPs to pay stipulated penalties if they fail to comply with the terms and conditions of the Agreement.

In mid-2001, the MPCA provided the three participating PRPs with proposed Performance Requirements, to be used as performance specifications for each of the remedial alternatives being considered in the FS, and also provided to the PRPs a list of Sediment Preliminary Remediation Goals (PRGs) for total PAHs, mercury, and metals. (The alternative to accepting the use of the PRGs as final cleanup goals would be for the PRPs to accept site-specific risk-based sediment remediation goals developed by the MPCA from newly-collected site-specific data.)

The Environmental Trust Fund Beneficiaries Committee has selected projects within the St. Louis River Watershed to be funded by the \$200,000 that was set aside by the PRPs, pursuant to the February 2000 Agreement. Work on the projects commenced during the 2001 summer and was to continue into 2002. A nine-member committee was appointed to solicit and choose proposals that are tangible and visible to the community and enhance or protect the environment. Committee

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

members represent the MPCA, responsible companies, City of Duluth, St. Louis County, St. Louis River Citizens Action Committee, and West Duluth neighborhoods or organizations.

Additional data were collected to fill 14-identified data gaps, and a draft Data Gap Report was submitted in November 2002. As described in Reference A-1016:

“Meetings were held during the data gathering period in 2001 and 2002 with the Peer Review Team, and additional meetings were held in February 2003, following completion of the Data Gap Report, with all Parties and 50 other stakeholders. A brain storming session at the February 2003 meeting produced a number of hybrid alternatives. Using these suggestions and comments, the Parties and the Minnesota DNR identified a hybrid alternative that they believed would meet the Superfund criteria, respond to the concerns expressed by the participants in the stakeholder meetings, and address other site conditions. The Parties then reconvened the stakeholders and sought their reaction to the hybrid option. As a result, by mutual agreement of the Parties, the Dredge/Cap Hybrid Alternative replaced the Dredging and On-Site Disposal Alternative option in this FS.”

Also, in 2002, Federal, state, and tribal natural resource trustees submitted for public comment an Assessment Plan for the Natural Resource Damage Assessment at the Site.

A total of fifteen reports were expected to be submitted by the PRPs, preceding the draft Feasibility Study. All submittals are reviewed by both the MPCA and an independent Peer Review Team. The draft Feasibility Study was submitted on November 24, 2003, to be followed by a Proposed Plan from the MPCA for public review and a ROD.

The draft Feasibility Study evaluated, compared, and costed four remedial alternatives: (1) No Action; (2) In-Situ Capping Only (\$19.3 million); (3) Dredge/Cap Hybrid, with disposal in a CAD cell in Slip 7 (\$31.9 million); and (4) Dredge/Off-Site Disposal (\$93.9 million). For Alternative (4), removal of 495,000 cy by dredging was estimated.

The Proposed Plan was issued in April 2004 for public review. The primary elements of the preferred cleanup alternative as described in the plan are:

1. Dredging up to 224,000 cy from:

- “Approximately 25 acres of sediment throughout the site (22 acres in Stryker Bay, 0.3 acres in Slip 6, and 3 acres in the Minnesota Channel). This includes areas located along the western shoreline, a portion of the wetlands located in the north end, and contaminated sediments which extend out into the St. Louis River beyond

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the mouth of the bay. Dredging will not be conducted in an area on the northeastern side of Stryker Bay where the highest naphthalene concentrations are located or where the bay is underlain by compressible peat that is conducive to surcharging;”

- “Contaminated sediments located within the federal navigation channel near the 48 inch outfall area;”
- “All contaminated sediments that lie in Wisconsin waters;” and
- “Two contaminated areas of wetland along the western shoreline of Keene Creek Bay/Slip 7.”

Backfill placement will follow dredging to “isolate any dredge residual and restore bathymetry and substrate to DNR permit requirements.”

2. “Capping approximately 7 acres of contaminated sediments in Stryker Bay, including sediments with the highest naphthalene concentrations in Stryker Bay. A portion of Stryker Bay will be capped using a surcharge technique to consolidate the underlying sediment and isolate contaminants without reducing the bay’s water depth and natural resource functions.” All other areas of 28-acre Keene Creek/Slip 7 will be capped, including an on-shore wetlands area of Keene Creek Bay/Slip 7 that exceeds MPCA criteria for TPAH of 13.7 ppm.

3. “Construction of a Confined Aquatic Disposal Facility (CAD) in Slip 6 to contain the dredged sediment.”

The estimated cost for performing this work is between \$43.8 and \$48.2 million.

Key Conditions:

capping, dedicated landfill or CDF, dredging, floating oil, Great Lakes AOC, property access issues, wetlands

Estimated Target Volume:

Phase I, 135,000 cy from Stryker Embayment; Phase II, 103,000 cy from Keene Creek Bay/Boat Slip 7.

Estimated Calendar Time to Implement Remedy:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: STARKWEATHER CREEK

SiteID: 05-33

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Demonstration Project. State Lead. Final

Contaminants of Concern: Mercury (primary); also lead, zinc, cadmium, and oil and grease

Overall Status Summary: As a result of years of urbanized growth within its watershed, Starkweather Creek became contaminated with mercury, lead, zinc, cadmium, and oil and grease. The creek was identified as the largest source of mercury to Lake Monona, contributing to establishment of a fish advisory for mercury in large sport fish in the lake. Pre-remediation data collected from the creek showed mercury levels averaging 1.1 ppm (3.5 ppm max.) in sediment and 1.7 ppt total mercury (0.042 ppt methyl mercury) in the water column. From the sampling, it was estimated that 40 pounds of mercury were distributed throughout the creek sediments. Six fish tissue samples were also collected and analyzed for mercury with analysis results showing mercury levels ranging from 0.16 to 0.48 ppm for three freshwater drum samples and 0.09 to 0.11 ppm for three carp samples. In addition to mercury, sediment data revealed lead levels averaging 130 ppm (2.4 tons total in sediment).

In the winter of 1992-93, remediation of the creek bed was performed through a cooperative effort between the WDNR and the City of Madison. The project was developed as a demonstration for two purposes: 1) to remove a mercury "hot spot" and 2) restore habitat in an urban watershed area. Approximately 15,000 cy of contaminated sediments, with mercury as the primary COC, were removed from the creek bed by wet excavation (conventional backhoe) and deposited directly into dump trucks. Small sections of the creek (approximately 100 yards) were under remediation at any one time. The sectional work included other sediment removal and creek bed and bank stabilization before moving to the next downstream section. Reportedly, this method helped to minimize resuspension of sediment during removal and confine elevated downstream turbidity levels to smaller areas.

A double silt curtain was placed across the width of the creek downstream of the work area to minimize the downstream movement of construction debris and suspended sediments resulting from removal activities. Sediment removal began on the upstream end of the west branch of Starkweather Creek on November 19, 1992 and proceeded downstream to the confluence with the east branch. The east branch was then remediated, again starting at the most upstream point, and was completed on January 27, 1993. No further excavation work was performed.

The removed sediment was transported by truck directly to a sediment retention

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

and dewatering facility located approximately 6 miles from the creek. The facility covered 2.8 acres and was built on county-owned land adjacent to a local municipal waste landfill. The facility used 7 foot berms built of local clay soils to contain the sediments. A concrete drop-inlet spillway was installed to allow excess water to be removed and sent to a sanitary sewer as required. Leachate tests indicated that metals and PAHs in the sediments were sufficiently low that the sediments could be handled as nonhazardous materials. The sediments and soils from the dewatering facility were eventually used as construction fill at the landfill.

Following remediation, bank shaping and stabilization was completed in February 1993. Final replanting of remediated creek banks and greenway areas was performed in Spring 1993. Due to high water levels throughout much of 1993, much of the lower lying vegetation did not survive. Subsequently, these areas were temporarily stabilized using straw mats and silt curtains until replanting could occur in Spring 1994.

Key Conditions: dredge spoil reuse/fill, habitat/streambank restoration

Estimated Target Volume: 15,000 cy

Estimated Calendar Time to Implement Remedy: Unknown

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: SULLIVAN'S LEDGE

SiteID: 01-05

US EPA Region: I

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Superfund. Final.

Contaminants of Concern: PCBs (1254); PAHs

Overall Status Summary: Remedy selection was based on ecological-based cleanup levels. Project implementation was delayed for consent decree negotiations and design. Remedial design was approved by USEPA in June 1997 and construction work was bid in July 1997. The site was divided into two OUs: OU-1, a 12-acre Disposal Area including the Unnamed Stream floodplain area, soil and sediment from the Unnamed Stream, and two golf course water hazards; and OU-2, a seven-acre Middle Marsh and an adjacent wetland area, Area 4. The remedy included the removal of an estimated 35,200 cy of streambed and wetland sediments and floodplain soil by excavation for consolidation within the onsite disposal area for covering with an impermeable cap.

Remedy implementation began in March 1998 and was performed in three phases. Work started on Phase I and involved the areas of OU-1 located south of Hathaway Road. Sediment and floodplain soil were removed from in and around the Unnamed Stream and a small tributary to the Unnamed Stream, resulting in the removal of 2,100 cy of material. Phase II began in early 1999 on areas included in both OU-1 and OU-2 located north of Hathaway Road. During Phase II, an estimated 7,600 cy of sediment was excavated from the OU-1 areas (the Unnamed Stream, a second tributary, and the two golf course water hazards) and another 25,500 cy of sediment was removed from OU-2 areas (Middle Marsh and Area 4). Soil and sediments excavated during Phase I and Phase II were placed in the onsite disposal area and were then capped as part of Phase III activities. Phase III also involved restoration of the remediated wetland areas. The project was completed in February 2001.

Key Conditions: dedicated landfill or CDF, hydrodynamic modeling, more-harm-than-good, wetlands

Estimated Target Volume: OU-2: 5,200 cy

Estimated Calendar Time to Implement Remedy: OU-1 work began in Fall 1998; OU-2 work targeted to begin in Spring 1999.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: *TEN-MILE/LANGE/REVERE CANAL (St. Clair Shores)*

SiteID: 05-44

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Time-critical Removal Action

Contaminants of Concern: PCBs; also heavy metals, VOCs, SVOCs

Overall Status

Summary:

In October 2001, routine sediment sampling was performed in two canals that are connected to each other at their western ends by a small length of canal (creating essentially a single U-shaped canal), each leg approximately 40 feet wide by 2,200 feet long and bordered by Ten-Mile Road/Lange Avenue/Revere Avenue (Ten-Mile/Lange/Revere Canal). The collection of sediment samples was required by the U.S. Army Corps of Engineers as part of the permitting process in preparation for maintenance dredging of the canal. The results of the sediment sampling indicated the presence of elevated levels of PCBs. The source of the PCB contamination was believed to be the Ten-Mile Drain (TMD) system that comprises storm water sewers and catch basins and discharges to the head of the Ten Mile/Lange/Revere Canal. The TMD system drains approximately 260 acres within St. Clair Shores.

As a result of finding elevated PCB levels in the canal sediments, an emergency investigation was initiated in Spring 2002 to determine the extent of PCB contamination within the TMD system and the canal sediments, and was followed by implementation of a time-critical removal action (TCRA) from July 2002 to March 2003. The TCRA involved (a) the cleaning of TMD system piping (b) removal of PCB-contaminated sediment from the TMD, and (c) removal of PCB-contaminated sediment from the Ten-Mile/Lange/Revere Canals. The investigation and TCRA was funded and headed by USEPA with support from Michigan DEQ, Macomb County, and the City of St. Clair Shores.

For the TCRA, sediment removal areas were delineated to 10 ppm PCBs and the removal target was all sediment containing greater than 1 ppm PCBs. Sediment removal was to a visually clean, or native, clay substrate, followed by the collection of confirmation samples. A combined total of about 24,000 tons of soil and sediment was removed from the TMD system and target areas within the canal, which was transported by truck for offsite disposal at a commercial landfill. Total cost of the TCRA was \$7 million (\$292 per ton).

The TCRA was followed by implementation of a remedial action from October 18 to mid-December 2003 to remove the remaining sediment originally targeted for maintenance dredging. Dredging was halted in early December 2003 due to weather. As of that time, the total volume of sediment removed was about 16,500

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

cy with about another 1,000 cy remaining to be removed from around existing in-water structures (e.g., boat slips). The removed sediment was barged to the USACE Pointe Mouillee, MI facility for disposal; transport and disposal costs for this sediment were estimated at \$7.50 per cy. The remaining dredging was to be performed in Spring 2004, followed by the completion of restoration activities that are part of the TCRA. The estimated total cost for the remedial action is \$1 million (about \$57 per cubic yard).

Substantial community interest has been generated as a result of the discovery of the PCB contamination. A community action group collected sediment samples from the canal areas where sediment was removed during the TCRA and found elevated PCB levels in small, localized areas. USEPA believes these are in areas where sand bags were left behind on the canal floor.

The local community collected sediment samples from within a TMD system sediment trap. PCB levels were shown to be as high as 2,000 ppm in the samples. Additionally, PCB levels in the water being discharged to the canals through the TMD were shown to be 3.4 ppb in the most recent sampling event. The USEPA acceptable level is 3.0 ppb and the MDEQ acceptable level is 0.0026 ppb. The community would like the TMD system piping replaced or lined to attempt to meet the MDEQ acceptable PCB-in-water discharge level. The County, which has authority over the TMD system, has selected to clean the interior of the TMD system a second time and then to periodically remove sediment from the TMD sediment trap as their preferred method of controlling the long-term release into the canal of PCBs that remain in the TMD system.

Key Conditions:

commercial landfill, dredging, navigational dredging component, post monitoring, property access issues, solidification/stabilization

Estimated Target Volume:

Estimated Calendar Time to Implement Remedy:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: *TENNESSEE PRODUCTS - PROJECT 1 (Hot Spot)*

SiteID: 04-06

US EPA Region: IV

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Superfund. Non-time critical removal action.

Contaminants of Concern: PAHs

Overall Status Summary: A FFS was completed by the USACOE in 1994 to address short-term cleanup activities associated with the hot spot area. Draft RI/RA reports addressing the remainder of the site, including additional creek sediments, are complete and PRP comments submitted for each. A final RI/FS is to be issued by late summer or early fall 2001. A ROD is expected in fall 2001.

An EE/CA for interim hot spot removals was prepared; interim removal action started in June 1997; 10,000-15,000 cy of coal tar deposits were estimated across the full width of the creek; in-the-dry removal was planned using Port-A-Dams and flume tubes and bypassing creek flow; Port-A-Dams and flume tubes were discontinued in favor of rock dams; removal was with a long-stick excavator located on the bank; private property access and haul road construction involved, but were not limiting.

From June to December 1997: 9,938 cy of coal tar contaminated material was removed from approximately 1,400 linear feet of creek and the North Coal Tar Pit; 748 truckloads shipped; about \$5.3 million spent. Cleanup of coal tar material began north of the 38th Street Bridge. Soon after starting the cleanup, it became clear that there was much more coal tar than originally estimated. More than two times the original estimate of coal tar for the entire creek was removed from this section alone. Work was suspended in November 1997 due to rainy weather. Work resumed in May 1998 and continued to completion in November 1998 resulting in the removal of 13,248 cy of coal tar material from the Creek. Air samples were collected on a 24-hour basis from stationary units surrounding excavations in the creek; concentrations were found to be well below established action levels.

At completion of the two-year project, 23,186 cy of coal tar and sediments had been removed from 4,236 linear feet of Chattanooga Creek. Additionally, 2,200 cy of coal tar waste was removed from adjacent land locations. Approximately 33,200 tons of coal tar wastes (project total) were recycled (used for fuel) at the Illinois power plant in Baldwin, IL and cement manufacturing plants in South Carolina and Tennessee. Thousands of tires were also removed from the creek and sent to a Chattanooga facility, which burns tires for fuel. Total project cost, about

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

\$11.5 million.

Key Conditions: extended (> 1 mile) river, incineration, property access issues

Estimated Target Volume: 3,000 - 5,000 cy

Estimated Calendar Time to Implement Remedy: June through November 1997.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: *TERRY CREEK - PROJECT 1 (Creek Hot Spots/Outfall Ditch)*

SiteID: 04-09

US EPA Region: IV

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Voluntary Removal Action. Interim. PRP-Lead.

Contaminants of Concern: toxaphene

Overall Status Summary: The site is located near the confluence of Terry Creek, Dupree Creek and the Back River near Brunswick, Georgia and includes an Outfall Ditch, areas of Dupree Creek (the receiving stream), Terry Creek (which Dupree Creek flows into after 0.4 miles), and three areas that historically received contaminated material from the dredging of Terry Creek. Terry Creek flows 1.3 miles into the Back River. The site is contaminated with toxaphene that originated from an adjacent pesticide formulation facility operated by Hercules. The facility produced toxaphene from 1948 until 1980 when use of toxaphene in the United States was officially banned. Wastewater from the facility discharged through a culvert to the Outfall Ditch which empties to Dupree Creek. During periods of peak production prior to 1972, Hercules reportedly discharged approximately 250-300 pounds per day of toxaphene to the Outfall ditch. In addition, Hercules reported a toxaphene spill of unknown quantity into Terry Creek in 1972. Periodic sampling of these areas has shown maximum toxaphene concentrations of 30,000 ppm in the Outfall Ditch, 290 ppm in Dupree Creek, and 110 ppm in Terry Creek. In addition, from 1939 to 1989 the Army Corps periodically dredged Terry Creek, depositing the dredge material primarily into three dredge spoil areas. These areas have been shown to contain elevated levels of toxaphene (a maximum concentration of 430 ppm). An ecological screening evaluation was performed in February 1997 that included the collection of surface water, sediment, blue crab, and forage and consumer fish. Sediment collected from the confluence of the Dupree and Terry Creeks and from the mouths of small streams that drain the dredge spoil areas all contained elevated levels of toxaphene. Fish sample results also indicated the potential existence of elevated levels of toxaphene-like compounds.

In December 1997, the USEPA and Hercules (voluntarily) signed an AOC to remove sediment from the Outfall Ditch and perform additional water and sediment sampling in Dupree and Terry Creeks. Additional sampling in both creeks identified localized areas of sediment containing elevated levels of toxaphene. In November 1998, the original AOC was amended to further delineate the removal in the Outfall Ditch and to include remediation of six hot spots located in the creeks. The removal action targeted sediments in three separate areas: 1) the Outfall Ditch (Pre- and Post-Weir Areas), 2) the North Dupree Creek Area consisting of three removal areas (Creek Zones 1 and 2, and the Outfall Ditch mouth), and 3) the Confluence

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Area comprising Creek Zones 3-6.

The removal work began on August 11, 1999 and was originally targeted for completion by November 1999; actual project completion was on April 12, 2000. Heritage Environmental Consultants performed the removal using Cable Arm environmental clamshell buckets and long-reach excavators. The project goal was mass removal with a target removal depth of 1-8 feet in the Outfall Ditch and one foot for the six Creek Zones. Removed sediment was deposited in drain beds located adjacent to the Outfall Ditch and remained there for about six months to dewater and dry prior to disposal in a commercial Subtitle D landfill. The original estimated volume of sediment to be removed was 26,000 cy. The actual volume removed was 35,148 cy, at a total cost of about \$3 million.

Water samples collected from outside the silt curtains during dredging were below the site-specific turbidity action levels and non-detect for toxaphene. Confirmation samples collected from the dredged areas were considered satisfactory by the USEPA and Hercules (no target level was selected for comparison; simply a case-by-case evaluation was used to determine if additional removal passes were warranted). Final toxaphene residual concentrations in sediment were defined by 209 post-excavation confirmation samples. The 209 samples exhibited a median of 4.5 ppm toxaphene and a maximum of 2,700 ppm. A close-out report describing the removal action was issued in June 2001 (Reference A-790).

In addition to the emergency removal action, Hercules is continuing development of an RI/FS for the Terry Creek Dredge Spoil Areas. Completion of the RI/FS is targeted for 2002.

Key Conditions:

commercial landfill, dredging, specialty dredge equipment, tidal fluctuations

Estimated Target Volume:

26,000 cy combined total from: 1) the Outfall Ditch, 2) North Dupree Creek, and 3) the Confluence Area (Dupree and Terry Creeks).

Estimated Calendar Time to Implement Remedy:

July to end of October 1999

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: **TORCH LAKE**

SiteID: 05-40

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund. Final. Fund-lead.

Contaminants of Concern: Primarily copper; others are arsenic, chromium, lead, nickel, silver, PAHs, and PCBs (1254)

Overall Status Summary: Areas of Michigan's Keweenaw Peninsula in and around Torch Lake (2,700 acres) are designated as both a Great Lakes Area of Concern (AOC) and a federal Superfund site. The Torch Lake AOC encompasses the areas included under the Superfund designation, as well as other areas of the peninsula. Specifically, the AOC comprises the Kenweenaw Waterway (North Entry Harbor of Refuge, Portage Lake, and Torch Lake), its watershed, portions of two other adjacent waterways (Trout River and the Eagle River Complex), and several miles of western Lake Superior shoreline; about 368 sq. miles total. The Torch Lake Superfund Site encompasses Torch Lake, the Kenweenaw Waterway, the northern portion of Portage Lake, the Portage Channel, Boston Pond, Calumet Lake, and a small area of Lake Superior where the western end of the Kenweenaw Waterway empties into it. The Superfund Site also includes about 450 acres of exposed mining waste, slag piles, and debris along the western shore of Torch Lake and another 12 discrete, localized sites with similar wastes located in upland areas.

The contamination is the result of over 100 years of copper mining, milling, and smelting activities along Torch Lake and the other water bodies. Waste materials exist in three forms: as poor rock piles, as slag and slag-enriched sediments, and as stampsands. The poor rock and stampsands contain elevated levels of copper, while the slag and slag-enriched sediment contain elevated levels of copper, arsenic, lead, chromium, and other heavy metals. An estimated 200 million tons of stampsands were disposed of in Torch Lake during the years of active copper mining and smelting, comprising about 20% of the lake's original volume. The lake also reportedly contains a single sediment "hot spot" of several acres containing slag-enriched sediment contaminated with heavy metals and the only documented organic contamination (PAHs) in the lake.

The site has been separated into three Operable Units (OU): OU-1 includes the above water stampsands and slag-contaminated western shore of Torch Lake; OU-2 includes the water column, the stampsand-covered lake bottom, and associated groundwater; and OU-3 includes the 12 upland areas and Lake Superior shoreline. In OU-2, the primary impact of the lake-bottom stampsand is its toxicity (due to elevated levels of copper) to the benthic community. Reportedly the level of copper

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

found in the stampsands is sufficiently high to have eliminated all native benthic organisms in these areas. Other ecological impacts were not observed. EPA has not found the lake-bottom contamination to be associated with any public health concerns. Additionally, restrictions on navigational dredging and the disposal of spoils are in place for many areas of the lake and nearby water bodies due to the potential ecological impact of the sediments.

RODs have been issued for all three OUs. The selected remedy for OUs-1 and -3 is to install a 6-8 inch sand and soil cap over the stampsands and slag piles, and promote vegetation of the cap. The remedy selected for OU-2 is no action. The rationale for this decision was summarized in a 1994 position paper prepared by EPA. The rationale provided two reasons for no action: 1) the extent of the lake-bottom contamination precluded the ability to select a cost-effective remedial solution; and 2) the lack of human health concerns and limited ecological health impacts did not warrant consideration of an active remediation approach. In the position paper, EPA surmised that by stopping the continued erosion of copper-contaminated waste materials into the waterways from nearshore sources, the waterways would eventually recover naturally through ongoing natural sedimentation and detoxification processes currently being observed in other water bodies in the area.

Remedial designs were completed in 1998 for all of the areas targeted under the OU-1 and OU-3 remedial actions. The estimated cost to complete these remedies is \$15.2 million. Installation of the OU-1 cap began in September 1998 and is to be completed in Spring 2002. The capping of OU-3 areas is ongoing and is anticipated to be completed by 2004. A baseline monitoring report for the lake was completed in August 2001. MDEQ has responsibility for performing long-term monitoring at the site following implementation of the OU-1 and OU-3 remedies. MDEQ is currently preparing a long-term monitoring plan.

Key Conditions:

capping, Great Lakes AOC, more-harm-than-good, natural recovery, post monitoring

Estimated Target Volume:

N/A

Estimated Calendar Time to Implement Remedy:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: **TOWN BRANCH**

SiteID: 04-03

US EPA Region: IV

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Franklin Circuit Court Judgment. Final.

Contaminants of Concern: PCBs (1248)

Overall Status Summary: Remedial activities at this site were initially governed by agreed orders between Rockwell International and the Kentucky Natural Resources and Environmental Protection Cabinet (KY NREPC) which included PCB cleanup for Town Branch and Mud River. As part of a third party matter, the court asked for and KY NREPC defined cleanup levels to be applied to Town Branch. Trial was conducted in Franklin Circuit Court, Frankfort, KY in January 1996. The court ruled in favor of KY NREPC in March 1997 and ordered further source control at the plant site, cleanup of 3.5 miles of Town Branch and floodplains to 0.1 ppm PCBs (or alternative floodplain levels based on property usage), and characterization of the Mud River followed by remediation of “hot spots” in the Mud River. In January 2000 the Kentucky Court of Appeals overturned a decision made three and one-half years earlier that required Rockwell to compensate 75 landowners an amount in excess of \$217 million as a result of PCB-contaminated floodplain soils found on their respective properties. The decision was reversed based on “unsupported testimony.” Appeals of the case have continued into 2002.

Cleanup of the first one-mile section of Town Branch and floodplains was completed in 1997/1998 as Phase I of the project. This resulted in removal and disposal (at commercial landfills) of 93,000 cy of combined floodplain soils and creek banks and sediment. Design and third-party property access issues required resolution prior to implementing additional remediation for the remaining 2.5 miles of Town Branch. The Court ended up ordering certain property owners to provide access for the second phase of remediation; the amount of compensation was negotiated separately or is subject to separate hearings with a special master commissioner.

Phase II of the Town Branch cleanup encompassed 5,900 linear feet (1.1 mile) of creek bed and began in August 1999, with mobilization starting in July 1999 and was completed in August 2000 except for final restoration (e.g., planting of trees), which was completed in 2001.

Phase III encompassed the remaining targeted 7,100 linear feet (1.3 miles) of Town Branch to its confluence with the Mud River. The Phase III removal began in late August 2000 and was completed in December 2000. Final restoration was

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

completed in 2001.

For all three phases, a total of approximately 239,000 cy (sediment, bank soil, and floodplain soil) was removed and disposed at offsite commercial TSCA and non-TSCA landfills. This included about 76,000 cy of sediment and bank soil and 163,000 cy of floodplain soils. Only 8% by weight of the material disposed was TSCA material.

A report was submitted in December 2000 by the design consultant summarizing past characterization efforts in the Mud River along with recommendations for further characterization studies in the river. Access for further sampling was obtained in Summer 2001 with sampling efforts completed in Fall 2001. A report summarizing all data collection in the Mud River and proposed activities to complete remediation as required in the March 1997 Judgment was submitted to KY NREPC in July 2002.

Key Conditions:

commercial landfill, floodplains targeted, habitat/streambank restoration, post monitoring, property access issues, solidification / stabilization, wetlands

Estimated Target

290,000 cy (floodplain soil and sediment)

Volume:

(From March 1997 court order for Rockwell to implement source control and cleanup activities in Town Branch and floodplains)

Estimated Calendar Time to Implement Remedy:

Rockwell was ordered by the circuit court in March 1997 to implement source control and cleanup activities in Town Branch and floodplains.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: TRIANA/TENNESSEE RIVER

SiteID: 04-05

US EPA Region: IV

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Superfund. Final.

Contaminants of Concern: DDT

Overall Status Summary: To resolve a DDT contamination problem, a Consent Decree was entered in 1983 between the State of Alabama, EPA, and Olin Corporation. Remediation consisting of permanent stream diversion, then isolation of the most contaminated 2.5 miles by direct burial was completed in 1987. Remediation included diversion/rechanneling of 2.5 miles of tributary (two sections); burial and revegetation of the isolated stretches of tributary containing an estimated 93% of the DDT; 150,000 cy of soil removed to form channels; and 400,000 cy of clean soil and rocks imported and used for burial.

Ten year post-construction monitoring of fish and groundwater started January 1, 1988. A five-year review performed in 1992 concluded that "remedial actions . . . appear to be doing well." In accordance with the Consent Decree, Olin had ten years following remediation to achieve the performance standard of 5 ppm DDT in the fillets of three species of fish in order to satisfy the Consent Decree and declare the remediation successful. A second five-year review was completed in 1998 and confirmed that "the remedial action is accomplishing its goal of preventing contact between the ecosystem and DDT," but, although fish DDT levels continued to decline, channel catfish and smallmouth buffalo did not meet the 5 ppm DDT performance standard. Largemouth bass reached the standard; channel catfish and smallmouth buffalo did not (although 80 to 90% DDT concentration reductions were observed). An Order was signed in April 1999 that extended the attainment periods for these two species of fish by five and ten more years, respectively.

Key Conditions: capping, extended (>1 mile) river, habitat/streambank restoration, post monitoring

Estimated Target Volume: Not available

Estimated Calendar Time to Implement Remedy: Not available

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: UNITED HECKATHORN

SiteID: 09-02

US EPA Region: IX

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund. Final. Four consent decrees between EPA and PRPs approved in July 1996.

Contaminants of Concern: DDT; dieldrin

Overall Status Summary: The project had been delayed by EPA negotiations with PRPs: four Consent Decrees were signed in July 1996; contaminants of concern were pesticides, primarily DDT and dieldrin; dredging targeted the pesticide-contaminated soft sediment down to underlying hard deposits in two dead-end waterways; mechanical dredging in the Lauritzen Channel started in September 1996 and finished in April 1997; removal using long-stick excavators started in the Parr Canal in August 1996 and finished in April 1997; 108,000 cy were removed, solidified, and disposed offsite, by rail to landfills in Arizona and Utah; a Cable Arm clamshell was used for soft sediment, a conventional clamshell for the harder material beneath. Dredged areas were backfilled with six to 18 inches of sand (15,700 cy).

Two years of post-remediation monitoring showed that elevated concentrations of DDT (2.7 - 130 ppm) and dieldrin (0.05 - 3.3 ppm) remained in the top 10 inches of sediments, and water concentrations of DDT and dieldrin were still about 100 times greater than the remedial goal; conversely, biomonitoring showed substantial and continuing reductions of DDT and dieldrin in resident and transplanted mussels.

Two additional studies (References E-164 and M-357) raised questions regarding the ecological success of the dredging project citing a) a lack of sufficient pre- and post-dredging data for benthic and fish populations, b) confounding effects from sediment disturbance from shipping and dredging activities as well as from sub-tidal deposits that were not dredgeable due to in-water obstructions such as pilings and wharves, and c) dramatic measured 3- to 70-fold increases in DDT body burdens in ten fish and invertebrates monitored.

EPA completed a Five-Year Review in September 2001. The Five-Year Review concluded that the dredging remedy has not kept the Lauritzen Channel from being recontaminated with unacceptable levels of pesticides, as evidenced by water column pesticide concentrations exceeding cleanup goals. As a result, EPA will take additional remedial actions at the site.

The first step (Phase I), to collect additional water and sediment samples, was performed in February and March 2002. EPA looked for outfalls that may

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

discharge into Lauritzen Channel and sampled embankments and sediment in the channel. Many of these samples were above cleanup goals, including one sediment sample that exhibited 23,190 ppm DDT. Additionally, during the 2002 sampling, a buried outfall only visible during low tide was found that discharged water with high levels of DDT. The second step (Phase II), additional water and sediment sampling, took place in May 2003.

As described in Reference A-1144 (February 2004):

“The reinvestigation confirmed that the site has not met cleanup goals. USEPA has entered into an agreement with the U.S. Army Corps of Engineers to prepare a Focused Feasibility Study (FFS) to assess a range of alternative actions that could be taken at the site to remediate the remaining contamination. The range of alternatives will include a no action alternative . . .”

“In preparing the FFS, it became clear that additional information on the nature of the sediments at the site would be necessary before an assessment of alternatives could be prepared. Therefore, the FFS has been put on hold while the Army Corps and USEPA gather more information on the types of sediments found in Lauritzen Channel. This work will delay the FFS by a year. However, sediment information will help determine which alternatives are truly feasible and what technologies simply are not viable.”

Key Conditions: capping, commercial landfill, specialty dredge, post monitoring, fish spawning limitations, rail transport for disposal, solidification / stabilization

Estimated Target Volume: 65,000 cy

Estimated Calendar Time to Implement Remedy: 2 months

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Site Name: VELSICOL CHEMICAL - PROJECT 1 (Pine River)

SiteID: 05-17

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund. Final.

Contaminants of Concern: DDT, hexabromobenzene (HBB), polybrominated biphenyl (PBB)

Overall Status Summary: A 1982 Consent Judgment between Velsicol and USEPA and the State of Michigan determined that leaving the sediment in-place was the most appropriate course of action and released Velsicol from further liability for sediments contaminated as a result of past operations. Velsicol retained liability for the upland source area. In 1996 as a result of ongoing concerns about public health resulting from the ingestion of fish from the St. Louis Impoundment, USEPA and the State of Michigan began to reassess the sediments in the impoundment. Sediment cores were collected in 1996 and 1997 and fish samples were collected in 1997 as part of the reassessment. Following review of the reassessment results, in 1998 the agencies determined that sediment removal within the impoundment was necessary to protect public health.

USEPA originally recommended the dredging of sediments in the Pine River as a result of persistently high levels of DDT in fish. Contamination was found to be concentrated in a 2,000-3,000 ft. long dammed section of the river, the St. Louis Impoundment. DDT concentrations in carp fillet tissue collected from the impoundment in 1997 averaged 34.5 ppm (maximum of 90 ppm). The maximum DDT concentration measured in carp fillet tissue from below the impoundment was 27 ppm. The initial remedy targeted removal of 260,000 cy of sediment at a cost of \$20.1 to \$34.1 million. The variability in cost was due to the uncertainty in the final volumes requiring disposal at municipal vs. hazardous waste landfills. The target cleanup goal was set at 5 ppm total DDT. EPA presented its recommended remedial plan to the National Remedy Review Board on March 31, 1998. A Proposed Plan for the removal of the 260,000 cy of DDT-contaminated sediment was issued for public comment in early September 1998. The ROD was issued in February 1999.

Prior to implementing the full remedy, EPA targeted a three-acre hot spot adjacent to the former plant property that contained maximum DDT levels in excess of 3,000 ppm (Project ID 05-26). In 1998, EPA issued an Action Memorandum requesting that the hot spot be removed under a time-critical removal action (TCRA). EPA estimated that 21,500 cy of DDT-contaminated sediment would be removed from the hot spot and disposed off-site at a cost of \$6 million. EPA estimated that the three-acre hot spot contained 80% of the DDT mass in the area of the

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

impoundment. Installation of sheetpile around the hot spot commenced in August 1998 and was completed before year end. In-situ stabilization of the targeted sediments followed by removal of the stabilized sediment was performed from April to October 1999 and resulted in the removal of 35,000 cy of in-situ stabilized sediments by dry excavation. A total of 31,625 tons of stabilized sediments were transported to and disposed at the Envirosafe Landfill, Oregon, OH. Total cost was \$7.8 million.

Implementation of the final remedy (the full remedy) to remove the remainder of the contaminated bottom material in the impoundment is proceeding. A sheetpile cofferdam was installed in Fall 1999 along the centerline of the Middle Basin portion of the impoundment from the downstream Mill Street Bridge to approximately the upstream-most location of the former plant property (the plant site is located on the south shore of the impoundment). The sheetpile divided the target area into two removal zones, a southern zone of about 11 acres that included the three-acre area targeted during the TCRA and a northern zone of about 14 acres that included the Mill Pond area. The southern removal zone was further divided into four removal cells.

Disagreement between EPA and Michigan DEQ over allowable DDT discharge limits from the water treatment system delayed the start of the project. Following extensive negotiation, the agencies agreed on a water discharge limit of nondetect (ND), 0.001 ppb, for DDT. (Note: Reportedly the regulating agencies were prepared to consider a variance to the discharge limit if ND could not be obtained by the existing water treatment system). Dewatering of the southern zone began on June 29, 2000 and finished about one and one-half weeks later. As was done during the TCRA, existing water was removed from the southern removal zone by pumping to a sheetpile settling basin (the same settling basin used for the TCRA). The water was then treated prior to discharge back to the river. Sediment removal began the last week of July 2000 starting in Cell 4, the most upstream cell, and in Cell 1. The exposed sediments are being stabilized in-situ by addition of approximately 15% (by volume) of pelletized lime for very wet sediment and sugar beet lime for moderately wet sediment prior to being loaded onto articulating dump trucks using conventional excavation equipment. The sediment is then placed on a holding pad to allow for further drying prior to offsite disposal.

By October 12, 2000, approximately 60,000 tons of solidified sediment had been transported off-site by truck for disposal at up to four non-TSCA landfills owned by Waste Management, located in Upper Michigan. Removal from the southern work zone was originally targeted for completion in Fall 2001. However, inadvertent flooding of the work area resulting from repair work being performed on the downstream Mill Pond dam forced postponement of the completion of the southern work zone to 2002. The volume of sediment removed from the southern removal zone during 2001 is estimated at 300,000 cy, a volume that already exceeds the

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original estimated removal volume of 260,000 cy for both removal zones combined.

Verification samples are being collected in 40 ft. x 40 ft. grids. Many of the verification samples collected at original target depths exhibited DDT levels exceeding the 5 ppm target level. Continued removal of sediment to achieve the 5 ppm or less target level reportedly is the primary reason for the increase in removal volume. Additionally, work in Cell 4 took longer than anticipated. A small peninsula located within the working cell, and previously considered uncontaminated, was found contaminated. Sheetpile installed around the peninsula had not been anchored into the bottom sediment as deeply as sheetpile in other areas. This required that work progress more slowly in this area to minimize disturbance of the sheetpile base. Reportedly, the water treatment system has consistently met the discharge limit of 1 ppt DDT for treated water. The water source being treated is water that continually infiltrates into the work zone. Additionally, in 2001, sediment samples were collected in the northern removal zone to better characterize sediment DDT levels at depth and to provide a better estimate of the volume of sediment to be removed from this zone.

In 2002, mobilization to the site began in April. Sediment removal in the southern removal zone was anticipated to last about two months and the remainder of the construction season was to involve restoration of the southern removal zone and installation of sheetpile to isolate the northern removal zone. Instead, DNAPL was discovered migrating from the plant site around the slurry wall enclosing the plant site and into glacial till that underlies the sediment. Approximately 1,200 feet of interceptor trench was installed that resulted in the collection of about 3,000 gallons of DNAPL. A clay cap was constructed over the trench and areas of residual DNAPL.

In 2003, an additional removal cell was constructed to allow access to the remainder of the sediment requiring removal from the southern area. Sediment removal was completed from this area, bringing the project total to about 350,000 cy of treated sediment removed. Work was also completed on the sheetpile wall around the northern removal zone to allow dredging to begin in the northern area in 2004. As of 2003, the water treatment system was able to consistently meet the 1 ppt DDT discharge limit. DDT is the discharge driver, but other constituents are being monitored and their limits are being consistently met as well. The water treatment system comprises two treatment trains, each one consisting of, in order of operation: influent intake; flocculant addition; dissolved air flotation; oil/water separator; 5 µm bag filter; 4 carbon units; and 0.5 µm bag filter. The average flow being treated is 0.5 to 2 million gpd.

At this time, insufficient funds are available for a full construction season for any year until the project is completed. To date, the project has cost an estimated \$50 million and it is estimated that another \$50 million will be required to complete the

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project. EPA is now targeting completion of the project in 2009.

Key Conditions:

commercial landfill, solidification/stabilization, water handling limitations

Estimated Target

260,000 cy overall at 5 ppm DDT (~4,600 pounds of DDT)

Volume:

***Estimated Calendar Time
to Implement Remedy:***

Not defined in ROD.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: VELSICOL CHEMICAL - PROJECT 2 (Pine River Hot Spot)

SiteID: 05-26

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Superfund. Interim. Time-critical removal action.

Contaminants of Concern: DDT, hexabromobenzene (HBB), polybrominated biphenyl (PBB)

Overall Status Summary: EPA recommended dredging of sediments in Pine River as a result of persistently high levels of DDT in fish. Contamination is concentrated in a 2,000-3,000 ft. long dammed section of the river, called the St. Louis Impoundment. Carp fillet tissue concentrations in 1997 averaged 34.5 ppm in the impoundment with a maximum level recorded at 90 ppm. The maximum carp fillet tissue concentration measured below the impoundment was 27 ppm. The proposed plan targeted removal of 260,000 cy of DDT-contaminated bottom material at a cost of \$20.1 to \$34.1 million. The variability in cost was due to the uncertainty in the volumes that would be disposed at municipal vs. hazardous waste landfills. The target cleanup goal was 5 ppm total DDT. EPA presented its recommendation to the National Remedy Review Board on March 31, 1998. A Proposed Plan for the removal of the 260,000 cy was issued for public comment in early September 1998. The ROD was issued in February 1999 (Project 05-17).

Prior to a full remedy, EPA targeted a three-acre hot spot within the impoundment adjacent to the former plant site containing DDT levels of 3,000 ppm and above. EPA issued an Action Memorandum requesting the hot spot be removed under a time-critical removal action. Installation of sheetpile around the hot spot commenced in August 1998 and was completed before year end. Sediment removal began in Spring 1999. EPA estimated that 21,500 cy would be removed from the hot spot and disposed off-site, for \$6 million. EPA equated the three-acre hot spot to 80% of the DDT mass in the area of the St. Louis Impoundment (430,000 pounds of the estimated total 534,000 pounds of DDT in the St. Louis Impoundment).

The time-critical removal action was performed from April to October 1999 and resulted in the removal of approximately 30,000 cy of in-situ sediment (stabilized volume was about 35,000 cy) by dry excavation. Stabilization was accomplished in-situ using powdered lime, and subsequently Calciment (pelletized lime). A total of 31,625 tons of stabilized sediments were disposed at the EnviroSAFE Landfill, Oregon, OH.

Key Conditions: commercial landfill, solidification/stabilization

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Estimated Target Volume: 21,500 cy in 3-acre hot spot >3,000 ppm DDT.

Estimated Calender Time to Implement Remedy: Interim Measure: Originally August to December 1998. Now, removal postponed until Spring 1999.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: VINELAND CHEMICAL

SiteID: 02-12

US EPA Region: II

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: Superfund. Final.

Contaminants of Concern: arsenic

Overall Status Summary: Design of source control in the form of a 2 million gallon-per-day groundwater pump and treat system was completed in late 1996 (OU-2); the contract for pump and treat was awarded in September 1997 and the system began operation in August 2000. Remediation of OU-3 is to begin by isolating portions of the upstream Blackwater Branch tributary (upstream of Mill Road Bridge) and excavating contaminated sediments and floodplain soils. As of August 1999, the remedial design was essentially complete and IT Corporation was awarded the contract to perform the remediation of the Blackwater Branch tributary. Sediment removal was originally anticipated to begin in early Spring 2000. Targeted sediment volume was 70,000 cy. Removed sediments will be washed ex-situ and the resultant clean sediments will be deposited onsite and the contaminated residue will be disposed offsite. The remedial action is scheduled to take 18 months. Following completion of the Blackwater Branch tributary, the Maurice River will be allowed to undergo 3 years of natural river flushing. Remaining high levels of arsenic in the river will be addressed at that time, followed by an evaluation and recommendation of remedial actions for Union Lake.

As of June 2000, the project was on hold due to higher than anticipated final design costs for sediment/soil washing operations. EPA is re-evaluating material handling options. The Corps of Engineers was meeting with EPA in an attempt to resolve outstanding issues.

As of June 2001, EPA is working on selecting and finalizing plans with a removal contractor for excavation of on-site arsenic contaminated soils (OU-1). EPA is anticipating that soil removal can begin by the end of Summer 2001 -- this work is estimated to take 18 months. Blackwater Branch tributary sediments will be addressed following completion of on-site soil remediation (start in 2003 at earliest).

Sediment volumes targeted for removal in the tributary, river, and lake now total 151,650 cy, plus 56,200 cy of floodplain soils.

Key Conditions: extended (> 1 mile) river, particle separation/soil washing

Estimated Target Volume: OU-3 (Blackwater Branch and Maurice River): sediment: 21,000 cy; floodplain soil: 56,200 cy.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

OU-4 (Union Lake): sediment: 34,000 cy (high access areas) and 96,650 cy (low access areas).

Estimated Calendar Time to Implement Remedy: Was originally to begin in early 2000 and continue thru late 2001; currently not expected to begin until 2003 at the earliest.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: **WHITE LAKE - PROJECT 1 (Tannery Bay)**

SiteID: 05-38

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Consent Judgment. State-Lead. Final.

Contaminants of Concern: arsenic, chromium, mercury, lead, nickel, and zinc

Overall Status Summary: Tannery Bay has been identified as having the most highly contaminated sediment in White Lake. The Bay's sediment reportedly contains chromium levels as high as 5,000 ppm and 20,000 ppm in the top 6 to 8 inches and in deeper sediments, respectively. Additionally, the sediment contains significant quantities of leather scraps, dyes, and cow hair. The source of contamination to the Bay was direct discharge of liquid and solid wastes from the now defunct Whitehall Tannery located adjacent to the bay that operated from about 1866 to 1976. Genesco, Inc. ("Genesco") purchased the tannery in 2000 and tannery operations ceased shortly thereafter. Cleanup of the upland areas around the tannery are ongoing. About 6.7 acres of the 10-acre bay is affected.

A US Army Corps of Engineers study in 2000 estimated the cost for removing 83,000 cy of contaminated sediment from Tannery Bay at between \$5 and \$8.5 million. At that time, a judge ruled that the proposed sediment cleanup could proceed and that the state could bill Genesco for costs of the cleanup. In 2001, MDEQ and Genesco reached a compromise agreement to remove and dispose of 73,000 cy of contaminated sediment from about 4.7 acres of the bay at an estimated cost of \$6.7 million. Genesco reportedly would pay \$3.35 million to remove 62,000 cy of sediment and MDEQ would pay a similar amount to remove the remaining 11,000 cy of sediment. The removal volume and estimated total cost were since increased to 78,000 cy and \$8 million, respectively. MDEQ began advertising for bids on February 16, 2002 and subsequently awarded the dredging contract to Williams Environmental Services, Inc. Sediment was removed from the bay in 2002 from August to mid-November and in 2003 from mid-April to the end of July. Final removal volume was 85,000 cy. Sediment removal was by both barge-mounted excavator and hydraulic cutterhead dredging and disposal was to a local commercial Type II landfill.

Key Conditions: commercial landfill, dredging, Great Lakes AOC, solidification/stabilization, water handling limitations

Estimated Target Volume: 78,000 cy (includes a maximum of one foot overdredging)

Estimated Calendar Time to Implement Remedy: Late May to end of September 2002.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: *WHITE LAKE - PROJECT 2 (Rest of Lake)*

SiteID: 05-39

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: RCRA. EPA-Lead.

Contaminants of Concern: PCBs; hexachlorobenzene; heavy metals (arsenic, cadmium, chromium, lead, manganese, mercury, nickel, and zinc); oil and grease; chloroform; mirex

Overall Status Summary: White Lake is a Great Lakes Area of Concern (AOC) that encompasses a 2,570 acre area of coastal, drowned river mouth along the east shore of Lake Michigan. The AOC includes the lake and a one-quarter mile zone around the lake. Originally listed as an AOC due to contaminated groundwater infiltration from the now defunct Hooker Chemical Company site (now Occidental Chemical Corporation [OCC]), sediment in the vicinity of the site's abandoned outfall pipe was found to contain elevated levels of hexachlorobenzene and PCBs. There are also eight other sites identified as potential sources of contamination to the lake. One of these is 10-acre Tannery Bay located at the east end of the lake (Project ID 05-38).

The lake is contaminated with PCBs, hexachlorobenzene, chlordane, mercury, chromium, and lead as well as other heavy metals. Chromium and lead are the most elevated contaminants in a majority of White Lake sediments. Consumption advisories are in place due to elevated levels in fish of PCBs, chlordane, and mercury. Water column samples collected in 1992 from the navigational channel connecting White Lake to Lake Michigan indicated that nearly all of the parameters of concern were below levels found in 1987 and that all were below Michigan's water quality standards.

In July 2001, USEPA issued a final decision document for the OCC site that selected dredging as the preferred remedy for sediment impacted by the site. In the document, USEPA requires that sediment containing 2 ppm or greater PCBs or 0.45 ppm or greater hexachlorobenzene be removed by dredging. Prior to this, OCC had recommended the use of in-situ bioremediation for the remediation of sediment using pellets of a proprietary formula marketed as BioGeoChemMix. USEPA rejected the recommendation based on strong community objection and because the method remained unproven.

During Summer 2001, OCC collected additional sediment samples to further characterize the impacted sediments and in Fall 2001 sent to USEPA a plan for the removal of approximately 12,500 cy of sediment from below the site outfall pipe. The remedial action reportedly would result in the removal of 1,100 pounds of contaminants from White Lake. Final design of the dredging project was sent to

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

USEPA in April 2002 and USEPA provided its approval based on proposed modifications in a letter dated May 13, 2002. The final design document reduced the targeted removal volume from 12,500 cy to 8,500 cy, from 1.6 acres of lake bottom.

Dredging was originally targeted to begin in September 2002 and Bean Environmental LLC was selected to perform the dredging. The dredging system to be employed was to consist of a Teflon-lined 4.6 cy horizontal profile grab bucket attached to a hydraulic excavator and slurry processing unit. During Fall 2002, USEPA reevaluated this selected method and the result was rebidding of the project in early 2003 and selection of Faust Construction to perform the dredging using Cable Arm environmental buckets. The design required removed sediment to be loaded onto barges for transport to OCC property where it would be slurried for transport to another area of the OCC site for subsequent dewatering using Geotubes. Following dewatering, the sediment would be disposed in either a TSCA-approved landfill for sediment with in-situ PCB concentrations greater than or equal to 50 ppm or a solid waste landfill, for in-situ PCB concentrations of less than 50 ppm.

The project was performed under USEPA oversight within the RCRA program. Site preparation began in June 2003; dredging began on or about July 28, 2003 and was completed by the end of September 2003. Final removal volume was 10,500 cy.

Key Conditions: commercial landfill, dredging, Great Lakes AOC, natural recovery, specialty dredge

Estimated Target Volume: 8,500 cy (of which 2,088 cy is anticipated to contain >50 ppm PCBs)

Estimated Calendar Time to Implement Remedy: To start in September 2002.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: **WILLOW RUN CREEK**

SiteID: 05-16

US EPA Region: V

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Site proposed for the NPL, but not listed. EPA Region V Regional Decision Team approved the Willow Run Creek Superfund Accelerated Cleanup Model Site Strategy, and approved funding for an EE/CA. Agreement between EPA and Michigan DEQ allows for state supervision of an approved Remedial Action Plan under state law. EPA however, approved the new TSCA landfill. Final.

Contaminants of Concern: PCBs (1242/1248/1254/1260)

Overall Status Summary: The selected remedy was in-situ solidification followed by removal of sludges, sediments, soils from the Willow Run (WR) Sludge Lagoon and Edison and Tyler Ponds, by dry excavation. Removed materials were solidified using lime/cement/cement kiln dust and disposed of in a new, dedicated TSCA landfill located on adjacent Wayne County property (considered part of the site). Pond sediments estimated at 310,000 cy. Removal work was slow to start in 1997 due to delay in completing the landfill and delays in placing sheetpile in Tyler Pond (intent was to dewater one-third, maintain flow through two-thirds, excavate the one-third, then vice versa). As of September 1998, remediation of the WR Sludge Lagoon and Edison Pond were complete; Tyler Pond was approximately 90% complete with work scheduled to be completed in October 1998 with an estimated 20,000 cy of sediment still to be removed. A total of 450,000 cy of consolidated sediments were removed and landfilled at the site. Sediment removal was completed in late 1998 and the landfill capped. As of April 1999, the only remaining field work was the minor repair and reseedling of the landfill cap.

Key Conditions: dedicated landfill or CDF, solidification/stabilization

Estimated Target Volume: 331,000 cy

Estimated Calendar Time to Implement Remedy: According to the 1994 EE/CA, . . .
"Estimates for dredging and dewatering contaminated sediments from Tyler and Edison Ponds indicate that approximately 19 months will be needed to complete the required tasks. This schedule is based on the assumption that, when necessary, dredging activities will be curtailed such that the amount of dredged sediment stockpiled in dewatering and holding tanks does not become unmanageable. The limiting factor in any removal action at the Willow Run Creek site will be the treatment system feed capabilities and/or the scheduling availability of transportation and/or disposal facilities for off-site waste delivery. While a large portion of these treatment and/or disposal activities can be conducted concurrently with dredging and dewatering activities, a period of time at the completion of the project (i.e.,

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

beyond the 75 weeks) may be necessary for completion of final treatment and/or disposal activities. It is quite possible that the full-scale remediation of the Tyler and Edison Pond sediments proposed for this removal action may require 2 to 3 years, or more, to complete."

These estimates were originally based on removal of a total of 130,000 cy from the two ponds.

These estimates were substantially increased in the Nov. 1994 Remedial Action Plan (RAP), to 331,000 cy total, including 284,000 cy sediment and 47,000 cy related soils. Breakdown is 20,000 cy from Willow Run Sludge Lagoon, 144,000 cy from Tyler Pond, and 167,000 cy from Edison Pond. No updated construction schedule was provided.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: WOONASQUATUCKET RIVER

SiteID: 01-10

US EPA Region: I

Status (Active, Complete, or Monitoring Only): Active

Type of Regulatory Action: US EPA Region I investigatory lead

Contaminants of Concern: dioxin, mercury, PCBs

Overall Status

Summary:

In July 1998, as a result of new sediment sampling results showing elevated dioxin levels in Woonasquatucket River sediment, the U.S. EPA and the R.I. Department of Health reminded the public to be aware of the "catch and release" advisory in place for fish caught in the river. The fish advisory was first imposed in October 1996 after EPA studies found dioxin, mercury, and PCBs in eels and sunfish from the Woonasquatucket. The 1998 sediment sampling results exhibited dioxin levels ranging from 0.094-8.2 ppb, with the highest level behind the Lymansville Dam in North Providence and the second highest (7.4 ppb) behind the Allendale Dam.

A second round of 45 soil and sediment samples obtained by EPA on and around the Centredale Manor property in September 1998 exhibited dioxin concentrations which exceeded EPA's action level of 1 ppb at three locations, namely a drainage ditch inaccessible to the public, the riverbank next to the Lee Romano ballfield, and the riverbank immediately upstream of the Allendale Dam. The 14 samples from these three locations exhibited dioxin concentrations ranging from 1.5 to 14.8 ppb.

In response to these data, EPA announced in January 1999 plans for two dozen inspections at various types of manufacturing facilities in the Woonasquatucket River watershed, which includes Smithfield, Johnston, North Providence, North Smithfield, and Providence. The inspections will focus on underground storage tank/wastewater discharges, hazardous waste storage and handling, and other environmental compliance issues. Thirty-nine enforcement inspections had been done last spring at facilities along the Woonasquatucket, many of them metal plating shops and jewelry makers. Inspections in the watershed have resulted in one enforcement action to date - an administrative complaint earlier this month against Microfin Corp. in Providence, proposing a \$1.15 million civil penalty. EPA indicates more actions are expected.

One additional surface soil sampling program was performed at the Centredale Manor Site in February 1999. Samples were collected from three areas of the site, (1) the north end where the chemical and drum reclamation facilities were once located, (2) the southern end which is a wooded wetland area that acts as a drainage area for the north end of the property and eventually drains to the Woonasquatucket River, and (3) the western river bank of the Woonasquatucket.

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

In addition, two upstream samples and 10 judgmental samples (from eight residential properties) were collected. Results of the sampling program indicate that 102 of the 248 samples (includes 23 duplicate samples) collected have dioxin levels exceeding the USEPA action level of 1 ppb. The highest level measured was 117 ppb (collected from the woods behind Centredale Manor) with a majority of the results in the 1 to 20 ppb range. Twenty nine samples (includes 4 duplicate samples) were collected from along the western bank of the Woonasquatucket. Seven of the samples (includes one duplicate sample) exceeded the USEPA action level of 1 ppb, with the maximum dioxin level being 2.48 ppb. A subsurface sampling program designed based on the surface soil sampling results was performed at the site during Summer 1999 (data not yet obtained).

To date, the US EPA has spent \$1.4 million to perform time-critical removal actions and collect soil and sediment samples. Portions of the site that were capped include the riverbank south of the Centerdale Manor parking lot and an area along the river between the manor and an existing apartment complex. Samples of river sediment and shoreline soil samples of the pond to Allendale Dam were collected throughout 1999 with analytical results due in March 2000. Preliminary work has begun on a site EE/CA. The site was placed on the NPL list in early 2000.

An Interim Remedial Action (NTCRA) is planned, per an Action Memorandum dated January 18, 2001. It calls for the removal of contaminated soil and sediment in floodplains containing dioxin concentrations greater than 1 ppb from properties subject to residential and recreational use at the Centredale Manor site. It also outlines plans for the restoration of the Allendale Dam. EPA is currently conducting a remedial investigation and feasibility study to evaluate the full nature and extent of contamination at the site.

Key Conditions:

extended (>1 mile) river, floodplains targeted, incineration, wetlands

Estimated Target Volume:

1,300 cy of soils and sediment located in floodplain (an additional 1,100 cy will be removed for the restoration of the Allendale Dam)

Estimated Calendar Time to Implement Remedy:

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: WYCKOFF CO./EAGLE HARBOR - PROJECT 1 (East Harbor)

SiteID: 10-02

US EPA Region: X

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Final. Superfund. Preceded by enforcement actions in 1988 (AOC), 1991 (UAO), 1993 (AOC), and 1994 (Consent Decree)

Contaminants of Concern: PAHs; mercury

Overall Status Summary: The first phase of the East Harbor capping remedy was completed in 1993-1994 and included capping of two hot spots of 54 acres total to a nominal depth of 3' by distribution of 280,000 cy of clean sediments obtained from a navigational dredging project 31 miles away; monitoring of the cap's effectiveness is in progress; other phases (of capping) were to follow after completion of additional source control, including facility demolition and control of a ground water source.

EPA delayed capping other areas of the East Harbor until a groundwater barrier wall was installed to eliminate creosote seeps from the site. Construction of the sheetpile barrier wall was performed from November 2000 to February 2001. Following this, an additional 15-acre cap was installed which extended from the southern boundary of the earlier 54-acre cap to the Wyckoff property. This additional cap is also about 3' thick.

From March to September 2002, an EPA team with support from the Corps of Engineers performed a "Five-Year Review" for both the East Harbor and West Harbor (Project ID 10-06). The Five-Year Review report concluded that (a) contamination still existed in the East Beach area and (b) localized disturbances of the subtidal sediment cap may be occurring.

Key Conditions: capping, fish spawning limitations, navigational dredging component, post monitoring, tidal fluctuations

Estimated Target Volume: 64 subtidal acres above the MCUL for PAHs; 121 subtidal acres above the SQS (neither of these totals include the existing capped area of 54 acres).

Estimated Calendar Time to Implement Remedy: 3 to 4 years (design, preparation, remediation).

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: WYCKOFF CO./EAGLE HARBOR - PROJECT 2 (West Harbor)

SiteID: 10-06

US EPA Region: X

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Final. Superfund. Preceded by enforcement actions in 1988 (AOC), 1991 (UAO), 1993 (AOC), and 1994 (Consent Decree)

Contaminants of Concern: PAHs; mercury

Overall Status Summary: Cleanup at the West Harbor Operable Unit (OU-3) was completed in Oct. 1997. The cleanup involved the full range of sediment remediation technologies including natural recovery, enhanced natural recovery, capping, dredging, CDF disposal, stabilization, and upland source control. Capping involved placement of 30,000 tons of sand – 22,600 tons over 6 acres (6-inch thick) and 7400 tons over 0.5 - 0.7 acres (3 ft. thick). A mercury containing hot spot was dredged (1350 cy) and mercury contaminated under-dock areas were wet-excavated (1000 cy), with disposal in a 1 acre nearshore CDF. Another 650 cy hot spot was wet-excavated at low tide, material was stabilized, and then disposed at an offsite commercial landfill.

From March to September 2002, an EPA team with support from the Corps of Engineers performed a "Five-Year Review" for both the East (Project ID 10-02) and West Harbor. One pertinent finding was that an eelgrass planting site adjacent to the CDF did not survive.

Key Conditions: capping, commercial landfill, confined disposal facility, dredging, natural recovery, tidal fluctuations, wetlands

Estimated Target Volume: 12.5 - 31 subtidal acres and 3.5 intertidal acres above the MCUL for mercury; 5 intertidal acres above the MCUL for PAHs.

Estimated Calendar Time to Implement Remedy: Not provided

Project Name and Overall Status Summary (Sorted Alphabetically by Project Name)

Site Name: YORK OIL

SiteID: 02-19

US EPA Region: II

Status (Active, Complete, or Monitoring Only): Complete

Type of Regulatory Action: Superfund. Final.

Contaminants of Concern: PCBs, heavy metals

Overall Status Summary: The public comment period for a Proposed Plan ended in late July 1998. A ROD (OU-2) was issued at the end of September 1998. The cleanup was performed by Alcoa. Four federal agencies and 21 companies and/or municipalities provided funds to assist in the cleanup. Contractor bids for the work were submitted on April 1, 1999. Cleanup of soils and wetlands began in Summer 1999 and was completed in Spring 2001. The \$3.2 million remedy involved removal of 11,000 cy of sediments exceeding 1 ppm PCBs and 31 ppm lead from the 17-acre Western Wetland. Removed sediments were dewatered, solidified/stabilized, and disposed under a cap on the plant site in conjunction with the remedy for OU-1 (the Site Proper). Damaged wetlands were mitigated. The remedy also included toxicity testing of sediments and surface water in the Northwest Wetland. No unacceptable toxicity results were obtained, therefore removal and solidification/stabilization of sediments from the 50-acre Northwest Wetland was not required. Sediments in the Western Wetland exhibited upwards of 212 ppm PCBs. Only one sample from the Northwest Wetland exceeded 1 ppm PCBs.

Key Conditions: dedicated landfill or CDF, more-harm-than-good, wetlands

Estimated Target Volume: Approximately 11,000 cy from the Western Wetland. The target volume could increase if unacceptable toxicity results are documented for the Northwest Wetlands.

Estimated Calendar Time to Implement Remedy: