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EPA Superfund
Record of Decision:

ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER
EPA ID: MID006007306
OU 04
KALAMAZOO, MI
09/28/2001

DECLARATION

SELECTED REMEDIAL ALTERNATIVE FOR THE 12th STREET LANDFILL-OPERABLE UNIT 4 OF THE ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER SUPERFUND SITE CITY OF PLAINWELL, MICHIGAN

Statement of Basis and Purpose

This decision document presents the selected remedial action (RA) for the 12th Street Landfill-Operable Unit 4 (12th St.-OU4) of the Allied Paper, Inc./Portage Creek/ Kalamazoo River Superfund site (Site). The 12th St.-OU4 is one of several polychlorinated biphenyl (PCB) source areas attributed to the potentially responsible parties (PRPs) at the Site. The remedy was chosen in a manner that is consistent with the Comprehensive Environmental Response, Compensation, and Liability Act, 1980 PL 96-510 (42 U.S.C. § 9601 et. Seq.), as amended by the Superfund Amendments and Reauthorization Act of 1986, as well as the Superfund implementing regulations of the National Oil and Hazardous Substances Pollution Contingency Plan (40 Code of Federal Regulations (CFR) Part 300). This Record of Decision (ROD) is applicable only to the 12th St.-OU4, which comprises the 12th Street Landfill (landfill) and four areas outside the landfill where PCB-contaminated residual material has eroded.

The 12th St.-OU4 is located near the city of Plainwell, Allegan County, Michigan (Figure 1). PCBs are present in the paper residuals (residuals) disposed of at the landfill by the owners and operators of the Plainwell Paper Mill. Due to erosion, the PCB-contaminated residual material has migrated from the landfill to the adjacent areas. Listed below are the PCB-contaminated areas that comprise this operable unit (Figure 2).

1. The landfill from which the PCB contamination in surrounding areas migrated, including any groundwater contamination and landfill leachate, if any.
2. The woodland area (woodland) in the southeast corner of the 12th St.-OU4.
3. Wetlands, as identified by National Wetland Inventory maps, adjacent to the landfill to the north and northwest (wetlands).
4. A portion of the adjacent gravel operation property (adjacent property), that borders the landfill to the west.
5. The portion of the former powerhouse discharge channel of the Plainwell Dam (former powerhouse discharge channel) on the Kalamazoo River that contains residuals that are contiguous with the east side of the landfill.

Assessment of the Site

The actual or threatened releases of hazardous substances from the 12th St.-OU4, if not addressed by implementing the RA in this ROD, present an imminent and substantial endangerment to public health, welfare, or the environment.

Description of the Selected Remedy

The purpose of this remedy is to eliminate the continued migration of PCBs from the 12th St.-OU4 to the Kalamazoo River, as well as from the landfill to the woodland, wetlands, adjacent property, and the former powerhouse discharge channel. This remedy will reduce, and possibly eliminate the unacceptable risk associated with the landfill from exposure to PCBs. This RA includes excavating the eastern portion of the landfill adjacent to the former powerhouse discharge channel and the Kalamazoo River; excavation of residual material that has eroded into the areas outside the landfill; relocation of the excavated material back into the landfill; and, construction of an on-site containment system.

This ROD covers the landfill and the residual material that is present in the adjacent areas that are listed above. The remaining portion of the former powerhouse discharge channel and those locations within the adjacent areas where there is no visual evidence of residual material are not addressed in this RA. Visual criteria will be the primary method by which PCB-contaminated materials will be identified, although this ROD does provide that the agency implementing this remedy can require additional sampling and analysis at those locations where it determines that visual criteria alone are inadequate to determine the extent of eroded, PCB-contaminated materials. The selected remedy further provides for post-excavation sampling in order to determine whether, upon completion of the remedy selected in this ROD, additional remedial work is necessary to reduce the risk to human health or the environment to levels acceptable under applicable or relevant and appropriate requirements. If such post-excavation sampling determines that unacceptable risks remain, additional remedial work will be required in future RODs for the site.

The major components of the selected remedy include:

1. Excavation and relocation into the landfill of contaminated residuals currently in the woodland, wetlands, and adjacent property, and the residuals in the former powerhouse discharge channel that are contiguous with the eastern side of the landfill. Following relocation into the landfill of the residual material, a containment system shall be constructed that complies with the requirements of Part 115, Solid Waste Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA).

2. Excavation and relocation into the landfill of the east side of the landfill along the former powerhouse discharge channel. The excavation shall be extensive enough to create a buffer zone sufficient to insure that, for the lifetime of the remedy, no hydraulic connection exists between the PCB-contaminated wastes within the newly constructed landfill containment system and the Kalamazoo River or the former powerhouse discharge channel.

3. Restoration of areas that are excavated, cleared and grubbed, or otherwise affected by the RA.

4. A side wall containment system (SWCS) shall be constructed around the outside of the landfill. The existing sides of the landfill are constructed of sand, fly ash, and PCB-contaminated residuals and were not designed to provide side slope stability, flood protection, and erosion control, or to prevent releases of leachate. The existing sides shall be completely covered by a new SWCS that is designed to prevent the release of PCBs and which provides the necessary side slope stability, flood protection, and erosion control. The containment system shall be designed to meet the relevant portions of the Michigan Solid Waste Landfill closure regulations pursuant to Part 115, Solid Waste Management, of the NREPA. Disposal of the residuals with PCB contamination at or above 50 parts per million, which are PCB remediation wastes under the Toxic Substance Control Act (TSCA), will take place pursuant to the risk-based disposal method set forth in 40 CFR Section 761.61(c). The erosion protection provided shall be sufficient to protect the containment system from a 500-year flood event. The erosion protection shall extend to a minimum elevation of 707.0 feet above mean sea level, which is two feet above the 100-year flood elevation.

5. A cover (cap) will be constructed over the landfill as part of the containment system to minimize infiltration of precipitation through the landfill, prevent migration of residuals or leachate from the landfill into the adjacent areas, and eliminate direct contact hazards. The cap shall be designed to meet relevant portions of the closure regulations pursuant to Part 115, Solid Waste Management, of the NREPA. The cap consists of the following components from bottom to top:

   - A select granular fill layer at least six inches thick shall be placed on top of the landfill as a suitable sub-grade for the cap. The need for a gas venting system shall be assessed by the PRP's in the remedial design (RD). If it is determined that a gas venting system is necessary, then this layer shall be designed and constructed to serve as a gas-venting layer. This gas-venting layer shall be capable of collecting the landfill gas produced and efficiently conveying it to a passive venting system. Clean granular fill from an off-site source, having a minimum hydraulic conductivity of 1×10^{-3} centimeters per second, shall be used to construct the layer.

   - A geomembrane liner (barrier layer) of at least 30-mil thick polyvinyl chloride (PVC) or its equivalent, as approved by the lead agency, shall be placed over the granular fill. The PVC geomembrane liner shall act as a barrier to minimize infiltration of precipitation into the residuals. The most appropriate liner material shall be determined in the RD and must be approved by the lead agency.

- A general fill layer (protective layer) at least 24 inches thick shall be placed above the 30-mil PVC geomembrane liner, or its equivalent. The protective layer shall be capable of sustaining the growth of nonwoody plants and shall have adequate water holding capacity. The water that accumulates within this layer shall drain to a ditch or a sedimentation outlet structure and subsequently discharge into the Kalamazoo River.

- A vegetative layer at least six inches thick shall be placed over the protective layer. This layer shall be designed to promote vegetative growth, provide surface water runoff, and minimize erosion.

6. Following the completion of the RA, an appropriate groundwater monitoring network shall be installed and long-term groundwater monitoring shall be performed in accordance with an approved monitoring plan. Existing wells that are no longer in use shall be properly abandoned. Monitoring of the groundwater aquifer under the landfill shall be conducted in accordance with Part 201, Environmental Remediation, of the NREPA, and the TSCA (40 CFR Section 761.75(b)(6)).

7. Short-term surface water monitoring shall be conducted during excavation activities in accordance with a lead agency approved monitoring plan.

8. Deed restrictions, approved by the lead agency, that are necessary to appropriately restrict future land use pursuant to Section 20120a(1)(i) of the NREPA shall be imposed on the landfill portion of the 12th St.-OU4 before the RA is final.

9. A fence shall be constructed to enclose the landfill and permanent markers and approved warning signs shall be placed around the perimeter of the landfill as required by Part 201, Environmental Remediation, of the NREPA.

10. The need for a leachate collection system shall be investigated by the PRPs in the RD and shall be designed and constructed as part of the RA if determined to be necessary by the lead agency.

11. Provisions for long-term maintenance and post-closure care, approved by the lead agency, shall be implemented.

Statutory Determinations

The lead agency has concluded that the selected RA for the 12th St.-OU4 is necessary and appropriate to protect human health, safety and welfare, and the environment. The selected RA is in compliance with federal and state requirements that are legally applicable or relevant and appropriate. The United States Environmental Protection Agency (U.S. EPA) concurs with this determination. The selected RA for the 12th St.-OU4 utilizes permanent solutions and alternative treatment technologies, or resource

recovery technologies, to the maximum extent practicable. A final decision on whether additional response actions are necessary for those areas of this OU not addressed in this ROD will be made as part of the ROD for the Phase I portion of the Kalamazoo River.

To ensure that the remedy continues to provide adequate protection of human health and the environment, a review shall be conducted within five years after commencement of the RA, and every five years thereafter. This shall be necessary because this remedy will result in hazardous substances remaining on-site above health-based and ecological based levels.

The lead agency's submission to the U.S. EPA of this ROD and its related documents (e.g., the RI/FS) and its request for concurrence with the determination of this ROD, constitute the application for risk-based disposal approval required by 40 CFR Section 761.61(c)(2), and represents U.S. EPA's determination that the disposal method set forth in this ROD for PCB remediation wastes will not pose an unreasonable risk of injury to human health or the environment.

William E. Muno, Director, Superfund Division United States Environmental Protection Agency	Date
Russell J. Harding, Director Michigan Department of Environmental Quality	Date

SUMMARY OF REMEDIAL ALTERNATIVE SELECTION

I. DECISION SUMMARY

A. SITE LOCATION AND DESCRIPTION

The Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site (the Site) is located in Kalamazoo and Allegan Counties, Michigan. The Site includes the Kalamazoo River and its adjacent floodplains and wetlands, from Morrow Lake Dam in Comstock Township, Kalamazoo County, downstream to Lake Michigan, as well as the lower three miles of Portage Creek, from Cork Street to the confluence with the Kalamazoo River. Five paper residual disposal areas and six paper mill properties located along the Kalamazoo River and Portage Creek are also included as part of the Site. Based on data collected by the potentially responsible parties (PRPs), it is estimated that there are at least 350,000 pounds of polychlorinated biphenyls (PCBs) in the sediment and soils in and adjacent to Portage Creek and the Kalamazoo River. The Site has been divided into several Operable Units (OUs), one of which is the 12th Street Landfill (12th St.-OU4), the subject of this Record of Decision (ROD).

The 12th St.-OU4 is located in the middle of Section 24, Township 1N, Range 12W, approximately 1.5-miles northwest of the city of Plainwell in Allegan County, Michigan, and 0.5-miles northeast of the Highway M-89 and 12th Street intersection (Figure 1). The 12th Street Landfill (landfill) is approximately 6.5 acres, and is bordered to the east by the former powerhouse discharge channel of the Plainwell Dam on the Kalamazoo River, to the north and northwest by wetlands, to the southeast by woodlands, and to the west by a gravel mining operation.

The areas that comprise the 12th St.-OU4 and that will be addressed by this ROD are shown on Figure 2 and listed below:

- The landfill itself, which primarily contains PCB-contaminated paper residuals (residuals), and from which PCB contamination has migrated into the surrounding areas.
- Groundwater contamination and any PCB-contaminated landfill leachate.
- The woodland located immediately south/southeast of the landfill.

- Wetlands, as identified by National Wetland Inventory maps, that border the landfill to the north and northwest.

- A portion of the adjacent gravel operation property (adjacent property) that borders the landfill to the west.

- A portion of the former powerhouse discharge channel of the Plainwell Dam on the Kalamazoo River, which contains residuals that have eroded from the east side of the landfill.

The 12th St.-OU4 is one of the major source areas of the Site. The landfill contains PCB-contaminated residuals, which have migrated into surrounding soils and river sediments. The landfill is a current, and potentially continuing, source of PCBs to the Kalamazoo River, its associated floodplains and wetlands, and to Lake Michigan. The remedial investigation (RI) for the 12th St.-OU4, together with other investigative documents prepared for the Site, have established that PCBs migrate from the 12th St.-OU4 into adjacent properties and, ultimately, off-site due to erosion. This migration of PCBs contributes to the ongoing contamination of the soils, sediments, surface water, and biota of the Site and Lake Michigan.

The Kalamazoo River and Portage Creek have been designated a site of environmental contamination under Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), due to PCB contamination. The Kalamazoo River and Portage Creek have been identified as an Area of Concern by the International Joint Commission on the Great Lakes due to the detrimental impact the release of PCBs has on Lake Michigan. Because of widespread PCB contamination, the Site was placed on the National Priorities List (NPL) in August 1990 in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act, 1980 PL 96-510 (CERCLA). In addition, due to the PCB contamination, the Michigan Department of Community Health has issued a fish consumption advisory annually since 1977 for reaches of the Kalamazoo River and Portage Creek, including the reach of the Kalamazoo River adjacent to the 12th St.-OU4.

The landfill, woodland, wetlands, adjacent property, and the former powerhouse discharge channel of the Kalamazoo River provide habitat for numerous important fish, aquatic, and terrestrial species. Species of special concern at the Site, including the 12th St.-OU4, include mink and eagles, due to their sensitivity to PCB contamination.

The river reach next to the 12th St.-OU4 is an important natural resource for southwest Michigan, providing recreational opportunities such as fishing, hunting, trapping, bird watching, boating, and swimming. The public enjoys recreational opportunities such as hiking and biking along extensive trail systems. Residents and visitors to the area also enjoy wetland and woodland habitats that support numerous species of plants, birds, reptiles, amphibians, and mammals.

B. SITE HISTORY AND ENFORCEMENT ACTIVITIES

PCBs are a hazardous substance and probable human carcinogen. The landfill contains an estimated 208,000 cubic yards of PCB-contaminated residuals, consisting predominantly of mineral matter in the form of gray clay. The PCB waste was generated at the Plainwell Paper Mill and disposed of by the past owners and operators of the mill in a low lying wetland area, which is now the landfill. From 1955 to 1981, the landfill was used for disposal of residuals from the paper mill.

Once the PCB-contaminated residuals were dumped, they could flow unrestricted out into the woodland, wetlands, adjacent property, former powerhouse discharge channel, and the Kalamazoo River. RI activities and site reconnaissance indicate that this waste entered the former powerhouse discharge channel, wetlands, woodland, and the adjacent property to the west. Historical photography does not show any evidence of containment.

In 1970 the Michigan Department of Environmental Quality (MDEQ) conducted a routine surface water and biota sampling at the mouth of the Kalamazoo River. The results of this investigation indicated that PCBs in the river were being discharged into Lake Michigan. A biological survey conducted by the MDEQ in 1971, pursuant to a federal Water Pollution Control Act (WPCA) program to monitor tributaries of Lake Michigan, confirmed that PCBs in the Kalamazoo River were discharging to Lake Michigan and were bioavailable.

PCBs are an oily liquid, clear to light yellow in color, and have no smell or taste. PCBs are a hazardous substance, are carcinogenic in animals, and a probable human carcinogen. Characteristics of PCBs that cause them to be especially persistent in the environment are that they bind strongly to soils, do not dissolve well in water, are not easily broken down, and are lipophilic and therefore have an affinity for the fatty tissue of biota. These characteristics cause PCBs to bioaccumulate.

A search conducted in 1990 identified three PRPs for the PCB contamination: H.M. Holdings, Inc. (now known as Millennium Holdings, Inc./Allied Paper, Inc.), Georgia-Pacific Corporation, and Simpson Plainwell Paper Company (now known as

Plainwell Paper, Inc.). These PRPs were notified of their status as potentially liable parties on June 23, 1990. In 1994, the James River Corporation (now known as Fort James Corporation) was added as a PRP. These four parties have been identified as PRPs due to past paper mill operations involving the recycling and deinking of office waste paper that included carbonless copy paper during the period from 1957 to at least 1971. During this time PCB-contaminated paper residuals were discharged directly to Portage Creek and the Kalamazoo River. The PRPs also disposed of large quantities of PCB-contaminated paper residuals in five disposal areas and several lagoons that subsequently released the residuals to Portage Creek and the Kalamazoo River.

On December 28, 1990, the PRPs signed an Administrative Order by Consent (AOC) with the state of Michigan and agreed to fund and conduct the RI/Feasibility Study (FS) for the Site, including the 12th St.-OU4. The RI/FS for the 12th St.-OU4 was initiated in July 1993, and completed in July 1997. The RI/FS reports, as well as all other appropriate data and materials, have been placed in the Administrative Record.

The Michigan Paper Company originally founded the Plainwell Paper Mill in 1886. Hamilton Paper purchased the mill in 1956 and named it the Michigan Division. Weyerhaeuser acquired the company in 1961 and operated the mill through the 1960s. Nicolet Paper Company was the owner from 1971-1975, and the mill became known as the Plainwell Paper Company. The mill retained the name Plainwell Paper Company under ownership by Philip Morris, Inc. and Philip Morris Industrial, Inc. from 1975 through 1984. The mill was then purchased by the Chesapeake Corporation in 1985. In late 1987, Simpson Paper Company purchased the mill and it became the Simpson Plainwell Paper Company. In 1998, the Simpson Plainwell Paper Company was merged into Plainwell Paper, Inc.

C. COMMUNITY PARTICIPATION

The Responsiveness Summary in Section II discusses the involvement of the community during the 12th St.-OU4 RI/FS and remedy selection process. As lead agency through the RI/FS process, the MDEQ has made every effort to ensure that the public, including the PRPs, have been afforded the opportunity to participate in the creation of the Administrative Record supporting this decision for the 12th St.-OU4, in a manner consistent with Sections 113 (k)(2)(B)(i)-(v), and 117 of the CERCLA. Attachment 1 is a brief synopsis of the community relation activities conducted by the MDEQ for this 12th St.-OU4.

D. SCOPE AND ROLE OF THE 12th St.-OU4 WITHIN THE SITE STRATEGY

The purpose of this ROD is to select the Remedial Action (RA) for the 12th St.-OU4. The selection of remedies for the other OUs, including Portage Creek and the Kalamazoo River, will be addressed in RODs specific to those areas.

The selected remedy for 12th St.-OU4 is a source control remedy that relocates residual material from the areas outside the landfill back into the landfill, and contains the PCB-contaminated material within the landfill by constructing a cap and containment system. The RA will include wetland mitigation and restoration of all excavated areas or areas otherwise affected by the RA activities. The cap and containment system of the landfill will be considered a final action. Post excavation sampling will be conducted in the excavated areas outside the landfill in accordance with an approved workplan. A final decision on whether additional response actions are necessary for the areas outside the landfill that are part of this RA will be made as part of the ROD for the Phase I portion of the Kalamazoo River (Morrow Pond Dam downstream to Lake Allegan, including Portage Creek). The remedy for the landfill proper will prevent the future release of PCBs to surface water, sediments, and the area surrounding the landfill.

The remedy does not include treatment that would reduce toxicity, mobility, or volume as a principal element. A highly significant reduction in the mobility of PCB-contaminated material will be achieved, however, by means of source containment. Although incineration was evaluated as a treatment option for these types of wastes as part of the King Highway Landfill Operable Unit 3 (KHL-OU3) remedy selection, the volume of the waste, implementation time, technical and administrative difficulties associated with implementation and cost made such a remedial approach prohibitive. Available information on landfill operations at the Site indicate, moreover, that it would not be feasible to locate and separately address concentrated areas of PCBs (hot spots) within the landfill because PCBs appear to be widespread throughout the landfill. Therefore, alternatives were not formally evaluated for identification and treatment or removal of hot spots. As required by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), a periodic (five-year) review of the remedy effectiveness will be performed.

E. SUMMARY OF 12th St.-OU4 CHARACTERISTICS

Land use in the immediate vicinity of the 12th St.-OU4 is generally characterized as industrial, with residential dwellings present beyond the nearby gravel pits and asphalt recycling/cement facilities that constitute the adjacent industrial use to the south and southwest. Extensive wetlands are present north and northwest of the

OU, and the Kalamazoo River and Plainwell Dam are located to the east and southeast. Access to the landfill is not reliably restricted. Fencing is present along the south side of the landfill only.

Based upon the information available to the MDEQ, the landfill portion of the 12th St.-OU4 is comprised mostly of paper residuals, with some concrete rubble and construction debris, waste lumber, and corroded steel drums. The presence of PCBs at the 12th St.-OU4 is a direct result of waste treatment systems operated at the Plainwell Paper Mill. The PCBs are associated with fine, gray, kaolinite clays that compose the bulk of the paper residuals that were disposed of in the landfill between 1955 and 1981.

The presence of PCB-contaminated residuals, soils, and sediments in areas outside the landfill is due to past or ongoing releases from the landfill. The sides of the landfill contain PCB-contaminated residuals that continue to be eroded into the woodland, wetlands, adjacent property, the former powerhouse discharge channel, and the Kalamazoo River. The possibility of catastrophic failure of any of the sides of the landfill is considered to be an additional potential release.

The cover on the landfill consists of sand, soil, and fly ash and ranges from between two and seven feet thick. This cover was applied only to the top of the landfill, and residual material on the sides remain exposed and have been and are being eroded into areas outside the landfill. The maximum thickness of the residuals within the landfill at the locations sampled is approximately 28 feet. There is perched PCB-contaminated leachate present in the landfill, due to the relatively low permeability of the residuals.

The upper portion of the surficial aquifer consists of sand and gravel, which is typical for this area. Geologic information, groundwater elevations, and stream stage elevations indicate that there is a hydraulic connection between shallow groundwater and the river. Plainwell Dam was found to have an influence on groundwater flow, particularly in the southeast portion of the Site.

Analytical Results:

In total, 62 residual/soil samples were collected within the landfill from a total of 16 test pits, six soil borings, and a buried steel drum, and analyzed for PCBs, volatile organic compounds (VOC's), semi-volatile organic compounds (SVOC's), inorganic compounds, pesticides, and dioxins and furans. Elevated concentrations of PCB's were detected in 31 samples, with a maximum concentration of 140 milligrams per kilogram (mg/Kg). Numerous inorganic compounds and pesticides

were detected in several samples above applicable cleanup criteria, whereas benzene, toluene, ethylbenzene, xylene isomers, and pentachlorophenol were detected above industrial and commercial cleanup criteria in isolated instances. Dioxins and furans were detected in each of the three samples analyzed for these parameters. Total toxic equivalency (TEQ) concentrations of dioxins and furans ranged from approximately 141 nanograms per kilogram (ng/Kg) to 2,241 ng/Kg. The maximum TEQ for dioxin detected (2,241 ng/Kg) exceeds state of Michigan Residential, Commercial I, Commercial II, Commercial III, and Industrial Criteria.

Soil/residual samples were collected from soil and monitor well borings that were conducted outside the landfill perimeter, and from two sediment cores collected in the former powerhouse discharge channel immediately adjacent to the east side of the landfill. Elevated PCB concentrations were reported in 24 of the 45 samples analyzed, including both samples collected from the former powerhouse discharge channel, with a maximum concentration of 158 mg/Kg. Elevated concentrations of inorganic compounds were also detected in several samples at levels exceeding applicable criteria. Trace concentrations of VOC's, SVOC's, and pesticides were also reported.

Attachments 2 and 3 include analytical data tables from Technical Memorandum 8 and the RI report that summarizes the soil/residual sample results. Figure 3 depicts the sample locations, with the exception of the sediment samples that were collected in the former powerhouse discharge channel at a location approximately 25 feet northeast of DB-14. Figure 3 also illustrates the approximate extent of visible paper residuals that are contiguous with the landfill.

In 1993, groundwater samples were collected from 15 monitor wells and analyzed for VOC's, SVOC's, inorganic compounds, pesticides, and PCB's. PCB's were not detected and all other results were either non-detect or below Industrial and Commercial Drinking Water Criteria and Groundwater Surface Water Interface (GSI) Criteria, with the exception of bis(2-Ethylhexyl) phthalate, which was detected in groundwater at a concentration of 290 micrograms per liter (ug/L). In 1995, a second round of groundwater samples was collected from each monitor well. Groundwater analyses was limited to PCB's only, and results indicated non-detectable concentrations.

Three leachate wells were sampled in 1993 and again in 1995. Analytical results from the 1993 sampling event indicate that trace concentrations of various VOC's, SVOC's, and Aldrin were present as well as an elevated concentration of toluene (680 ug/L) in leachate collected from LH-2. The toluene concentration exceeds GSI

Criteria. In 1995 leachate samples were analyzed only for PCB's. Results indicate that leachate collected from leachate well LH-1 had PCB concentrations of 1.4 ug/L.

F. SUMMARY OF SITE RISKS

In 1994, a baseline risk assessment was conducted for the KHL-OU3, another OU in the Site, to evaluate risks to human health under unremediated conditions. Due to the similarities between the KHL-OU3 and the 12th St.-OU4, such as similar waste (i.e., PCB-contaminated residuals generated from the same paper recycling process at similar concentrations), identical routes of exposure, and identical receptors, it was assumed that there was a similar level of unacceptable risk at the 12th St.-OU4. Consequently, an OU-specific risk assessment was not conducted for 12th St.-OU4.

A Site-wide Baseline Ecological Risk Assessment (BERA) was however, completed in June 1999 (subsequently amended in August 2000). Although the BERA is currently being revised by the MDEQ and the United States Environmental Protection Agency (U.S. EPA), results of the BERA continue to indicate that PCB concentrations in surface water, in-stream sediments, and floodplain sediments that can erode into an aquatic environment and which are present at the 12th St.-OU4, exceed threshold levels that are protective of ecological health. A Human Health Risk Assessment (HHRA) that is currently being completed also indicates that there is an unacceptable risk for ingestion of biota from the Kalamazoo River. Listed below is a summary of risks.

1. Human Health Risks

Based on the setting of the 12th St.-OU4 and the known existing conditions, PCBs are the primary threat. Possible exposure pathways include incidental ingestion and dermal contact with surface soil, sediment, and residuals by on-site workers, trespassers and anglers; inhalation of airborne particulates by on-site workers; and, ingestion of fish.

As previously explained, the King Highway Landfill Risk Assessment was used to estimate the risks associated with incidental ingestion, dermal contact, and inhalation exposure scenarios. The HHRA being completed summarizes the human health risks. PCB concentrations detected at the 12th St.-OU4 exceed the threshold levels identified in the HHRA, and exceeds applicable criteria outlined in the NREPA.

2. Environmental Risks

The primary habitat in the vicinity of the 12th St.-OU4 is the Kalamazoo River and associated extensive wetlands and the woodland. The landfill sides, upslope from the Kalamazoo River, are part of the ecosystem encompassed by the Kalamazoo River, woodland, and wetlands. There are no barriers to prevent fauna movement to the landfill, woodland, wetlands, adjacent property, or river that have been impacted by PCB releases from the landfill, all of which provide habitat for terrestrial and aquatic species.

The aquatic flora and fauna in the vicinity of the 12th St.-OU4 are typical of the area. Most aquatic wildlife species are generally associated with the adjacent river and wetlands. The aquatic habitat of the river and wetlands adjacent to the landfill provide support for development of various life stages of fish, turtles, and amphibians.

Terrestrial wildlife species which inhabit the 12th St.-OU4 include small mammals (e.g., mice, squirrels, woodchucks, mink, raccoons, fox, and muskrats) and birds, especially passerines and waterfowl. The Kalamazoo area is part of a major migratory flyway route for waterfowl species, and the area surrounding the 12th St.-OU4 is a migratory stopover that attracts and supports waterfowl. During nesting season, vegetation in the area provides cover and materials for nesting. Larger mammals, such as white-tailed deer, also use the 12th St.-OU4 as indicated by the deer paths running over the top and along the sides of the landfill. Muskrat dens have been observed in the wetlands and there is evidence of extensive burrowing into the sides of the landfill by fox and woodchuck.

There is no federally listed endangered or threatened species known to reside within the 12th St.-OU4. Because the 12th St.-OU4 is one of several sources of PCBs to the rest of the Site, it is important to consider the federally listed endangered or threatened species that inhabit the entire Site. The federally-listed endangered or threatened species known to reside within the Site are two turtle species that are considered scarce, one snake species that is considered endangered, bald eagles that are considered a threatened species, and four threatened and one scarce plant species.

Total PCB concentrations that were detected at the 12th St.-OU4 in surface water and sediment exceed the state Surface Water Quality Division standards for protection of avian and mammalian wildlife.

Environmental risks associated with exposure to PCBs from the 12th St.-OU4 are listed below.

- Sensitive aquatic biota such as invertebrates and fish, are likely to be adversely affected both directly (direct contact) and indirectly (food chain) by PCBs in surface water and sediment. These effects include mortality, reproductive effects (i.e., failure), decreased populations, and growth retardation for sensitive species.

- PCB contamination of surface water and sediment affects sensitive piscivorous predators, such as mink, through consumption of PCB-contaminated prey. Impaired reproduction of mink and, ultimately, decreases in mink populations are the observed effects of PCB contamination in aquatic prey.

- Other less sensitive piscivorous predators, such as bald eagles, are at risk if fish are consumed and if foraging takes place mostly within contaminated aquatic areas. Bald eagles have successfully nested only three times since 1990 at the Site, producing a total of only five young. This success rate is well below what the U. S. Fish and Wildlife Service considers either a stable or healthy population.

- Terrestrial and semi-aquatic biota are at risk from PCB-contaminated sediment and soil, depending on life history (e.g., foraging behavior, diet, mobility) and sensitivity to PCBs.

- Carnivorous terrestrial species are likely to be at significant risk if foraging is concentrated in riparian areas with PCB-contaminated soil or sediment, and diet consists of prey that reside in PCB-contaminated areas.

- Omnivorous terrestrial species, represented by mice, appear to have moderate potential for risk from PCB-contaminated soil and sediment. These risks would be location-dependent, and would be influenced by diet, season, mobility of consumers, and by the level of contamination in food items.

- Omnivorous birds that consume a substantial amount of vegetation, represented by the robin, may be at risk if consumed terrestrial plants are taken from highly contaminated areas. Consumption of terrestrial

invertebrates such as earthworms is also expected to contribute to total PCB intake.

- Semi-aquatic herbivorous mammals, represented by muskrat, are at risk from PCB contamination because estimated dietary doses exceed recommended threshold values for rats. Muskrats contaminated with PCBs also cause adverse effects to muskrat predators such as mink.

In summary, due to the human health and ecological risks associated with the 12th St.-OU4, the objectives of the RA must address the following risks:

- Human health risks for persons who trespass or work on the 12th St.-OU4.

- Human health and ecological risks due to past migration of PCB from the landfill to the woodland, wetlands, adjacent property, former powerhouse discharge channel, and the Kalamazoo River.

- Human health and ecological risks due to the continuing release of PCB from the landfill to the woodland, wetlands, adjacent property, former powerhouse discharge channel, and the Kalamazoo River.

- Human health and ecological risks due to the potential additional release of PCB to the woodland, wetlands, adjacent property, former powerhouse discharge channel, and the Kalamazoo River caused by failure of the sides of the landfill.

G. DESCRIPTION OF ALTERNATIVES

The MDEQ has relied on the information and analysis contained in the Administrative Record for 12th St.-OU4 and KHL-OU3. General similarities between the KHL-OU3 and this 12th St.-OU4 justifies such an approach. Both landfills contain large quantities of the same type of contaminated paper-making residuals. The type and concentration of PCB contamination is similar for both landfills. The same paper making process (the recycling of carbonless copy paper) led to the generation of the residuals at both locations, and both landfills accepted residuals during approximately the same time period. Finally, each landfill is located adjacent to the Kalamazoo River.

The screening of the alternatives for KHL-OU3 was determined to be applicable to the 12th St.-OU4. During the KHL-OU3 RI/FS, a total of seven potentially applicable technologies that incorporated 60 different process options were screened with respect to technical implementability. Based upon this screening, three potentially applicable technology types, as well as the No Action alternative, were carried forward in the remedy selection process for the KHL-OU3. Based on the analysis in the KHL-OU3 FS evaluation, the MDEQ determined that consolidating the PCB-contaminated material from outside the landfill back into the landfill, and capping and closing the landfill in accordance with Part 115, Solid Waste Management, of the NREPA standards and as specified in this ROD, was protective of human health and the environment.

Based on the information contained in the Administrative Records for both KHL-OU3 and this 12th St. OU4, the MDEQ has formally evaluated the following two alternatives for purposes of this ROD:

Alternative 1: No Action
Development of the No Action alternative is required under the NCP (40 Code of Federal Regulations (CFR) 300.430). It was evaluated as required by the NCP to provide a baseline for comparison of the effectiveness of the remedial alternatives. Under the No Action alternative, no active response measures would occur, and therefore, no risk reduction would result from the No Action alternative.

Alternative 2: Landfill Closure (excavation, containment, and capping in accordance with Part 115, Solid Waste Management, and Part 201, Environmental Remediation, of the NREPA, and restoration of areas affected by the RA).
Alternative 2 provides for relocating residual material that has eroded from the four areas outside the landfill back into the landfill, closure of the landfill in accordance with certain requirements of Part 115, Solid Waste Management, and Part 201, Environmental Remediation, of the NREPA, restoration of areas impacted by the remedial activities, and other requirements which the MDEQ, in consultation with the U.S. EPA, has determined to be necessary to ensure long-term protectiveness of human health and the environment. Closure of the landfill involves: *(1)* visual identification by the lead agency of PCB containing material and excavation of that material; (2) installing a landfill cap including a flexible membrane liner (FML); *(3)* construction of a new sidewall containment system (SWCS) with sufficient erosion protection to prevent berm failure under 500 year flood conditions; (4) location of the SWCS at such a distance from the Kalamazoo River/former powerhouse discharge channel to ensure that there can be no hydraulic connection between the Kalamazoo River/former powerhouse discharge channel and the wastes within the landfill during the lifetime of the remedy; and (5) restoration of all areas excavated or

otherwise affected by the RA. In addition, this alternative requires long-term groundwater monitoring to verify the effectiveness of the containment system and an evaluation during remedial design (RD) to determine if methane or leachate production is occurring. If the RD analysis indicates that methane or hazardous leachate is present or likely to occur after construction of the landfill cap, then this alternative will include the installation of a gas venting system and/or a leachate collection system. Wetland mitigation and restoration of excavated areas or areas otherwise affected by the RA activities will also be conducted in accordance with an approved plan. Finally, institutional controls such as deed restrictions, fencing, and sign posting shall be utilized to reduce potential human exposure to soil, residuals, and other media.

The 1997 FS identified capital costs of $1,655,040 associated with implementing Alternative 2, and annual operation and maintenance (O&M) costs of $14,000, resulting in a present worth cost of $1,828,800, based on 1997 dollars. Data indicates that residual material has continued to erode from the landfill since the RI/FS data was collected, and consequently, the volume of residuals in the areas outside the landfill is now approximately 4,000 cubic yards. Consequently, the impacted area is larger than presented in the 1997 FS and costs for clearing and grubbing and excavating the additional area, and wetland mitigation and restoration of affected areas now reflect the larger area. In addition, costs associated with post-excavation sampling to identify the concentration of any remaining PCBs, and some O&M were inadvertently excluded from the 1997 FS. With the aforementioned additional expenses, revised capital costs are $1,769,238, and O&M costs are $434,967, resulting in total costs of $2,204,205 (approximately a 20 percent overall increase from 1997).

Attachment 4 summarizes the costs.

Capital costs consist of direct costs (e.g., construction, equipment, transportation, disposal, analytical, treatment, and contingency) and indirect costs (e.g., engineering, legal, and permitting fees) incurred by implementing a specific alternative. O&M costs refer to long-term, post-construction measures necessary to ensure continued effectiveness of the RA. The O&M costs were developed for the first year of system operation and the 30-year present worth cost analysis. Total net present worth cost is intended to represent the sum of money, if invested in the base year and disbursed as needed, that would be sufficient to cover costs of a remedy over its planned life (assumed to be 30 years for comparison purposes).

This alternative is estimated to take approximately one year to reach construction completion.

H. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

In accordance with the NCP, the relative performance of each alternative is evaluated using the nine criteria (Section 300.430 (e)(9)(iii)) of the NCP as a basis for comparison. The purpose of the evaluation process is to determine which alternative: (a) meets the threshold criteria of overall protection of human health and the environment and attainment of Applicable or Relevant and Appropriate Requirements (ARARs), (b) provides the "best balance" with respect to the five balancing criteria of 40 CFR § 300.430(e)(9)(iii)(C)-(G), and (c) takes into consideration the acceptance of the support agency (here, the U.S. EPA) and the community.

As noted above, the MDEQ relied on the comparative analysis performed in connection with the KHL-OU3 to reach a remedy decision for this 12th St.-OU4. A formal analysis under the NCP of alternatives in this decision document would result in the same conclusion as those for the KHL-OU3 FS and ROD, and therefore was not conducted in order to prevent a duplication of effort.

1. Threshold Criteria

a. **Overall Protection of Human Health and the Environment** addresses whether a remedy provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled through treatment, engineering, or institutional controls. The selected remedy must meet this criterion.

The major exposure pathways of concern at the 12th St.-OU4 are ingestion, inhalation, and dermal contact with PCB-contaminated soils, sediments, or residuals in the landfill or in the areas outside the landfill; dermal contact with PCB-contaminated surface water; and ingestion of fish.

Alternative 2 would provide adequate protection of human health and the environment by controlling the mobility of contaminants through engineering and institutional controls. A cap would serve as a barrier to human and wildlife contact with the residuals. An adequate cap would also decrease the rate of precipitation infiltration, thereby reducing the likelihood of formation of new leachate and the potential for PCBs to migrate into groundwater. Construction of new berms would prevent release of PCBs due to side failure. Excavation using visual criteria to remove residuals from the landfill sides, woodland, wetlands, adjacent property, and in a portion of the former powerhouse

discharge channel, and relocating the residuals back into the landfill prior to the construction of the cap, will reduce the potential for exposure and migration of PCBs into the environment. A buffer zone will be established between the toe of the newly constructed berm and the former powerhouse discharge channel in order to ensure that, for the lifetime of the remedy, no hydraulic connection exists between the landfill and the Kalamazoo River/former powerhouse discharge channel.

The No Action alternative does not provide adequate protection because it does not address the existing unacceptable human health and ecological risks associated with the 12th St.-OU4.

b. **Compliance with ARARs** addresses whether a remedy meets ARARs set forth in federal and state environmental laws and/or justifies a waiver from such requirements.

ARARs for this RA include the following:

- Surface water quality standards contained in Part 31, Water Resources Protection, of the NREPA.
- Rules established pursuant to Part 31, Water Resources Protection, of the NREPA regarding permit requirements.
- Site-specific pollutant limitations and performance standards which are designed to protect surface water quality contained in the federal Clean Water Act (CWA).
- Regulations prohibiting unauthorized obstruction or alteration of any navigable water in the United States (dredging, fill, cofferdams, piers, etc.) contained in the federal River and Harbor Act.
- Regulations regarding the dredging or filling of lakes or stream bottoms contained in Part 301, Inland Lakes and Streams, of the NREPA.
- Rules prescribing soil erosion and sedimentation control plans, procedures, and measures contained in Part 91, Soil Erosion and Sedimentation Control, of the NREPA.

- Rules prohibiting the emissions of air contaminants in quantities which cause injurious effects to human health, animal life, plant life of significant economic value, and/or property contained in Part 55, Air Pollution Control, of the NREPA.

- National ambient air quality standards contained in the federal Clean Air Act.

- Statutory provisions and rules specifying environmental response, risk assessment, RA, and site cleanup criteria pursuant to Part 201, Environmental Remediation, of the NREPA.

- Certain regulations regarding the construction, operation, and closure of sanitary landfills, solid waste transfer facilities, and solid waste processing plants pursuant to Part 115, Solid Waste Management, of the NREPA.

- Effluent standards for toxic compounds including PCBs contained in the federal WPCA Toxic Pollutant Effluent Standards.

- Regulations regarding activities in wetlands found in Part 303, Wetland Protection, of the NREPA.

- Federal regulations under the Toxic Substances Control Act (TSCA) regarding the risk-based disposal of PCB remediation waste, 40 CFR § 761.61(c).

Requirements of the above ARARs will be met by Alternative 2.

The No Action alternative does not meet the ARARs.

2. Primary Balancing Criteria

c. **Long-term Effectiveness and Permanence** refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals have been met.

Alternative 2 would provide long-term effectiveness via isolation of the residuals by capping and containment. The RA for the landfill will be considered a final action. Long-term O&M and monitoring of the landfill must be provided to ensure that the remedy maintains its ability to protect human health and the

environment over time. A final decision on whether additional response actions are necessary for the areas outside the landfill that are part of this RA will be made as part of the ROD for the Phase I portion of the Kalamazoo River.

The No Action alternative does not meet the long-term effectiveness and permanence criteria.

d. **Reduction of Toxicity, Mobility, or Volume Through Treatment** addresses the statutory preference for selection of RA that employ treatment technologies that permanently and significantly reduce toxicity, mobility, or volume through treatment of the hazardous substance as a principal element.

As detailed above, the stated programmatic goal of the U.S. EPA, as expressed in the NCP, is to select remedies that are protective over time and "minimize untreated waste", Section 300.430 (a)(1)(i). The NCP states that the U.S. EPA will use "treatment to address the principal threats at a site, wherever practicable", Section 300.430 (a)(l)(iii)(A). This preference is satisfied when treatment is used to reduce the principal threats at a site through destruction of toxic contaminants, reduction of total mass of toxic contaminants, irreversible reduction in contaminant mobility, or reduction of total volume of contaminated media.

Alternative 2 would not result in the reduction in the toxicity, mobility, or volume of contaminants through treatment. The employment of treatment technologies at this OU was not found to be practicable. Alternative 2 will, however, achieve significant reductions of the mobility of the contaminants at this OU through containment, and this reduction in mobility will endure for as long as the integrity of the containment system is maintained.

The No Action alternative does not reduce toxicity, volume, or mobility.

e. **Short-term Effectiveness** considers the time to reach cleanup objectives and the risks an alternative may pose to site workers, the community, and the environment during remedy implementation. This criterion also considers the reliability and effectiveness of any mitigative measures taken during remedy implementation to control those short-term risks.

It is estimated that once construction is started, Alternative 2 could be completed in approximately one year. Alternative 2 has some potential short-term negative impacts. For example, truck traffic during cap construction may increase noise and dust in the vicinity of the landfill, however, air monitoring will be required and

protective controls will be implemented to suppress dust in order to comply with federal and state air quality standards. The use of erosion controls will be used to mitigate any short-term effects posed by potential siltation and contaminant release to the Kalamazoo River. Health and safety precautions will be undertaken to reduce the likelihood of accidents during construction and to protect site workers and the community from unacceptable exposures to hazardous substances. The discharge of treated water to the surface water of the Kalamazoo River or to the Kalamazoo Wastewater Treatment Plant will be in accordance with a National Pollutant Discharge Elimination System (NPDES) permit. This permit will establish discharge criteria (as administered by the state under Part 31, Water Resources Protection, of the NREPA), that are set at protective levels.

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

No significant implementation problems are projected for Alternative 2. Cap and containment system materials are expected to be obtainable from nearby sources and standard construction methods will be used. All necessary excavation and NPDES permits, or any other required permit can be obtained from the federal or state governments. Excavation firms are available to install sheetpile and remove the residual material from the wetlands, woodland, adjacent property, and the portion of the former powerhouse discharge channel that contains residuals that have eroded from the landfill. Environmental controls will be implemented to prevent air emissions to the atmosphere or migration of PCBs to the river during excavation and cap and containment system construction.

g. **Cost** listed below in Table 1 include estimated capital and O&M costs, also expressed as net present worth. The O&M will need to be continued for the lifetime of the remedy because the remedy leaves hazardous waste at the 12th St.-OU4.

TABLE 1

Estimated Cost of Remedial Alternatives for the 12th St.-OU4

ALTERNATIVE	capital	O&M (30 YEARS)	PRESENT WORTH
1. No Action	None	None	None
2. Excavate, cap and contain, wetland mitigation	$1,769,238	$434,967	$2,204,205

3. Modifying Criteria

h. **Support Agency Acceptance** addresses whether or not the support agency agrees with, or objects to, any of the remedial alternatives.

The U.S. EPA, as the support agency for the Site, agrees that **Alternative 2** is protective of human health and the environment.

i. **Community Acceptance** addresses the public's general response to the remedial alternatives and to the Proposed Plan. Specific responses to public comments are addressed in the attached Responsiveness Summary.

I. THE SELECTED REMEDY

Based upon the evaluation of the RI/FS completed in connection with this 12th St.-OU4, the RI/FS completed in connection with the KHL-OU3, other analyses performed in connection with the Kalamazoo River OU, and the nine criteria for remedy selection contained in the NCP, the MDEQ selects Alternative 2 as the remedy for the 12th St.-OU4. The RA shall insure that unacceptable exposure to PCBs will not occur. Construction details for Alternative 2 shall be part of the RD.

1. Excavation

Prior to any excavation in the woodland, wetlands, adjacent property, or the former powerhouse discharge channel, the horizontal and vertical extent of the PCB contamination shall be determined based on field reconnaissance and/or sample analyses. The east side of the landfill, along the former powerhouse

discharge channel and the river, shall also be excavated and relocated further into the landfill. The excavation shall be extensive enough to create an adequate buffer zone to ensure that, for the lifetime of the remedy, no hydraulic connection exists between the PCB-contaminated wastes within the newly constructed landfill containment system and the Kalamazoo River/former powerhouse discharge channel. This buffer zone shall take into account potential changes in the direction and current of the river's flow. This buffer zone shall be of sufficient size to allow for the installation of and access to groundwater monitoring wells and to provide for a hydraulic separation between the waste and the surface water.

An excavation work plan shall be submitted to the lead agency for review and approval prior to initiating any excavation activity. The excavation work plan shall be based on the results of the pre-excavation sampling and/or field reconnaissance and shall include air and surface water monitoring provisions. Subsequent to work plan approval, all excavated material will be dewatered as necessary and disposed of in the landfill prior to construction of the cover and containment system.

Following post-excavation sampling, a determination whether additional response actions will be necessary for the areas outside that landfill will be made as part of the ROD for the Phase I portion of the Kalamazoo River.

Short-term surface water monitoring shall be conducted during all construction activities and excavation of materials from the landfill, woodland, wetlands, adjacent property, and the former powerhouse discharge channel in accordance with an approved monitoring plan. Surface water monitoring shall be conducted in order to assure that public health, safety, welfare, and the environment are being protected in accordance with state and federal law during implementation of excavation activities.

Air monitoring may be necessary during the RA activities. This monitoring may be necessary to ensure that the RA activities do not violate the rules prohibiting the emission of air contaminants in quantities which have injurious effects on human health, animal life, plant life of significant economic value, and/or property as established in Part 55, Air Pollution Control, of the NREPA.

Upon completion, the excavated areas shall be restored to their natural condition in accordance with an approved plan. Soil erosion shall be controlled compliant with state law during remedy implementation. Restoration of the wetlands

pursuant to Part 303, Wetlands Protection, of the NREPA, shall also be carried out.

2. Cap

Under Alternative 2, a cap shall be placed in the landfill portion of the 12th St.-OU4 in compliance with the appropriate requirements of Part 115, Solid Waste Management, of the NREPA concerning cap specifications for closure of a solid waste disposal facility. The construction of the cap over the landfill will minimize infiltration of precipitation through the landfill and migration of PCB from the landfill into the groundwater, woodland, wetlands, adjacent property, and the former powerhouse discharge channel. The cap consists of the following components from bottom to top.

A layer of select granular fill at least six inches thick, from an off-site source, having a minimum hydraulic conductivity of 1×10^{-3} centimeters per second, shall be placed on top of the landfill as a suitable sub-grade for the cap. The need for a gas venting system will be evaluated in the RD process. If it is determined that a gas venting system is needed, this layer will be modified as approved by the MDEQ to also act as a gas venting layer. If so modified, this gas venting layer shall be designed to collect landfill gas (methane) and route it to a passive venting system. If it is determined that a gas venting system is required, it shall be monitored pursuant to an approved monitoring plan to determine whether emissions may cause potential health effects. If potential health effects are indicated, an emission treatment system shall be placed in the venting system as directed by the lead agency to reduce the emissions to acceptable levels. A polyvinyl chloride (PVC) geomembrane liner at least 30 mils thick, or its equivalent, will be placed over the select granular fill.

A general fill (protective) layer at least 24 inches thick will be placed above the 30-mil PVC, geomembrane liner. The protective layer will be capable of sustaining the growth of non-woody plants, and shall have adequate water holding capacity. The water that accumulates within this layer will drain to a sedimentation outlet structure and discharge to the Kalamazoo River.

A vegetative (erosion) layer at least six-inches thick will be placed over the protective layer. The vegetative layer will be designed to promote vegetative growth, provide surface water runoff, and minimize erosion. The feasibility of using vegetation that would provide habitat, such as native grasses, will be addressed in the RD.

3. Erosion Protection

Erosion protection shall be placed on the newly constructed side walls of the landfill. This protection shall be sufficient to protect the side walls from a 500-year flood event. The erosion protection shall extend, at a minimum, to an elevation of 707.0 feet above mean sea level (MSL), which is approximately two feet above the 100-year flood elevation.

Placement of erosion and flood protection on the side walls of the landfill is consistent with requirements of Part 115, Solid Waste Management, Part 301, Inland Lakes and Streams, Part 91, Soil Erosion and Sedimentation Control, and Part 303, Wetlands Protection, of the NREPA.

4. Installation of Groundwater Monitoring System

Groundwater monitoring wells will be installed and wells that are no longer necessary will be properly abandoned. This groundwater monitoring system will be designed to detect any groundwater contamination from the landfill and will be developed as part of the RD in accordance with Part 201, Environmental Remediation, of the NREPA.

5. Long-Term Monitoring

Long-term groundwater monitoring shall be performed in accordance with an approved groundwater monitoring plan. The plan may require the installation of additional monitoring wells. The continued need for monitoring will be evaluated at the five-year review required under the NCP, and at each review thereafter, but shall continue until the lead agency, in consultation with the support agency, determines that such monitoring is no longer necessary. Monitoring of the groundwater aquifer under the landfill shall be conducted in accordance with Part 201, Environmental Remediation, of the NREPA.

6. Engineering Controls - Fencing

After the RA is completed, fencing shall be installed around the entire landfill portion of the 12th St.-OU4 in accordance with approved work plans.

7. Containment System

A containment system shall be constructed around the outside of the landfill. The existing sides of the landfill are constructed of sand, fly ash, and PCB-contaminated residuals. These sides were not designed to provide side slope stability, flood protection, or erosion control. The existing sides will be completely covered by the new containment system. The containment system shall be designed to prevent release of any PCB contamination. It must provide appropriate slope stability and flood and erosion protection. The containment system shall be designed, at a minimum, to meet the relevant provisions of Michigan Solid Waste Landfill closure regulations pursuant to Part 115, Solid Waste Management, of the NREPA. The containment system must be approved prior to construction.

8. Leachate Collection

During RD, an evaluation of the need for a leachate collection system shall be submitted for approval. The evaluation, at a minimum, shall consider the water content of the waste, the presence of perched water within the landfill, and the potential and effect of waste settlement.

If it is determined that leachate collection is necessary, a leachate collection system as specified by the lead agency shall be included in the final design and it shall be operated to assure that the public health, safety and welfare, and the environment are adequately protected.

9. Posting and Permanent Marker(s)

Permanent marker(s) shall be placed at the landfill describing the restricted area of the 12th St.-OU4 and the nature of any restrictions. Warning signs will also be posted on the fence every 200 feet and on all entry gates. The number, content, and location of the permanent markers and warning signs shall be approved by the lead agency.

10. Deed Restrictions

Deed restrictions approved by the lead agency shall be placed on the landfill area property to regulate future use of the landfill to protect public health, safety and welfare, and the environment.

11. Long-term Maintenance

Long-term maintenance, post-closure care, and financial assurance as required by Part 201, Environmental Remediation, of the NREPA, shall be provided as part of this RA. A detailed O&M Plan shall be submitted as part of the RD. Once approved, long-term O&M shall be carried out pursuant to the plan.

12. Other Provisions

Measures will be taken during remedy construction activities to minimize the noise and dust impacts of construction upon the surrounding community. Fugitive dust emissions will be monitored and controlled in a manner to ensure that they comply with the standards contained in Part 55, Air Pollution Control, of the NREPA.

13. Five-Year Review

Because this remedy will result in hazardous substances remaining on-site above health-based and ecological-based levels, a review will need to be conducted within five years after commencement of the RA, and every five years thereafter. This review will be done to evaluate whether the remedy continues to provide adequate protection of human health and the environment and determine if any additional action is needed for the remedy to be protective.

J. STATUTORY DETERMINATIONS

As explained at length below, the selected remedy is consistent with the requirements of Section 121 of CERCLA to:

1. Protect human health and the environment.
2. Comply with ARARs.
3. Be cost-effective.
4. Utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable.

Although the selected remedy does not satisfy the CERCLA's preference for treatment as a principal element of the remedy, such treatment was not considered necessary to ensure protectiveness at this 12 St.-OU4.

1. Protection of Human Health and the Environment

   The presence of PCBs at concentrations exceeding applicable criteria and ecological and human health based threshold values in areas outside the landfill is evidence of past and on-going releases. The possibility of failure of the sides of the landfill, especially the side between the landfill and the Kalamazoo River including the former powerhouse discharge channel, is recognized as a threatened future release of PCBs into the environment. The on-going release of PCBs to the environment is occurring from the PCB-contaminated residuals, soils, and sediments located in the landfill, woodland, wetlands, adjacent property, and the former powerhouse discharge channel. The data from the Lake Michigan Mass Balance Study indicates that at least 30 kilograms per year of PCB is being discharged from the Site into Lake Michigan. This action will reduce and control the migration of PCBs from the 12th St.-OU4.

   Following consolidation of the excavated material, the cap and containment system will provide a barrier that will control or eliminate the PCB exposure pathways, and will reduce precipitation infiltration through the residuals over time, thereby reducing the potential for additional leachate formation. The containment system will eliminate the erosion of contaminated material from the landfill. Engineering and institutional controls in the form of fencing and posting, along with deed restrictions, will further reduce the likelihood of human exposure to PCBs at the 12th St.-OU4.

   No unacceptable short-term risks or cross-media impacts will be caused by implementation of the remedy. As mentioned above, mitigative measures will be taken during excavation and construction activities to minimize noise and dust, siltation and contaminant release to the Kalamazoo River and surrounding community.

2. Compliance with ARARs

   The selected remedy will comply with the federal and/or state ARARs (categorized as chemical-specific, location-specific, and action-specific) listed below.

   a. **Chemical-specific ARARs**

      Chemical-specific ARARs regulate the release of specific substances which have certain chemical characteristics. Chemical-specific ARARs typically determine the extent of cleanup at a site.

      Federal Chemical-Specific ARARs:

TSCA

TSCA's PCB Remediation Waste Rule, 40 CFR § 761.61 et seq. provides cleanup and disposal options for PCB remediation waste. PCB remediation waste is that waste containing PCBs as a result of the spill, release, or other unauthorized disposal at a concentration, for purpose of this OU, equal to or greater than 50 ppm.

The Remedial Alternative selected in this ROD provides for disposal of the PCB remediation waste at this OU by means of the risk-based disposal method provided in 40 CFR § 761.61(c). This federal regulation allows the U.S. EPA Superfund Division Director, in consultation with the TSCA program, under which disposal is to occur, to make a determination that a proposed disposal method will not pose an unreasonable risk of injury to health or to the environment.

Through its request for concurrence on this ROD to the U.S. EPA Superfund Division Director, in consultation with the TSCA program, the MDEQ has applied pursuant to 40 CFR § 761.61(c)(1) for approval of the proposed disposal method, i.e. consolidation of the wastes and capping. During the RI/FS process for this 12th St.-OU4, the MDEQ has submitted to the U.S. EPA the information described in the notification required by 40 CFR § 761.61(a)(3), or its equivalent. The concurrence of the Region 5 Superfund Division Director, in consultation with the TSCA program, with the remedy selected in this ROD represents the U.S. EPA's written approval, pursuant to 40 CFR § 761.61(c)(2), of the MDEQ's application, and U.S. EPA's concurrence with the MDEQ's conclusion that the method of disposal selected in this ROD will not pose an unreasonable risk of injury to health or to the environment.

The conclusion that the consolidation and capping disposal method proposed in this ROD does not pose an unreasonable risk of injury to human health or to the environment is supported by all of the data collected in the RI. As an initial matter, most of the contaminated materials that will be disposed of in the landfill are not, by definition, PCB remediation wastes because the level of PCB contamination is below 50 ppm. The contaminated residuals in the landfill have had the opportunity to naturally settle for many years. The base of the contaminated residuals will have had time to dewater and establish a dense low hydraulic conductivity zone. Tests show that the residuals are relatively impermeable. These factors should reduce the likelihood that leachate, if produced can escape from the new landfill. In any event, soil investigations to be conducted during the RD phase of this

remedy will establish whether leachate is present or will be generated by compressing the residuals. The risk of leachate release will be evaluated and, if hazardous leachate is present in quantities that should be addressed, this remedy provides for installation of a leachate collection system.

The proposed cap will ensure that terrestrial biota are no longer exposed to the PCB-contaminated wastes in the landfill. The sides and slopes of the landfill will be constructed to withstand flooding that statistically occurs only once in every 500 years. This construction standard, along with the buffer zone that will be created between the former powerhouse discharge channel and the landfill, should ensure that the aquatic biota in the Kalamazoo River are no longer exposed to PCB-contaminated materials eroding from the landfill area. In short, no significant reduction in long-term risks to human health and the environment would be achieved by disposing of these contaminated materials off-site. In fact, off-site disposal carries the potential of additional short-term risks to excavation and transportation personnel.

In summary, this remedial alternative will achieve the TSCA ARAR by implementing a risk-based disposal method. The disposal method selected in this ROD comprises: (1) consolidation of the PCB-contaminated materials into the existing landfill area; (2) the creation of a buffer zone between the former powerhouse discharge channel and the landfill; (3) capping of the landfill in a manner that complies with all applicable Michigan requirements; and (4) if necessary, installation of a leachate collection system. This disposal method will pose no unreasonable risk to human health or the environment.

CWA - Ambient Water Quality Criteria:
This act and criteria establish monitoring requirements for the discharge of waste treatment effluents to waters of the United States. They are applicable to the surface water discharges resulting from excavation and dewatering of soils, sediments, or residuals from the former powerhouse discharge channel, wetlands, woodlands, and adjacent property.

Federal WPCA - Toxic Pollution Standards:
This act would be applicable to the discharge to the Kalamazoo River of water from all dewatering activities.

State Chemical-Specific ARARs:

Part 201, Environmental Remediation, of the NREPA provides for the identification, risk assessment, evaluation, and remediation of contaminated sites within the state; therefore, Part 201, Environmental Remediation, of the NREPA is applicable to the 12th St.-OU4. The statute and its rules provide, *inter alia*, that RAs shall be protective of human health, safety and welfare, and the environment of the state. Part 201, Environmental Remediation, of the NREPA, in particular those in Section 20120a and 20120b, specifies that a RA shall achieve a degree of protectiveness appropriate for the use of the property, in this case, the 12th St.-OU4.

Part 31, Water Resources Protection, of the NREPA establishes effluent standards in accordance with the federal WPCA and the CWA, and also establishes rules specifying standards for several water quality parameters including PCBs. Part 31, Water Resources Protection, of the NREPA, would be applicable to the discharge of water from the site to the Kalamazoo River.

b. **Location-Specific ARARs**

Location-specific ARARs are those requirements that relate to the geographical position of a site. These include:

State Location-Specific ARARs:

Part 115, Solid Waste Management, of the NREPA:
Part 115, Solid Waste Management, of the NREPA contains regulations regarding the construction, operation, and closure of sanitary landfills, solid waste transfer facilities, and solid waste processing plants.

c. **Action-Specific ARARs**

Action-Specific ARARs are requirements that define acceptable treatment and disposal procedures for hazardous substances.

Federal Action-Specific ARARs:

CWA:
The CWA establishes site-specific pollutant limitations and performance standards that are designed to protect surface water quality. Types of discharges regulated under the CWA include discharge to surface water, indirect discharge to a publicly owned treatment works (POTW), and

discharge of dredge or fill materials to United States waters. This act is relevant to the treatment and discharge of water to the Kalamazoo River or POTW from the dewatering operations.

Rivers & Harbor Act:
The Rivers & Harbor Act prohibits unauthorized obstruction or alteration of any navigable water in the United States (dredging, fill, cofferdams, etc.). It also requires that federal agencies, where possible, avoid or minimize adverse impacts of federal actions upon wetlands and floodplains. Remedial activities, which may require a permit to perform, must be conducted in such a way that they will avoid unacceptable obstruction or alteration of the Kalamazoo River channel.

Clean Air Act:
The Clean Air Act establishes requirements for constituent emission rates in accordance with national ambient air quality standards. Excavation and cap construction activities will be regulated by the Clean Air Act.

TSCA:
TSCA's PCB Remediation Waste Rule, 40 CFR, Section 761.61 provides the requirements for the disposal of PCB-contaminated wastes, and would therefore be applicable to this remedy.

State Action-Specific ARARs:

Part 91, Soil Erosion and Sedimentation Control, of the NREPA:
This part regulates earth changes, including cut and fill activities which may contribute to soil erosion and sedimentation of surface water.
Part 91, Soil Erosion and Sedimentation Control, of the NREPA would apply to any such activity where more than one acre of land is affected or the regulated action occurs within 500 feet of a lake or stream. Part 91, Soil Erosion and Sedimentation Control, of the NREPA would be applicable to the cap construction activities since these actions could impact the Kalamazoo River, which is less than 500 feet from the 12th St.-OU4.

Part 301, Inland Lakes and Streams, of the NREPA:
Part 301, Inland Lakes and Streams, of the NREPA regulates the dredging or filling of lake or stream bottoms. Activities associated with the selected remedy, sediment removal, and berm stabilization are regulated under this part due to the proximity of the 12th St.-OU4 to the Kalamazoo River.

Part 115, Solid Waste Management, of the NREPA:
Part 115, Solid Waste Management, of the NREPA contains regulations regarding the construction, operation, and closure of sanitary landfills, solid waste transfer facilities, and solid waste processing plants.

Part 31, Water Resources Protection, of the NREPA:
Part 31, Water Resources Protection, of the NREPA establishes rules regarding water and wastewater discharges. This is applicable for discharge of waters to the Kalamazoo River. Part 31, Water Resources Protection, of the NREPA also includes the rules regarding permit requirements for discharges.

Part 55, Air Pollution Control, of the NREPA:
Rules prohibiting the emission of air contaminants in quantities which have injurious effects on human health, animal life, plant life of significant economic value, and/or property are established in Part 55, Air Pollution Control, of the NREPA. This would be applicable to excavation and cap construction activities. During the construction of the RA, the total emissions from the entire site shall comply with the secondary risk screening level (SRSL) for PCB. The SRSL for PCB based upon an incremental cancer risk of 1 in 100,000 is 0.02 ug/m^3 (micrograms per cubic meter) applied at the 12th St.-OU4 perimeter. At a perimeter location where the adjacent property is an industrial property or a public roadway, Rule 225 (3)b allows for compliance with the SRSL multiplied by a factor of 10. Where the adjacent property is not an industrial property or public roadway, the perimeter location shall comply with the SRSL.

Michigan Occupational Safety and Health Act 154 (MIOSHA):
MIOSHA establishes the rules for safety standards in the work place and is applicable to the remediation activities.

Part 201, Environmental Remediation, of the NREPA:
Part 201, Environmental Remediation, of the NREPA provides for the evaluation and remediation of contaminated sites within the state. The MDEQ has determined that Part 201, Environmental Remediation, of the NREPA is applicable to the 12th St.-OU4. Part 201, Environmental Remediation, of the NREPA requires that RAs be protective of human health, safety and welfare, and the environment.

Part 303, Wetland Protection, of the NREPA:
Regulates activities conducted in wetlands as well as mitigation of wetlands.

3. Cost-Effectiveness

The selected remedy for the 12th St.-OU4 has the least cost of those remedies that provides an acceptable degree of protectiveness, compared to the other alternatives evaluated formally in this ROD and informally through analysis and comparison with the alternatives considered as part of the KHL-OU3 remedy selection process. Capital costs are the direct and indirect costs and O&M costs refer to long-term, post-construction measures necessary to ensure continued effectiveness of a RA. Total net present worth cost represents the sum of money, if invested in the base year and disbursed as needed, that would be sufficient to cover costs of a remedy over its planned life (assumed to be 30 years for comparison purposes).

Alternative 2 will be effective in the long-term due to the significant reduction of the mobility of the PCBs achieved through excavation of residuals that are contiguous with the landfill and containment of these materials with the materials in the landfill.

4. Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

The state of Michigan has determined that the selected remedy provides the best balance in terms of long-term effectiveness and permanence, reduction of toxicity, mobility, or volume of contaminants through treatment, short-term effectiveness, implementability, and cost, taking into consideration acceptance by the U.S. EPA and the community.

The selected remedy includes excavation of residual material from the woodland, wetlands, adjacent property, and from the portion of the former powerhouse discharge channel where residuals have eroded into the channel from the landfill; relocation of these materials back into the landfill; installation and maintenance of a landfill containment system; restoration of areas affected by the RA; groundwater monitoring; gas venting and/or leachate collection systems (if necessary), and access and land use restrictions.

5. Preference for Treatment as a Principal Element

The state of Michigan believes that the selected remedy is protective of human health and the environment and utilizes permanent solutions and alternative technologies to the extent practicable. The remedy, however, does not satisfy the statutory preference for treatment of the hazardous substances present as a principal element because additional treatment of the source areas of the landfill would not be practicable and too costly as compared to ensuring the long-term containment of the hazardous substance at the site.

6. Five-Year Review Requirements

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of the RA to ensure that the remedy is, or will be, protective of human health and the environment.

K. SUMMARY

The selected remedy will satisfy the statutory requirements established in Section 121 of the CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986, to protect human health and the environment. It complies with all ARARs, will provide overall effectiveness appropriate to its costs and will use permanent solutions and alternative treatment technologies to the maximum extent practicable. Treatment is not a component of the selected remedy because an attempt to treat the PCBs in the soils, sediments, and residuals at the 12th St.-OU4 would not provide sufficient additional risk reduction in relation to increased cost.

II. RESPONSIVENESS SUMMARY

The public participation requirements of the CERCLA Sections 113 (k)(2)(i-v) and 117 have been met during the remedy selection process. Section 113 (k)(2)(i-v) and 117 of the CERCLA require the state as the lead agency to respond "to each of the significant comments, criticisms, and new data submitted in written or oral presentations" on a Proposed Plan for an RA. The Responsiveness Summary addresses the concerns expressed by the public, PRPs, and governmental bodies in written and oral comments received by the MDEQ regarding the preferred alternative for the 12th St.-OU4. The public supports the preferred alternative.

OVERVIEW

The MDEQ has established the Citizens Advisory Committee (CAC) and the Government Advisory Committee (GAC) to enhance public participation. The CAC is comprised of local residents and the GAC is comprised of all interested elected officials from local, state, and federal governments. A list of meeting dates, attendees, and topics discussed at each meeting concerning the 12th St.-OU4 can be found in Attachment 1 of this ROD.

At the time of the public comment period, the MDEQ as lead agency, in consultation with the U.S. EPA, the support agency, had proposed a preferred alternative for the 12th St.-OU4. The preferred alternative addresses the PCB-contaminated soils, sediments, and residuals associated with the 12th St.-OU4. The preferred alternative specified in the ROD includes relocating PCB-contaminated material back into the landfill, capping and containment of the landfill, restoration of affected areas, and long-term monitoring. Prior to construction of the containment system, the PCB-contaminated soils, sediments, and residuals from the landfill sides, woodland, wetlands, adjacent property, and residuals in the former powerhouse discharge channel that are contiguous with the landfill, will be excavated and returned to the landfill.

Based on the comments received during the public comment period, the selected alternative was generally supported. The residents would prefer not to have a non-productive zone (i.e., the closed landfill) in their community and their comments dealt with issues of the long-term effectiveness of the selected alternative. The PRPs generally support the preferred alternative.

These sections follow:

- Background on Community Involvement and Concerns
- Summary of Comments Received During the Public Comment Period and the MDEQ's Responses

BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

Prior to the 12th St.-OU4 being included in the Site as a source area, community involvement was non-existent. Since the 12th St.-OU4 became part of the Superfund site, the MDEQ has issued 12 progress reports/fact sheets and hosted 22 public meetings. These meetings and reports covered the time period from the placement of the Site on the NPL, to the Proposed Plan meeting for the 12th St.-OU4. During the

public meetings the MDEQ provided background information on the 12th St.-OU4, explained the Superfund process, and provided details of the upcoming investigations and their findings. During July 1993, the MDEQ issued a fact sheet describing the RI work being conducted at the 12th St.-OU4. All phases of the RI/FS were completed by July 1997. The MDEQ issued other fact sheets and progress reports summarizing the results of the test pit investigation and RI. Results of the test pit investigation were presented to the GAC/CAC on August 18, 1993. The majority of the RI results were presented to the GAC/CAC on July 20, 1994. Some additional RI findings were reported at a GAC/CAC meeting held June 12, 1996. The test pitting, RI, and FS reports were released to the public and placed in the six information repositories, listed in Table 2, in February 1994, October 1996, and July 1997, respectively. The Proposed Plan was also released for public review in July 1997. The Administrative Record has been made available to the public at the Superfund Section of the MDEQ in Lansing, Michigan. General site information may also be reviewed at the six information repositories established at the locations shown in Table 2.

TABLE 2

Allegan Public Library 331 Hubbard Street Allegan, Michigan 616-673-4625	Charles Ransom Library 180 South Sherwood Plainwell, Michigan 616-685-8024	Saugatuck-Douglas District Library Center Street Douglas, Michigan 616-857-8241
Kalamazoo Public Library 316 South Rose Kalamazoo, Michigan 616-342-9837	Otsego District Library 219 South Farmer Otsego, Michigan 616-694-9690	Waldo Library Western Michigan University Kalamazoo, Michigan 616-387-5156

A public meeting was held on August 13, 1997, to discuss the Proposed Plan. The meeting was attended by approximately 25 persons, including local residents and representatives of the PRPs. At the meeting, representatives from the MDEQ and the PRPs answered questions about the 12th St.-OU4 and the remedial alternative under consideration. Formal oral comments on the Proposed Plan were documented by a court reporter. A verbatim transcript of questions and answers, and public comments during the public meeting has been placed in the information repositories and Administrative Record. Written comments were accepted at the meeting and by mail and were also placed in the information repositories.

The Proposed Plan was available for public comment from July 30, 1997, through August 30, 1997. Based upon a request for an extension, the MDEQ extended the comment period an additional 15-days. Comments received during this public comment period were reviewed, and the MDEQ responses are included in this Responsiveness Summary. Advertisements announcing the availability of the Proposed Plan and start of the public comment period were published in the *Kalamazoo Gazette,* the *Union Enterprise, Allegan County News & Gazette, Holland Sentinel, and* the *Kalamazoo Gazette-North.*

Summary of Comments Received

Comment 1

One commenter stated that the proposed remedy is not in the public interest because it does not consider possible damage to health.

Response 1

A risk assessment was conducted on the KHL-OU3 and used for the 12th St.-OU4 due to similarities between the two landfills. Both landfills consist of similar materials, have the same chemical of concern, and have similar human and ecological receptors and pathways. They also show similar PCB trends: PCB concentration increases with depth in the landfill, no PCBs were detected in the groundwater, and PCBs have migrated into the Kalamazoo River from both of these areas. Human health risk was assessed for exposure to PCBs through inhalation of dust particles by on-site workers, dermal contact with residuals, and ingestion of contaminated soils/residuals. Although the noncarcinogenic risks were determined not to be of concern, the risk associated with the exposure to the carcinogen PCB for on-site workers, trespassers, and anglers was determined to provide an unacceptable risk.

As stated in the CERCLA, all remedies must meet the threshold criterion of being protective of human health and the environment. It has been determined that the remedy selected for the 12th St.-OU4 meets this criterion. Consolidating residuals that have migrated from the landfill into the surrounding woodland, wetlands, adjacent property, and the former powerhouse discharge channel of the Kalamazoo River in the vicinity of the landfill will reduce the areal extent of PCB-containing materials. Capping the residuals consistent with Part 115, Solid Waste Management, of the NREPA will significantly reduce or eliminate the potential exposure and risks associated with inhalation, dermal contact, and ingestion of residuals. Berm construction with slope stabilization, in combination with the landfill cap, will further reduce or eliminate erosion of PCBs into the area surrounding the landfill, thereby reducing potential exposure to PCBs. Institutional controls will also be implemented

to restrict access and future use of the Site in order to protect public health, safety and welfare, and the environment.

Comment 2
One commenter was concerned that ease and cost were the only thoughts involved in the selection of a remedy.

Response 2
In accordance with the CERCLA and the NCP, the remedial alternatives were evaluated against nine criteria. The criteria are grouped into three categories: threshold, primary balancing, and modifying. The first of these, threshold criteria, consists of protection of human health and the environment and compliance of ARARs. A remedy can only be considered for implementation if it meets these criteria. The primary balancing criteria category contains long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost. These criteria are used to compare the remedial alternatives against one another. The modifying criteria, consisting of support agency and community acceptance, are used to assess U.S. EPA and community support of the remedy. The preferred alternative can be modified based on the U.S. EPA's and community's comments on the Proposed Plan.

Ease (or implementability) and cost were categorized as primary balancing criteria and were therefore used to compare one alternative to another. These two criteria were considered as part of the nine criteria as the NCP requires but were not given any more weight than other primary balancing criteria. However, prior to comparing the remedy to the primary balancing criteria it was determined that the remedy met the threshold criteria of being protective of human health and the environment and complied with ARARs.

Comment 3
One commenter stated that soils behind the dams and "hot spots" in the river should be addressed before the landfill is capped.

Response 3
The first step in the strategy for the remediation of this site is to shut-off the external sources of PCB to the Kalamazoo River and Portage Creek. Beginning at the upstream locations, major external sources of PCB include the landfill, the King Highway Landfill, the Willow Boulevard/A-Site, and the Allied Paper property. Once the external sources are controlled, we can begin with the river. During this RA,

however, a portion of the area of the Kalamazoo River known as the former powerhouse discharge channel shall be remediated.

Comment 4

Three commenters and the Kalamazoo River Protection Association (KRPA) stated that containment walls or berms are needed at the landfill due to its proximity to the river. The KRPA suggested using 300 feet of impenetrable materials, including a bulkhead or seawall for support and erosion control.

Response 4

The new containment system will increase side slope stability and eliminate/reduce erosion. Items such as the composition of materials, height of the new containment system to be installed, and the side slopes to be stabilized shall be determined during RD. In addition, a buffer zone of adequate distance shall be created to ensure that, for the lifetime of the remedy, no hydraulic connection will exist between the wastes in the landfill and the Kalamazoo River/former powerhouse discharge channel.

Comment 5

Four commenters expressed a concern over the recreational use and aesthetics of the landfill after the remedy is implemented. Several persons suggested that the landfill be used as a scenic stop along the future river trail walkway, a boat ramp, or a park. Two commenters stated that the local habitat should be restored to high quality after the landfill is capped. Another suggested that any rip-rap next to the Kalamazoo River be dressed to be aesthetically pleasing.

Response 5

After disposal of PCB-contaminated materials back into the landfill and capping, the landfill shall be seeded and maintained to provide an aesthetically acceptable appearance. The type of vegetation shall be selected during the RD process. The RD process shall also determine what kind of erosional control structures would be necessary at the 12th St.-OU4.

Although the post-closure plan for the landfill will necessarily include institutional controls such as access restrictions as required by Part 201, Environmental Remediation, of the NREPA, the remedy is not expected to prohibit the restoration back to high quality habitat.

Comment 6

Many commenters stated their support of the remedy because it prevents contaminants from migrating to the Kalamazoo River and Lake Michigan.

Response 6
The MDEQ acknowledges these comments.

Comment 7
Six commenters, the KRPA, and the Michigan United Conservation Club (MUCC) stated that the landfill should be moved out of the 100-year floodplain of the Kalamazoo River.

Response 7
Off-site disposal of the landfill contents (i.e., PCB-contaminated residuals) was evaluated as a possible remedial alternative in the Alternative Arrays Document and the Focused Feasibility Study (FFS) for the KHL-OU3. For the reasons stated in the KHL-OU3 ROD, this alternative was not selected. The MDEQ determined there, as it has here, that the cap and containment alternative satisfies all of the requirements of the CERCLA and Part 201, Environmental Remediation, of the NREPA. Moreover, it has been determined that the landfill is out of the 100-year flood elevation. The RD process shall address the erosion protection necessary to protect the containment system from the erosional effects of a 500-year flood.

Comment 8
One commenter and the KRPA insisted that all sediments and residuals outside the landfill be removed down to 0.33 ppm Method of Detection Level to be protective of wildlife, especially sensitive receptors such as mink.

Response 8
This RA shall excavate the PCB-contaminated material that eroded from the landfill into the adjacent areas and relocate that material back into the landfill. Post-excavation sampling will be conducted and a final determination whether or not additional response actions are necessary will be made as part of the ROD for the Phase I portion of the Kalamazoo River.

Comment 9
One commenter stated that the flexible membrane liner (FML) should be able to withstand burrowing animals such as woodchucks and muskrats. Another asked if data exists to show how brittle the FML becomes when exposed to long cold periods.

Response 9
Construction of the landfill capping is consistent with the requirements of Part 115, Solid Waste Management, of the NREPA. The cap shall consist of a six-inch topsoil layer underlain by a barrier layer at least two feet in depth, a 30-mil thick FML and a

six-inch granular fill layer. The MDEQ Waste Management Division has determined that a barrier layer at least two feet thick will protect against freeze/thaw damage to the FML, even when subject to long cold periods. To control damage from burrowing animals, a monitoring repair and animal control program shall be implemented.

Comment 10

Two commenters were concerned that capping provides a temporary solution to the PCB contamination rather than a permanent one. One person stated that the remedy should eliminate rather than reduce the potential migration of PCBs into the Kalamazoo River.

Response 10

If maintained properly, the landfill cap should provide long-term protection of human health and the environment. Residuals containing PCBs will be confined beneath the cap and therefore will not come into contact with humans or wildlife. With proper construction and maintenance of the cap, the remedy will adequately control the release of PCBs to the environment.

Comment 11

The KRPA and one other commenter insisted that the PRPs be financially accountable for cleaning and restoring the Site.

Response 11

The PRPs for the Site, Millennium Holdings, Inc./Allied Paper, Inc., Georgia-Pacific Corporation, Simpson-Plainwell Paper Company, and James River Corporation signed an AOC (DFO-ERD-91-001) with the state of Michigan in 1991. Under the AOC, the PRPs have agreed to fund and conduct the RI and FS and reimburse the state for oversight. When the ROD for the 12th St.-OU4 is signed, the PRPs will be given the opportunity to implement the chosen remedy. If they decline, the U.S. EPA and MDEQ will conduct the cleanup with money from the Superfund and state appropriations and pursue reimbursement from the PRPs.

Comment 12

Three commenters and the KRPA expressed a concern that the cap may not stop erosion from river meander. They added that, since the residuals are present below the mean water level of the river, everyday erosion may have a significant effect on the landfill. The KRPA added that, if the dam is removed or fails, the river may cut into the landfill.

Response 12
Detailed specifications of the landfill cap and associated erosion control measures will be determined in the RD phase of the Superfund process. New containment system construction, placement of erosion protection, and a buffer zone between the landfill and the Kalamazoo River should adequately protect against the everyday erosive forces of the river. Protection against a 500-year flood event will be incorporated into the final cap design. This includes construction of a new containment system and erosion protection that extends to a minimum elevation of 707 feet MSL, which is approximately two feet above the 100-year flood elevation. If dam removal is undertaken, it will be done in a manner that is consistent with the remedy. If the river starts to meander, the PRPs would be required to take actions that assure the integrity of the cap and containment system.

Comment 13
Two persons and the KRPA commented that visual criteria should not be used when dredging the river or consolidating waste from outside the landfill boundaries.

Response 13
A visual criterion is being used to direct the excavation of the residual material that has eroded from the landfill. Verification sampling will be performed after removal is complete. A decision on whether additional response actions are necessary will be included as part of the ROD for the Phase I portion of the Kalamazoo River.

Comment 14
The KRPA commented that more sampling is necessary in the area to determine the amount of residuals present.

Response 14
The amount of residuals present was estimated by reviewing historical information, conducting 16 test pits and several soil borings, installing 15 monitor wells and three leachate wells, and conducting field reconnaissance along the periphery of the landfill in the adjacent properties. Samples were collected from within the landfill as well as from locations outside the landfill. Laboratory analyses of soil, sediment, and residuals, and visual classification of deposits have been recorded. The MDEQ has determined that the RI sampling and field reconnaissance was adequate to estimate the extent of PCB contamination. Additional investigation will, however, be conducted during the design of the excavation and disposal activities to better define the extent of material impacted with PCBs.

Comment 15
The KRPA and one commenter proposed the use of a nearby gravel pit as a landfill in which the PCB-contaminated residuals from the 12th St.-OU4 could be placed.

Response 15
The MDEQ evaluated the option of transporting the PCB-contaminated residuals to an off-site location in the removal alternative evaluated in the FFS for the KHL-OU3, which is directly applicable to the 12th St.-OU4. The preferred alternative was the cap and containment alternative.

Comment 16
The KRPA stated that presumptive remedies should not be used at the12th St.-OU4 due to the differences between it and the KHL-OU3. The differences mentioned were that the King Highway Landfill has a berm and the landfill has no berms and is by a wetland and a dam.

Response 16
The presumptive remedy approach was proposed for the landfill due to its similarity to the King Highway Landfill:

- Each landfill is comprised of large amounts of paper-making residuals which contain PCBs. Residuals in each landfill were generated from the same paper manufacturing process.
- Each landfill accepted paper-making residuals produced during the same time period.
- Each landfill is adjacent to the Kalamazoo River and floodplain.

The differences between the landfill and the King Highway Landfill were examined and determined not significant enough to change the selection of the remedy itself. Containment and capping will provide adequate protection of human health and the environment at both the King Highway Landfill and the landfill.

Comment 17
The KRPA commented that there has not been an adequate risk assessment for the 12th St.-OU4.

Response 17
The risk assessment conducted for the KHL-OU3 was determined to be generally applicable to the 12th St.-OU4. In addition, a Site-wide BERA (June 1999 and August 2000 addendum) has been completed.

Comment 18
The KRPA stated that, as the paper waste (excluding PCBs) breaks down, chemical changes will create a need for groundwater monitoring. Another commenter asked whether the remedy adequately protects groundwater in the future.

Response 18
The implementation of a long-term groundwater monitoring plan compliant with Part 201, Environmental Remediation, of the NREPA and the TSCA (40 CFR Section 761.61(c)) will ensure effectiveness of the remedy. The details of the monitoring plan will be determined in the RD stage of the Superfund process.

Comment 19
The KRPA and the MUCC stated that the hydraulic vacuum dredge is a more environmentally sound method for dredging than the backhoe.

Response 19
The MDEQ determined that removal of the residual material in the former powerhouse discharge channel that is contiguous with the landfill will be most effective by enclosing the area with sheet piling, dewatering, then excavating the material and relocating it back into the landfill. Proper siltation controls will be implemented during the procedure.

Comment 20
The KRPA expressed a concern that the remedy selected for the 12th St.-OU4 will set precedence at the other landfills within the Site.

Response 20
Except as noted in this ROD with regard to the relevance of the KHL-OU3 to the remedy selection for this 12th St.-OU4, the individual OUs at the Site have been (or will be) investigated and evaluated separately. This approach is consistent with the AOC between the MDEQ and the PRPs, and also is consistent with the CERCLA, the NCP, and Part 201, Environmental Remediation, of the NREPA.

The various reaches of the river, and within each individual river OU need to be treated on a case by case basis. It is not likely that one remedial alternative, or technology, will be adequate to address the variety of conditions in and along the Kalamazoo River and Portage Creek.