3/7/01

Total Maximum Daily Load

PCB and Chlordane

Monongahela River

Maxwell Lock and Dam to Lock and Dam 4 at Monessen &
Lock and Dam 2 to Mouth

Fayette, Washington and Allegheny Counties

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Introduction

Pennsylvania has conducted monitoring of fish tissue contaminants since 1976. Early efforts were comprised of special studies in major water bodies as well as smaller waters with suspected sources of contaminants. Routine sampling for tissue contaminants began in 1979 with implementation of the EPA "CORE" monitoring network that mandated collection of whole fish samples. Because Pennsylvania wanted the fish tissue monitoring program to focus on protection of public health, we began sampling both the edible portion and whole body at one-half of the stations. In 1987, Pennsylvania began sampling the edible portion almost exclusively. In order to increase spatial coverage, the Department also began rotating sampling through its routine ambient monitoring network and provided both Department of Environmental Protection (DEP) and Fish and Boat Commission field biologists the opportunity to sample suspected problem areas.

Fishing is a wholesome, relaxing pastime, and fish are nutritious and good to eat. Some fish, however, may accumulate contaminants to levels that may be harmful to those who eat them over a long period of time. In an attempt to protect public health, the Commonwealth periodically (at least annually) issues fish consumption advisories based on monitoring data from a number of sources. Advisories are issued jointly by the Department of Health, the Fish and Boat Commission, and DEP. The list of advisories is published in the "Pennsylvania Summary of Fishing Regulations and Laws" which is provided to each fishing license buyer, and is also available from the Department in hard copy and through the Internet at http://www.dep.state.pa.us. In addition, the annual list and any individual advisories needed between lists are issued using press releases.

A number of Pennsylvania water bodies with fish consumption advisories were listed on the Clean Water Act Section 303(d) List of Impaired Waters for 1996. They were listed because long-term, unrestricted consumption of these fish could potentially lead to human health problems. This document addresses contamination of fish tissue in the Monongahela River, Fayette, Washington and Allegheny Counties, by PCB and chlordane.

Background

This Total Maximum Daily Load (TMDL) applies to two segments of the Monongahela River (Stream Code 37185): from the Maxwell Lock and Dam (L&D) at Monessen (River Mile 61.2) to L&D 4 (River Mile 41.5); and from L&D 2 at Braddock (River Mile 11.2) to the mouth at Pittsburgh (River Mile 0.0). The Maxwell to L&D 4 segment was included on the 1998 Section 303(d) list in State Water Plan Watershed 19-C (ID 9921) as a high priority for TMDL development. This segment appears to have been inadvertently omitted from the 1996 303(d) list. The L&D 2 to mouth segment was included on the 1998 list in Watershed 19-A (ID 9916) as a high priority. This segment was also on the 1996 Section 303(d) list, but it was listed

incorrectly as Stream Code 18025 (Monongahela Creek, tributary to Penns Creek in the Susquehanna River basin).

A consumption advisory ("Do Not Eat") for carp due to chlordane at 0.96 ppm in the Maxwell to L&D 4 segment was first issued through a statewide press release on June 26, 1986. The same advice was added for channel catfish due to chlordane at 0.24 ppm in June 1987. This advice was reissued several times in the late 1980s/early 1990s, and remained in place until development of the 1998 advisory based on PCB levels using the Great Lakes protocol. Currently, channel catfish remain "Do Not Eat", smallmouth bass are listed as one meal per week (Group 2), and carp are included at one meal per month (Group 3).

The initial advisory for the lower Monongahela River (L&D 2 to mouth) was also included in the June 26, 1986 release. "Do Not Eat" advice was given for carp due to chlordane at 1.7 ppm and for channel catfish due to chlordane at 0.66 ppm and PCB at 4.46 ppm. Data for this segment are collected in cooperation with ORSANCO, and these advisories remained in place until 1998. At that time, carp and channel catfish advice remained "Do Not Eat" for the consistency with the advice for the main stem Ohio River and with that issued by other states. Walleye and both smallmouth and spotted bass were added for 1998 due to PCB at one meal per week (Group 2), and fresh water drum was added as one meal every two months (6 meals per year, Group 4).

Driving Directions: from Philadelphia to the South Fayette Equipment site:

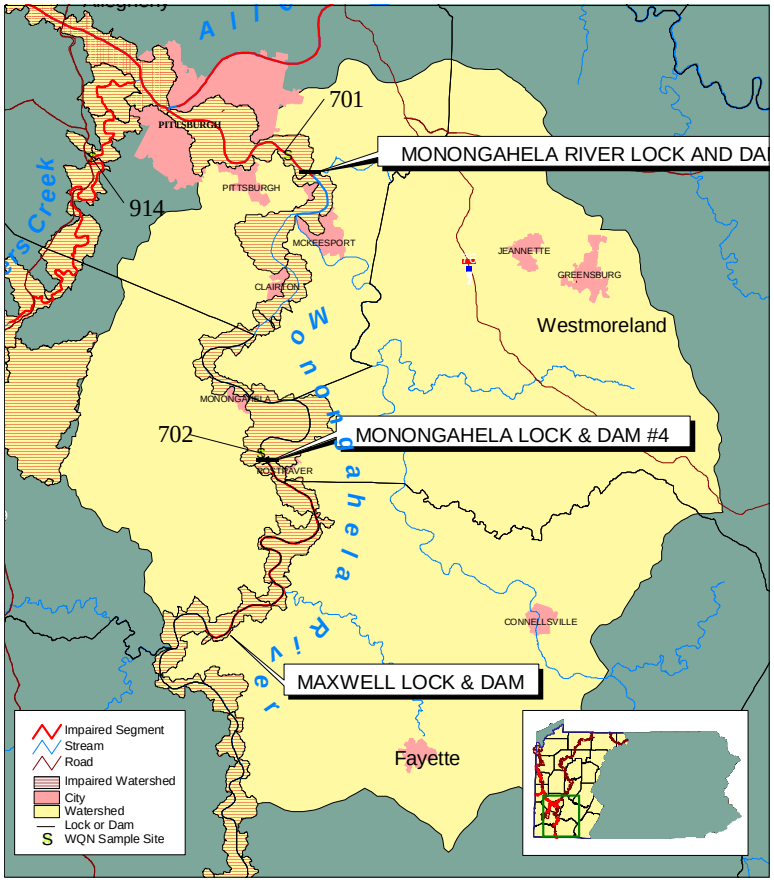
1. Take I-76 West to I-79, Exit No. 8
2. Follow Route 119 South to Uniontown, Rt 51 South exit
3. Follow Rt 51 through downtown Uniontown until you get to Rt 40
4. Take Route 40 east about 3 blocks, the site is on the left hand side.

Driving Directions from Philadelphia to the Wheeling Pittsburgh Steel site:

1. Take I-76 West to I-79, Exit No. 8
2. Follow Rt 70 West to exit 17
3. Follow Rt 88 South 3 miles to the plant on the left

Driving Directions from Philadelphia to the Westinghouse Trafford site:

1. Take I-76 West to Exit 6 at Monroeville
2. Follow Rt 48 South to route 130
3. Turn left onto route 130 into trafford
4. The plant is on the left hand side as you cross the bridge



TMDL Development

Endpoint Identification

The overall goal of a TMDL is to achieve the "fishable/swimmable" goal of the federal Clean Water Act. Because consumption advisories are in place for smallmouth and spotted bass, walleye, fresh water drum, channel catfish and carp for PCB and chlordane, these goals are not being met in these Monongahela River segments.

The specific goal of a TMDL is to outline a plan to achieve water quality standards in the water body. For these segments of the Monongahela River, the TMDL goal is for levels of PCB and chlordane in the water column to be equal to or less than the Commonwealth's water quality criteria. The criteria, found in the "Water Quality Toxics Management Strategy - Statement of Policy" (Chapter 16 of the Department's rules and regulations) are 0.00004 ug/L (micrograms per liter, equivalent to parts per billion) for PCB and 0.0005 ug/L for chlordane. Both of these compounds are probable human carcinogens, and these are human health criteria developed to protect against excess cancer risk. Specifically, the Department's water quality toxics management program controls carcinogens to an overall risk management level of one excess case of cancer in a population of 1 million (1×10^{-6}). Expressing this another way, the probability of an individual getting cancer is increased by a factor of 1 in 1 million.

Two means were employed in an effort to obtain readily available data on instream PCB and chlordane levels for comparison to the criteria. First, the Department's Southwest Field Office searched for PCB and chlordane data in or upstream from the Monongahela River fish consumption advisory segments. Second, data from the EPA Storage and Retrieval System (STORET) was obtained. An "Inventory" retrieval that would include data collected by all agencies using STORET was run for all areas with a five-mile radius around the Department's fish tissue sampling stations. The station in the Maxwell to L&D 4 segment is located just below the Maxwell L&D. Samples from the lower Monongahela River have been collected at Water Quality Network Station 701 (Rankin Bridge off SR0837 at River Mile 9.8). No water column data were found near Maxwell. A number of data points collected between 1975 and 1982 were found for the Rankin bridge station. All sample results were less than detection, except for one sample that showed PCB 1254 at 0.02 ug/l. In any event, these data do not represent current conditions.

As a means to compare current conditions to the water quality criteria, an estimated water column concentration was calculated based on the fish tissue concentrations and bioconcentration factors. The calculation involves dividing the average fish tissue concentration by the bioconcentration factor to obtain a projected water column concentration.

The equation is:

$$\frac{TC}{BCF} = WC \times 1000, \text{ where}$$

TC = Tissue Concentration in mg/kg (equivalent to mg/L)
BCF = EPA Bioconcentration Factor in L/kg
WC = Water Column Concentration (estimated) in mg/L
(multiply by 1000 to obtain (ug/L)

The average fish tissue concentration is the mean of all samples shown in the tables below. A Storet data retrieval of all the PCB and chlordane fish tissue data for all the fish tissue sampling stations on the Monongahela River are included in Appendix A. The average concentration is used for two main reasons. First, the fish tissue samples are composites. This means that the sample result represents the average tissue concentration in three to five individuals, and not an exact value. Second, use of an average value considers the natural variation in tissue burden found in wild fish populations. The PCB bioconcentration factor (BCF) of 31,200 from the EPA criteria development document (EPA 440/5-80-068, October 1980) was used. The chlordane BCF of 14,100 from the EPA criteria development document (EPA 440/5-80-027, October 1980) was also applied. These BCFs were used because no Bioaccumulation Factors (BAFs) are available for statewide use. The use of the BCFs is consistent with the provisions of the Department's water quality toxics management strategy. Average PCB and chlordane tissue levels were determined for each species using all samples. An estimated water column concentration was then calculated for each compound for each species. These estimated water

column concentrations were averaged for each compound in order to provide a single estimated water column concentration for each parameter for the segment.

Fish Tissue Data Used to calculate the TMDL for the Monongahela River from the Maxwell Lock and Dam to Lock and Dam 4 at Monessen

Parameter	Fish Species	Number of Data Sets	Range of Years	Years
PCB	Bass	2	1985 - 1996	1985, 1996
	Carp	7	1985 - 1996	1985, 1987, 1988, 1996
	Channel Catfish	5	1985 - 1988	1985, 1987, 1988
Chlordane	Carp	7	1985 - 1996	1985, 1987, 1988, 1996
	Channel Catfish	5	1985 - 1988	1985, 1987, 1988

Fish Tissue Data Used to calculate the TMDL for the Monongahela River from Lock and Dam 2 to mouth

Parameter	Fish Species	Number of Data Sets	Range of Years	Years
PCB	Bass	3	1985 - 1993	1985, 1992, 1993
	Walleye	1	1988	1988
	Drum	1	1990	1990
	Carp	9	1985 -1993	1985, 1988, 1989, 1990, 1992, 1993
	Channel Catfish	3	1988 - 1990	1988, 1989, 1990
Chlordane	Carp	9	1985 - 1993	1985, 1988, 1989, 1990, 1992, 1993
	Channel Catfish	3	1988 - 1990	1988, 1989, 1990

The average PCB levels in the Monongahela River segment from L&D 2 to the mouth are: carp - 2.58 mg/kg; freshwater drum - 1.45 mg/kg; smallmouth and spotted bass - 0.233 mg/kg; walleye - 0.120 mg/kg; and channel catfish - 0.817 mg/kg. The estimated concentration of PCB in the water column is 0.03333 ug/L. The average chlordane concentration in carp is 0.551 mg/kg and in channel catfish is 0.217 mg/kg. The estimated water column concentration for chlordane is 0.02724 ug/L.

The average PCB levels in the Monongahela River segment from the Maxwell L&D to L&D 4 are: carp - 0.679 mg/kg; smallmouth and spotted bass - 0.075 mg/kg; and channel catfish – 0.764 mg/kg. The estimated concentration of PCB in the water column is 0.0162 ug/L. The average

chlordane concentration in carp is 0.341 mg/kg and in channel catfish is 0.278. The estimated water column concentration for chlordane is 0.0220 ug/L**.**

These estimated concentrations exceed the applicable water quality criteria. These values most likely do not represent the actual existing instream concentrations due to the basis for the back-calculation. The back-calculations from tissue level to water column concentration were performed using data on species for which consumption advisories have been issued, i.e., fish with elevated tissue levels of these compounds. It must also be noted that the average tissue concentrations may be artificially elevated because of the use of one-half of the detection limit for data reported as less than detection. The actual concentration could lie anywhere between zero and the detection limit. The use of one-half of the detection limit is merely a means of obtaining a reasonable value to use in calculating the average. While the actual concentrations in the water column are not known, they are likely to be lower than the calculated estimates.

Source Assessment

The production and use of PCB in the United States was banned in July of 1979. While it is now illegal to manufacture, distribute, or use PCB in the United States, these synthetic oils were used in the past as insulating fluids in electrical transformers and other products, as cutting oils, and in carbonless paper. PCB was introduced into the environment while use was unrestricted, and occasional releases still occur. In addition, some permitted discharges and Superfund sites contribute PCB to surface water. Once in a waterbody, PCB becomes associated with solids particles and enters the sediments. PCB is very resistant to breakdown and thus remains in river and lake sediments for many years.

Chlordane is a man-made organochlorine compound that was widely used as a broad-spectrum agricultural pesticide before its use was restricted to termite control around building foundations. All uses of chlordane have been banned since April 1988. Chlordane may be introduced to surface waters through contaminated ground water or surface runoff, and is therefore a nonpoint source contaminant. Once in a waterbody, chlordane becomes associated with solids particles and enters the sediments. Fish are exposed to and accumulate PCB and chlordane from the water, through contact with or ingestion of sediments, and in the food they eat.

It should be noted that in the Southwest Region, the configuration of the listed streams (primarily the Allegheny, Monongahela and Ohio Rivers) consists of a series of Locks and Dams. Any PCB contaminated sediments tend to stay in the river pools rather than being washed out as they would be on free flowing streams. All known point source discharges of PCB or Chlordane in the Southwest region have been required to obtain an NPDES permit with water quality based effluent limits and a requirement of “not detectable” for limits lower than detection.

Two methods were employed in order to locate known sources of PCB or chlordane in these segments of the Monongahela River. First, the Southwest Field Office searched for information on known existing or historical sources that might contribute PCB or chlordane in or upstream

from the fish consumption advisory reaches. Second, the EPA Permit Compliance System (PCS) database was searched for any major discharge permits containing PCB or chlordane as an effluent limitation. For the Monongahela River segment from L&D 2 to the mouth, no active, major dischargers for either compound were found on PCS. For the Monongahela River segment from the Maxwell L&D to L&D 4, no major dischargers for either compound were found on PCS.

The former South Fayette Equipment, Wheeling Pittsburgh Steel, and Westinghouse - Trafford sites were identified as potential sources that may have discharged PCBs into the segment from L&D 2 to the mouth of the Monongahela River. In addition, the former South Fayette Equipment and Wheeling Pittsburgh Steel sites were identified as potential sources that may have discharged PCBs into the segment of the Monongahela River from the Maxwell L&D to L&D 4. It should be emphasized that all these facilities are "non point sources" and do not have discernable point source discharges to the stream that are subject to NPDES permit requirements. Any PCB migrating to the stream (other than spills) does so via groundwater pathways. The intent of the clean up plans for sites where statewide soil/groundwater standards are exceeded is to intercept the contaminated groundwater via wells or trenches and treat the groundwater to acceptable levels. Any discharges from such a remediation system are subject to NPDES permit requirements.

Prior to 1980, no federal legislation existed which addressed past disposals of hazardous wastes. Therefore, Congress enacted the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) to address the hazards created from past disposals. Sites identified as possible sources of PCBs are to be remediated under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), which is commonly referred to as Superfund. The act deals with environmental response, providing mechanism for reacting to emergency situations and to chronic hazardous material releases. In addition to establishing procedures to prevent and remedy problems, it establishes a system for compensating appropriate individuals and assigning appropriate liability.

CERCLA required the Environmental Protection Agency (EPA) to develop criteria for prioritizing among sites potentially needing remediation. Those sites scoring high enough on the ranking system are included on the National Priorities List (NPL). Only NPL sites are eligible for EPA remedial action. Once a site on the NPL has been selected for remediation, a formal process must be followed to determine and implement appropriate actions. A Remedial Investigation/Feasibility Study (RI/FS) is done first. The conditions at the site must be determined, including the extent of contamination, migration offsite, and potential for human and environmental exposure. A series of specific remediation alternatives must be developed, including specification of costs, technical feasibility, and environmental impacts. Based on the RI/FS, a Record of Decision (ROD) is written by the EPA, which documents and justifies the selection of a particular cleanup option. This process must include substantial public and state participation. Following the ROD, the detailed engineering plans are prepared (the Remedial Design), and implementation (Remedial Action) can begin.

The Superfund Amendments and Reauthorization Act (SARA) of 1986 provided additional guidance for determining "how clean is clean" for the level of removal during a site cleanup. Cleanups must be protective of human health and the environment, be cost-effective, and use permanent solutions, including treatment and resource recovery, as much as practicable. Land disposal is discouraged.

The decision-making framework for the management of sediments has two major components: the remedial investigation and the feasibility study (RI/FS). For a Superfund site with contaminated sediments, the remedial investigation identifies the character of the sediments and the extent of contamination, among other information. The feasibility study includes an evaluation of all reasonable remedial alternatives, including treatment and non-treatment options.

Pennsylvania' Hazardous Sites Cleanup Act (HSCA) was created so that Pennsylvania could effectively fulfill their statutory responsibilities under CERCLA; recover costs incurred fulfilling those statutory responsibilities; and supplement CERCLA by creating a state program for cleanup of sites not included on the National Priorities List.

Discussion of Potential Sources of PCB/Chlordane

South Fayette Equipment

South Fayette Equipment comprises 8 to 9 acres in South Uniontown, Fayette County, along an unnamed tributary (stream code 40124, RMI 0.5) to Coal Lick Run (stream code 40109). Fayette Equipment operated at the site from the mid-1950s to the early 1980s. The business involved repair and maintenance of mining equipment. Until 1981, lead was reclaimed from used batteries, and various wastes such as battery casings, empty drums, copper wire, scrap metal, paint cans, and tires were dumped in areas in and near the unnamed tributary and in a small adjacent wetland area. The unnamed tributary flows approximately 0.7 miles to Coal Lick Run. Coal Lick Run flows approximately 1.4 miles before discharging to Redstone Creek.

Inspections conducted by DEP in 1992 and 1993 focused on sampling associated with battery casings piles and drums of fluid remaining at the site. EPA conducted a preliminary assessment in 1993 and a screening site inspection in 1995 (Identification Nos. PA-3066, PAD987393485) under CERCLA. DEP completed a final site characterization report in 1997 pursuant to Pennsylvania's Hazardous Site Cleanup Act (HSCA).

In 1998 and 1999, DEP conducted an interim response removal action at the site that included excavation, treatment, and off-site disposal of lead-contaminated soil over a large portion of the site and excavation and off-site disposal of PCB-contaminated soil from a small pit area containing empty transformers. Following excavation, existing site soil was regraded and vegetated. Some areas were covered with topsoil and additional seed the following year. The majority of soil removed from the site was contaminated with lead.

Based on the work performed by the state's HSCA program staff, there is no evidence of any of the PCB contamination in the stream, and the soil contamination is localized. Monitoring of groundwater and surface water is expected to continue to determine if any PCBs are migrating off site.

Wheeling Pittsburgh Steel Allenport Plant

The Wheeling Pittsburgh Steel Allenport Plant (WPSC) is located in Washington County at RMI 46.2 on the Monongahela River. DEP has identified PCB contamination at an area known as Tube Mill Building 8, an area located several hundred feet from the Monongahela River. Following building demolition conducted circa 1990, DEP discovered a discharge of PCB through an underground pipeline – associated with a drain from within the former building - to an unnamed tributary to the Monongahela River. Subsequent investigation revealed the presence of PCB-containing oil (product) atop the water table.

Based on the Environmental Clean up Programs records, demolition activities at this site recently caused PCB oil to be discharged into the river. WPSC subsequently installed a soil dike surrounding the former facility to contain surface water runoff. Since 1993, WPSC has installed 13 monitoring wells and five recovery wells at the site and quarterly measures the thickness of product in monitoring wells, PCB content in product, and oil & grease in standing water within the diked area. WPSC also periodically removes product from the wells. Through 1999, WPSC had removed approximately 872 gallons of product and water from the recovery wells. In December 1999, WPSC measured 3 feet of product in one well and between 0.02 and 0.3 feet in nine other wells. Standing water is observed within the diked area throughout the year.

Currently, PCB is being recovered from wells on the property as part of the interim and long term clean up plan in place for this site. This recovery process will ensure that there will be no additional pollution loading into the Monongahela River from this site.

Westinghouse Trafford Plant

The Westinghouse Trafford Plant is located in Westmoreland County on Turtle Creek (stream code 37204, RMI 6.4) which is tributary to the Monongahela River at RMI 11.52. PCBs are present in the soil and ground water at this site and also in the stream sediments.

Prior to development of the site as a power circuit breaker facility, it was largely comprised of land within historical floodplains of Turtle Creek and Brush Creek. Most of the low-lying areas have been filled, rendering an overall flat topology. Surface water drainage from the site occurs towards these two streams. PCB associated with the disposal of electrical components (contained in fill material ranging from 1.0 to 29.5 feet in thickness) has been reported above medium specific concentrations (MSCs) in 72 soil samples with a maximum concentration of 590,000 mg/kg. Fifty-one surface soil samples exceeded PCB MSCs for surface-to-groundwater standards (Remedial Investigation Report, 2000).

The Remedial Investigation (RI) conclusions specify immediate risks of contaminated soils only from direct human contact (i.e., inhalation, ingestion, or dermal contact with fugitive soils). There is a potential for soil erosion during surface runoff events. This erosion may result in the migration of PCB contaminated soils from the site, to receiving surface water bodies (Turtle and Brush Creeks).

PCB concentrations of Aroclor-1242 and Aroclor-1260 were found to exceed MSCs in 10 of the 45 samples taken from 20 wells on the site. Nine samples showed Aroclor-1242 concentrations exceeding the MSC of 5.2 µg/L (ppb) with a maximum concentration of 330 µg/L. One sample resulted in an Aroclor-1260 concentration (6.6 µg/L) exceeding the MSC (1.1 µg/L). Groundwater at this site has been determined to be hydraulically connected with both Turtle and Brush Creeks, and therefore, poses a potential threat to the Monongahela River.

PCBs have not been detected in the water column downstream.

Swissvale Auto Surplus

Swissvale Auto Surplus is located within the drainage area of the segment of the Monongahela River from Lock and Dam 2 to Mouth. The facility operated a scrap metal recovery business from the 1940s until 1984. The site is located in Swissvale, Allegheny County, Pennsylvania immediately east of Pittsburgh (Identification Nos. PA-0776, PAD051129971). As part of those operations the company recycled used transformers that contained PCB. The facility incinerated used PCB oil removed from the transformers and also contained the PCB oils in drums. Soil sampling conducted by the EPA Region 3 Removal Section in 1984 revealed high concentrations of PCB in on-site soil (up to 32,000 mg/kg) and within a drainage ditch that carries runoff from the site (up to 1,106 mg/kg). The drainage ditch from the site flows to Tassey Hollow, a tributary to the Monongahela River. EPA issued a Unilateral Order in 1984 that restricted access to and from the site and required the operator to cease use of the incinerator. EPA then excavated and removed approximately 6,000 tons of contaminated soil from on site, a nearby residence and garden, and drainage ditches west and south of the site. EPA also covered and regraded on-site soil with uncontaminated topsoil and/or stone. EPA indicates that the clean up was complete in 2000.

Under HSCA and the KEY sites program, DEP performed an interim response to address the contaminated building and three areas of soil contamination. Phoenix Land Recycling submitted an NIR and final report under Pennsylvania ACT 2 and received an ACT 2 Release of Liability after demonstrating through attainment sampling that the Swissvale site meets ACT 2 Residential standards. A copy of the release letter is available in DEP Central Files.

Atmospheric Deposition: Development of the TMDLs for the Monongahela River considers background pollutant contributions. The natural in-stream background concentration of chlordane is assumed to be zero because chlordane is a man-made product and there are no natural sources. PCB is also a man-made product and no natural sources of PCB load exists in the environment. Nonetheless, due to the pervasive use of PCBs prior to their ban in the late

1970s and their slow degradation rates, PCBs are now widespread in the environment. This pervasive distribution of PCBs in air, soil, and water effectively creates a background load of PCB in all water bodies. Atmospheric deposition can contribute to background concentrations of PCB in water bodies.

Atmospheric deposition of PCB plays a dominant role in PCB cycling in many freshwater systems. Monitoring conducted under the Integrated Air Deposition Network (IADN) and the Great Waters Program indicate that wet and dry deposition of PCB can vary greatly both regionally and by season. According to EPA's Lake Michigan Mass Balance (LMMB) Study, atmospheric transport and deposition of PCB provides about 82 percent of the total PCB load to Lake Michigan. Because PCB is no longer produced, the major source of PCB to the atmosphere is volatilization from sites where they have been stored, disposed, or spilled; from incineration of PCB-containing products; and, to a lesser extent, from PCB formation during production processes.

Although analysis predicts that atmospheric deposition may provide a significant source of PCB load to the water body, volatilization from the water column and sediments is likely to result in continuing PCB loss from the water body, thereby reducing, or negating, the atmospheric load. Hillery, et. al., (1998) found that the Great Lakes are currently experiencing a net loss of PCB. In each of the five Great Lakes, the net deposition of PCB is believed to be insignificant because gas transfer out of the lakes counteracts the flow into the lakes from wet and dry deposition. Similar processes are likely to be occurring in Pennsylvania water bodies.

TMDL Calculation

Development of TMDLs includes consideration of background pollutant contribution, appropriate and/or critical stream flow, and seasonal variation.

Monitoring for Background Concentrations of PCBs

PCB concentrations in surface waters may be greater than zero in waters where no specific source, either point or nonpoint source, can be identified. Only site-specific data can be used for the TMDL calculations. However, because sufficient data does not exist for this particular waterbody segment that would allow the selection of such a background value for TMDL calculation purposes, a value of zero was used. In order to verify this assumption, or to properly select a background concentration for calculating a TMDL, site-specific water quality monitoring for PCBs may be conducted at this site some time in the future.

If future background sampling were to identify PCB levels greater than zero for this segment, Pennsylvania would review and appropriately revise the TMDL. Currently, there is no approved and widely available analytical method for analyzing water column samples at the ultra low levels at which PCBs may be present. EPA method 1668-A may offer such capability, but is currently only approved for use in analyzing sewage sludge, is very expensive to run and of limited availability.

PCB and chlordane are probable human carcinogens. Carcinogenesis is a nonthreshhold effect, an adverse impact that may occur at any exposure greater than zero. Such an effect is often related to long-term exposure to low levels of a particular chemical or compound, rather than an immediate effect due to a short duration exposure to a high level. As noted earlier, the Department's water quality toxics management program uses a cancer risk level of 1×10^{-6} to protect human health. Attainment of this risk level is predicated on exposure that includes drinking 2 liters of water and ingesting 6.5 grams of fish per day over a 70-year lifetime. The Department uses harmonic mean flow as the appropriate design condition for dealing with exposure to carcinogens. This is a long-term flow condition that will, when applied to the Total Maximum Daily Load, represent long-term average exposure. Because seasonal increases and decreases in concentration are less important than the long-term exposure to a carcinogen, use of harmonic mean flow adequately considers seasonal variations in PCB and chlordane concentrations.

The calculation of the Monongahela River TMDLs utilizes the water quality criteria and flow data from the U.S. Geological Survey (USGS) surface water discharge station near the Point Marion L&D (03063000). The harmonic mean flow was calculated using the low flow yield method found in the Department's "Implementation Guidance - Design Stream Flows" (Document No. 391-2000-023, p 4). This method requires that the harmonic mean flow (Qhm) from the USGS gage used be divided by the gage drainage area to arrive at a Unit Qhm that is multiplied by the drainage area of the segment to produce a Segment Qhm in cubic feet per second (cfs). The Segment Qhm for the Monongahela River segments are: Lock & Dam 2 to the mouth equals 2357.05 cfs and from the Maxwell Lock and Dam to Lock and Dam 4 equals 1674.06 cfs.

The Segment Qhm is used in calculating the Total Daily Maximum Load (TMDL) by multiplying it by the water quality criterion and a multiplier (0.00539) to convert from cfs x ug/L to lbs/day (pounds per day).

1. PCB TMDL for Lock & Dam 2 to mouth:

2357.05 cfs x 0.00004 ug/l = 0.0943 cfs x ug/l x 0.00539 = 0.000508 lbs/day.

Chlordane TMDL for Lock and Dam 2 to mouth:

2357.05 cfs x 0.0005 ug/l = 1.1785 cfs x ug/l x 0.00539 = 0.00635 lbs/day.

The Total Maximum Daily Load of PCB for this segment of the Monongahela River is 0.000508 lbs/day.. The chlordane TMDL is 0.00635 lbs/day.

2. PCB TMDL for Maxwell Lock & Dam to Lock & Dam 4:

1674.06 cfs x 0.00004 ug/l = 0.06696 cfs x ug/l x 0.00539 = 0.000361 lbs/day.

Chlordane TMDL for Maxwell Lock and Dam to Lock & Dam 4:

1674.06 cfs x 0.0005 ug/l = 0.8370 cfs x ug/l x 0.00539 = 0.00451 lbs/day.

The Total Maximum Daily Load of PCB for this segment of the Monongahela River is 0.000361 lbs/day.. The chlordane TMDL is 0.00451 lbs/day.

Percent Reduction

The goal of this TMDL is to achieve the water quality criteria in order to protect public health. In order to achieve this, the instream concentration must be reduced from the estimated current levels to the criteria. Percent reduction is calculated using the following formula:

% Reduction = (1 - TMDL Goal/ Existing Concentration) x 100.

Lock & Dam 2 to Mouth

The percent reduction for PCB is calculated as follows:

% Reduction = (1 - 0.00004/0.03333) x 100
% Reduction = (1 - 0.0012) x 100 = 99.88 %

Percent reduction for chlordane is:

% Reduction = (1 - 0.0005/0.02724) x 100
% Reduction = (1-0.01836) X 100 = 98.16%

Overall reductions of 99.9% for PCB and 98.2% for chlordane are needed to achieve the TMDL goal in the lower Monongahela River.

Maxwell Lock & Dam to Lock & Dam 4

The percent reduction for PCB is calculated as follows:

% Reduction = (1 - 0.00004/0.01621) x 100
% Reduction = (1 - 0.00247) x 100 = 99.75 %

Percent reduction for chlordane is:

% Reduction = (1 - 0.0005/0.02195) x 100
% Reduction = (1-0.0228) X 100 = 97.72 %

Overall reductions of 99.8% for PCB and 97.7% for chlordane are needed to achieve the TMDL goal in the Maxwell to L&D 4 segment.

Margin of Safety (MOS)

Achievement of the TMDLs will generally ensure achievement of the water quality criteria. To account for uncertainties that may be associated with the TMDL calculations, the Department proposes to hold 10% of the TMDLs in reserve. Applying this 10% margin of safety results in a PCB MOS of 0.0000508 pounds per day and a chlordane MOS of 0.000635 pounds per day for the L&D 2 to mouth segment. Similarly, applying a 10% margin of safety results in a PCB MOS of 0.0000361 pounds per day and a chlordane MOS of 0.000451 pounds per day for allocation to all sources in the Maxwell Lock & Dam to Lock & Dam 4 segment. The remaining load is available for allocation to all sources.

Wasteload Allocations (WLAs) and Load Allocations (LAs)

There is no current data available on PCB or chlordane concentrations upstream of these two segments of the Monongahela River.

The potential PCB sources identified in the Source Assessment Section have ceased operations and there are no known point sources of PCBs. Therefore, the PCB load is contributed by nonpoint sources and may be introduced to surface water through contaminated ground water, surface runoff, or contaminated sediment. The Source Assessment notes that once in a water body, PCB becomes associated with soil particles and enters the sediments. Fish tissue contamination results from this sediment load. Because of this and because there is no way to accurately quantify loadings from groundwater or erosion, the entire remaining PCB load of 0.000457 pounds per day is assigned to a Load Allocation for the instream sediment for the Monongahela River segment from Lock & Dam 2 to the mouth. Similarly, the entire remaining PCB load of 0.000325 pounds per day is assigned to a Load Allocation for the instream sediment for Monongahela River segment from Maxwell Lock & Dam to Lock & Dam 4.

Because there are no known point sources of chlordane to these segments of the Monongahela River, it is also treated as a nonpoint source contaminant that may be introduced to surface water through contaminated ground water, surface runoff, or contaminated sediment. Chlordane also becomes associated with soil particles and enters the sediments once in a water body. Fish tissue contamination results from this sediment load. Because of this and because there is no way to accurately quantify loadings from groundwater or erosion, the entire remaining TMDL for chlordane for both the reaches of the Monongahela River are assigned to Load Allocations (LAs) for the instream sediment. For the Monongahela River segment from Lock & Dam 2 to the mouth the chlordane Load Allocation (LA) is 0.005175 pounds per day and the Load Allocation (LA) for the Monongahela River segment from Maxwell Lock & Dam to Lock & Dam 4 is 0.00406 pounds per day.

TMDL Summary

The TMDLs for the Monongahela River segments from the Maxwell Lock & Dam (RMI 19.8) to Lock & Dam 4 and Lock & Dam 2 (RMI 11.2) to the mouth (RM 0.0) can be summarized as follows:

Monongahela River Lock & Dam 2 to Mouth				
Pollutant	**TMDL**	**WLA**	**LA**	**MOS**
PCBs	0.000508 lbs/day	0	0.000457 lbs/day	0.0000508 lbs/day
Chlordane	0.00635 lbs/day	0	0.00572 lbs/day	0.000635 lbs/day

Monongahela River Maxwell Lock & Dam to Lock & Dam 4				
Pollutant	**TMDL**	**WLA**	**LA**	**MOS**
PCB s	0.000361 lbs/day	0	0.000325 lbs/day	0.0000361 lbs/day
Chlordane	0.00451 lbs/day	0	0.00406 lbs/day	0.000451 lbs/day

TMDL Verification

The stated goal of this TMDL is to meet the PCB and chlordane water quality criteria for the protection of public health in these reaches of the Monongahela River. Another way to state the goal is to reach a point where fish consumption advisories are no longer needed because tissue levels of PCB and chlordane are no longer above the levels of concern.

The three agencies involved with the issuance of fish consumption advisories in Pennsylvania currently apply the "Protocol for a Uniform Great Lakes Sport Fish Consumption Advisory" (commonly referred to as the Great Lakes protocol) for issuance of consumption advisories due to PCB. Following this method, meal-specific consumption advice is issued by species. The first level of consumption advice, eat no more than one meal per week, is issued when the tissue PCB concentration is 0.06 to 0.20 mg/kg. The upper limit for unrestricted consumption is 0.05 mg/kg. In order to verify the protectiveness of the PCB TMDL , the estimated fish tissue concentration expected to accumulate at a water column concentration of 0.00004 ug/L was calculated. Reaching the PCB criterion would result in an estimated tissue concentration of 0.001 mg/kg, well below the 0.05 mg/kg level for unrestricted consumption.

Pennsylvania currently uses the U.S. Food and Drug Administration (FDA) Action Level of 0.3 mg/kg for issuance of advisories due to chlordane contamination. Achievement of the chlordane water quality criterion of 0.0005 ug/l would result in an estimated fish tissue concentration of 0.007 mg/kg, much lower than the Action Level. The consumption advisory could be lifted at that level.

Recommendations

The use of both PCB and chlordane has been banned in the United States, so there should be no new point sources to which controls can be applied. There are no known current sources of PCB

and Chlordane to these Monongahela River segments. PCB and chlordane present in the main stem of the Monongahela River are believed to reside primarily in the sediment due to historical use and improper disposal practices. Generally, the levels of PCB and chlordane are expected to decline over time due to the bans on use through natural attenuation. Examples of processes in natural attenuation are covering of contaminated sediments with newer, less contaminated materials, and flushing of sediments during periods of high stream flow.

Natural attenuation may be the best implementation method because it involves less habitat disturbance/destruction then active removal of contaminated sediments. Mechanical or vacuum dredging removes the habitat needed by certain benthic macroinvertebrates. In addition some of these organisms will be killed during the dredging process. Suspension of sediments during dredging may also cause abrasive damage to the gills and/or sensory organs of benthic macroinvertebrates or the gills of fish. Suspended sediments can also affect the prey gathering ability of sight-feeding fish. In addition, active removal may cause resuspension of contaminated materials thus making PCB and chlordane available for additional uptake. This alternative is also the least costly option.

For the Monongahela River segments outlined above, long-term natural attenuation is the best alternative and provides reasonable assurance that the TMDL will be implemented.

More than ten Federal statutes provide authority to many EPA program offices to address the problem of contaminated sediment. These statutes include: the National Environmental Policy Act; the Clean Air Act; the Coastal Zone Management Act; the Federal Insecticide, Fungicide, and Rodenticide Act; the Marine Protection, Research, and Sanctuaries Act; the Resource Conservation and Recovery Act; the Toxic Substances Control Act; the Clean Water Act; the Great Lakes Water Quality Agreement of 1978, and the Comprehensive Emergency Response, Compensation, and Liability Act. These statutes do not include any type of sediment criteria or a cleanup standard for PCBs or chlordane. Therefore, a determination on whether to conduct remediation of contaminated sediments is not as simple as comparing the sediment concentration to a criteria or standard. Generally, areas with sediment concentrations of PCB of 50 ppm or greater are considered areas of high concentration or “hot spots” and are actively remediated.

EPA’s Contaminated Sediment Management Strategy (CSMS), indicates, “Widespread, low levels of contaminants may favor natural attenuation, while geographically limited areas containing high levels of contaminants favor active remediation.” Natural attenuation may include natural processes that can reduce or degrade the concentration of contaminants in the environment including biodegradation, dispersion, dilution, sorption, volatilization, and chemical or biologic stabilization, transformation or destruction of contaminants, and the deposition of clean sediments to diminish risks associated with the site.

There are no known sediment data for the advisory portion of the receiving stream. With the ban on the production of chlordane and PCBs, the mitigation of the release into the environment as the result of the remedial actions being conducted, and the continued natural attenuation that is occurring in the receiving stream, it is believed the criteria for these pollutants in the water

column will eventually be achieved and the goal of the TMDL for the receiving stream to be "fishable" will be met.

Monitoring

Pennsylvania will continue to monitor PCB and chlordane in smallmouth and spotted bass, walleye, channel catfish, freshwater drum and carp tissue in these reaches of the Monongahela River. Samples will be collected once every five years. The data will be used to evaluate the possible threat to public health and to determine progress toward meeting the TMDL. The consumption advisories will remain in place until the water quality criteria are achieved and advisories are no longer needed.

Public Participation

Notice of the draft TMDL for Beaver River was published in the *Pittsburgh Post-Gazette*, a daily newspaper of approximately 1.2 million readers, on Friday October 6, 2000 (Section-Classifications 444 to 479) and in the PA Bulletin on September 29, 2000. A public meeting was held on November 14, 2000 at DEP's Southwest Regional Office, located at 400 Waterfront Drive, Pittsburgh, PA 15222 (Waterfront Rooms A & B) to discuss and accept comments on the proposed TMDL. The public comment period closed on November 29, 2000.

Four people attended the public meeting. They were from the Army Corps of Engineers, a local watershed group and a USX attorney Primarily, the following concerns were noted in our discussions:

a) Will the State be responsible for cleaning up the PCBs in the river sediment if "natural attenuation" approach is not acceptable?
b) How long will "natural attenuation" take in order to reduce PCBs to acceptable levels?
c) Will industries be required by EPA to sample for soils and groundwater to find any unknown existing sources of PCBs?

Additionally, "Friends of the Riverfront" furnished written comments on 11/28/00. The comments applied to Shenango River, Beaver River, Chartiers/Little Chartiers Creek, Monongahela River and the Ohio River. The comments centered on "implementation" issues of the TMDLs. These comments were addressed. Please refer to Appendix B for a copy of the letter and the response.

The Department considered all comments in developing the final TMDL, which is to the Environmental Protection Agency (EPA) for approval. Notice of final TMDL approval will be posted on the Department website.

Appendix B

COMMENT AND RESPONSE ON THE PROPOSED PCB/CHLORDANE TMDL FOR THE MONONGAHELA RIVER MAXWELL L&D TO L&D 4, AND L&D 2 TO MOUTH

EPA Region III

Comment: General: The proposed TMDL does not include a map depicting relevant features and information.

Response: The final TMDL contains a map.

Comment: General: The report notes that the major fate process for PCBs and chlordane is adsorption to soil and sediment organic matter. However, only contaminants moving to lower layers of the sediment may be effectively sequestered. Otherwise, the sediments may act as an environmental reservoir, and any hydrologic processes that disturb or scour sediments also act to redistribute contaminants. The dam structures should be included in the TMDL analysis as they may act to trap the majority of sediments from reaching the downstream impaired segments of the Ohio River. In addition, given that volatilization is a significant environmental transport process for dissolved PCBs, the presence of a dam or other feature that may increase aeration rates could act to decrease PCBs in the water column prior to the impaired segment.

Response: The comment suggests that instream concentrations of the contaminants may be less than expected because of possible resuspension in the water column and volatilization. There are no data to adequately characterize the water column concentrations and the TMDL states that estimating from fish tissue concentrations (as was done) likely over-estimates the water concentration. Because movement of the fish is prohibited to upstream of the dam, there is no reason to address concentrations of PCB or chlordane (even if there were data) that may exist above the dam.

Comment: General: It is not sufficient to simply allocate to instream sediments when three potential nonpoint sources have been identified. When hazardous sites with PCB contamination have been identified, they must be allocated to. TMDL development can be aided by the use of data and information from Superfund. It is EPA's interpretation that cleanup of soils and stream sediments will be done such that these sources of PCBs will comply with water quality standards. The remedial actions provide further reasonable assurance that the TMDL can be achieved. This approach is predicated on the existence of remedial actions that will ensure these potential sources are controlled in such a manner that the main stem or tributaries will attain and maintain applicable water quality standards. . The revised analysis thus allows for explicit consideration of the contaminated land based source of PCBs in the allocation. In addition, the margin of safety accounts for unknown sources of PCB contamination. The remedial action further provides reasonable assurance that the TMDL can be achieved. This type of approach is

predicated on the existence of remedial actions which will ensure that sources of PCB contamination (land-based contaminated soil runoff or in stream sediments) will be controlled in a manner such that applicable stream segments, mainstem or tributaries, will attain and maintain applicable water quality standards. Alternatively, the TMDL must allocate PCB loading from non-point sources to each of the 4 land based sources of PCB contamination as well as in stream sediments. That allocation method must be scientifically defensible.

Response: The Department acknowledges EPA's assistance in looking for additional data and used that data, as appropriate, to increase discussion of sources of the PCB/chlordane pollution. Pennsylvania believes that more complete allocation of the loadings is dependent on sufficient data. Additional allocation may be part of the next step in the TMDL process, i.e., implementation. Pennsylvania is committed to fulfilling its obligation to implement the TMDLs and will address the refined allocations as a step in implementing the TMDLs. We are further committed to implementation that maximizes public participation as our citizens assume responsibility and authority in managing their watersheds. In this spirit, it is premature for DEP to make unilateral decisions on implementation so early in the process, without that citizen involvement. Conversely, the ambitious, court-directed schedule to complete TMDLs precludes a sufficiently detailed involvement of citizens in development of the TMDL. The TMDL regulation at 40 CFR § 130 does not require implementation as an integral part of the TMDL, nor does it require reasonable assurance of implementation.

Comment: Information Sheet, What Pollutant does this TMDL Address?: This section lists only PCBs, even though other sections of the Information Sheet and the draft TMDL discuss PCBs and chlordane.

Response: This was an inadvertent error that has been corrected.

Comment: Information Sheet, How Was the TMDL Developed?: This section lists only PCBs as probable human carcinogens without mentioning chlordane.

Response: This was an inadvertent error that has been corrected.

Comment: Background: The information presented lists the species for which consumption advisories have been issued, but does not mention the responsible parameter or parameters.

Response: This comment is generally correct. While chlordane is clearly listed as the parameter of concern in the lower Monongahela River segment in 1986, the other advisory information is not tied to a parameter.

The report has been revised to note the following for the Maxwell to Lock and Dam 4 segment: 1) the initial (1986) advisory for carp was due to chlordane at 0.96 ppm; 2) the addition of channel catfish was due to chlordane at 0.24 ppm, approaching the Action Level; and 3) the 1998 advisories using the Great Lakes protocol are based on PCB. The information for the Lock and Dam 2 segment has been revised to indicate that the 1998 additions were due to PCB.

Comment: Background: Information on fish tissue concentrations of both PCBs and chlordane should be provided for the two river segments.

Response: Average PCB and chlordane tissue levels were determined for each species using all samples. An estimated water column concentration was then calculated for each compound for each species. These estimated water column concentrations were averaged for each compound in order to provide a single estimated water column concentration for each parameter for the segment. The report has been revised to include this explanation. A listing of the fish tissue data is included in the final TMDL as Appendix A. The back-calculation was done to provide an estimated water column concentration for comparison to the water quality criteria because no current data are available. The important point for the TMDL is that the data show the criteria are most likely exceeded making a TMDL necessary.

Comment: TMDL Development/Endpoint Identification: The report states that the SERO (sic) searched for PCB and chlordane data in or upstream from the fish consumption advisory segments. The TMDL should include the details of the research.

Response: This comment appears to combine the two methods noted in the report. The first method listed in the TMDL was a file search for "known or historical sources that may contribute PCB or chlordane in or upstream from the fish advisory segment." The second method, which is clearly defined, was "the EPA Permit Compliance System (PCS) database was searched for any major discharge permits containing PCB or chlordane as an effluent limitation."
Text has been clarified.

Comment: TMDL Development/Endpoint Identification: PA DEP found that insufficient STORET data were available within a five-mile radius of the fish tissue sampling stations to estimate water column concentrations for PCBs or chlordane. The TMDL should specify whether PA DEP searched for STORET data in any other portions of the listed segment to support the water column concentration estimates. Also, the TMDL should specify the analytical detection limit for those results that were reported as less than detection and whether the analytical results were only for PCBs.

Response: The 5-mile radius for the STORET searches was chosen as representative of the fish advisory segments, and was intended to supplement the file search conducted by the Southwest Field Office. No water column samples were found for the Maxwell Lock and Dam segment. The detection limits for PCB and chlordane in the Lock and Dam 2 segment are not important because the water column data found were not representative of current conditions. The data found were collected between 1975 and 1982. The STORET retrieval request included both PCB and chlordane. Only one detection, for PCB, was found and noted in the report to document the search. As noted, this data is not representative of current water quality conditions.

Comment: TMDL Development/Endpoint Identification: Two tables show the range of years and the years of available fish tissue data for PCBs and chlordane in various fish species.

Because the time frame is over ten years, the data may show a decreasing trend. An attempt should be made to evaluate time trending of PCB and chlordane levels in fish tissue.

Response: The Department does not believe trend information based on the limited sampling results would be meaningful in this TMDL document. The important factor is that fish consumption advisories are in place and the estimated water column concentrations exceed the criteria. This means that a TMDL must be developed.

Comment: TMDL Development/Endpoint Identification: The tables also show that the number of data sets are either the same or more than the number of years, suggesting that in one or more of the years listed, two or more sets of analytical data are available. The table should be modified to reflect the exact number of data sets available for each listed year followed by an explanation of how the tissue data were used to arrive at the estimated water column concentrations.

Please consider listing the fish tissue data that were used to back-calculate the instream water concentration of PCBs or chlordane. This would help clarify whether the tissue concentrations were determined by averaging all data for both carp and channel catfish for each of the years identified. Did the state observe any changes in fish tissue concentrations from 1985 through 1997 that would support natural attenuation as the best alternative for the TMDL?

Response: Average PCB and chlordane tissue levels were determined for each species using all samples. An estimated water column concentration was then calculated for each compound for each species. These estimated water column concentrations were averaged for each compound in order to provide a single estimated water column concentration for each parameter for the segment. The report has been revised to include this explanation. The back-calculation was done to provide an estimated water column concentration for comparison to the water quality criteria because no current data are available. The important point for the TMDL is that the data show the criteria are most likely exceeded making a TMDL necessary.

The Department does not believe trend information based on the limited sampling results would be meaningful in this TMDL document.

Comment: Source Assessment: PA DEP indicates that known point sources of PCBs or chlordane must obtain an NPDES permit, but does not identify these potential sources. The report notes that several potential nonpoint sources have been identified, but they are not listed. Furthermore, the report states that no data are available to quantify the potential nonpoint source loads. Non-detect readings for effluent, soil or ground water samples may not be sufficient to omit point or nonpoint sources from the TMDL analysis. Current testing techniques lack the precision necessary to accurately quantify levels that could ensure compliance with the water quality criteria for PCBs. If the point sources can demonstrate they are no longer accepting any discharge potentially containing PCBs or chlordane, their removal from the TMDL can be justified. Otherwise, the TMDL analysis and allocation should be revisited to consider the impact of point sources.

Response: The report states in at least two places that there are no known point sources of PCBs or chlordane. Non-detect readings are the readily available data supporting the TMDL. In the absence of data, it is not correct to assume non-compliance with water quality standards and attempt to refine allocations.

Comment: Source Assessment: A search of potential sites undergoing remediation under CERCLA, SARA TSCA or Pennsylvania's Hazardous Site Cleanup Act (HSCA) should be conducted to locate potential PCB or chlordane sources.

Response: The Department acknowledges EPA's assistance in looking for additional data. Additional data has been added to the source assessment on potential sites of PCBs or chlordane. This has been added to the text.

Comment: Source Assessment: The report states, "Appropriate level of cleanup is difficult to determine. Removal of all contaminates is virtually impossible and exceedingly expensive. However, cleaning up to any other level raises issues of dose response, which links an amount of a contaminate to the resultant effect, which is difficult to accurately predict." The word "contaminate" is used here instead of "contaminant." The entire paragraph should be clarified, and may not be appropriate for this section.

Response: The paragraph has been deleted.

Comment: Source Assessment: This section provides a summary of CERCLA, SARA and HSCA in an apparent attempt to define the programs under which sediment remediation could occur. The TMDL implementation, however, relies on natural attenuation, so these discussions do not appear to be relevant.

Response: The discussions have been deleted as irrelevant.

Comment: TMDL Implementation: Implementation relies on natural attenuation of the contaminated sediment. Existing fish tissue or sediment data demonstrating that this process is ongoing would support the reasonable assurance section of this TMDL.

Response: Thank you for this perspective. The Department believes implementation is best addressed under the lead of local citizen groups, following completion of the TMDL.

Comment: Sediment Remediation: This section provides background information on the federal statutes and regulations that address sediment contamination and appears to have been pasted from another document without editing. This section should be revised to include only information relevant to this TMDL. The document indicates that a number of "criteria have been evaluated in order to determine the appropriate remedial actions for the four sites of concern." Throughout the TMDL, there is no mention or description of any four specific sites of concern.

Response: The Department has revised the TMDL accordingly.

Comment: Sediment Remediation: The last paragraph states that there are no known "hot spots" in the advisory segment where sediment samples exceed 50 mg/kg. This suggests that sediment samples have been collected, but there is no mention of such sampling throughout the document.

Response: There are no known sediment data for the advisory portion of the receiving stream. The report has been revised to state that.

Comment: Monitoring: This section states that fish tissue monitoring will continue once every five years. First, other EPA-approved for comment TMDLs include monitoring of fish tissue every two years. Secondly, this section does not specify which fish species will be monitored and for what parameters. Last, given that this TMDL segment is about 39.6 miles in length with several tributaries, the monitoring will require multiple locations. A consolidated fish tissue monitoring program for the whole Ohio River watershed may be appropriate.

Response: Pennsylvania's fish tissue monitoring program is generally based on a five-year sampling rotation. Two particular streams, currently under No Kill regulations, are monitored every two years. This TMDL is for PCB and chlordane. Both of these compounds are included in the parameter list for the Department's routine monitoring program. Any monitoring will attempt to target the species for which consumption advisories are in place, although obtaining target species is not always possible.