

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029
4/9/2001

Mr. David E. Hess, Acting Secretary
Pennsylvania Department of Environmental Protection
Rachel Carson State Office Building
400 Market Street
Harrisburg, PA 17101

Re: Ohio River Total Maximum Daily Loads (TMDLs)

Dear Mr. Hess:

The U. S. Environmental Protection Agency (EPA) Region III is pleased to approve the Ohio River Total Maximum Daily Loads (TMDLs), submitted to EPA by the Pennsylvania Department of Protection (PADEP) by letter dated March 9, 2001. The TMDLs were established and submitted in accordance with Section 303(d)(1)(c) and (2) of the Clean Water Act. The TMDLs were established to address impairment of water quality as identified in Pennsylvania's 1996 Section 303(d) list. Pennsylvania identifies the impairment for this water quality limited waterbody based on a fish consumption advisory for Polychlorinated Biphenyls (PCBs) and chlordane. The Ohio River segment is located from the Point in Pittsburgh, Pennsylvania to the State Line.

In accordance with Federal regulations found in 40 CFR §130.7, a TMDL must: be designed to meet water quality standards; include, as appropriate, both wasteload allocations for point sources and load allocations for nonpoint sources; consider the impacts of background pollutant contributions; take critical stream conditions into account (the conditions when water quality is most likely to be violated); consider seasonal variations; include a margin of safety (which accounts for any uncertainties in the relationship between pollutant loads and instream water quality); and be subject to public participation. The enclosure to this letter describes how the Ohio River TMDL satisfies each of these requirements.

Following the approval of the TMDLs, PADEP shall incorporate it into the state's Water Quality Management Plan pursuant to 40 CFR §130.7(d)(2). As you know, any new or revised National Pollution Discharge Elimination System permits with applicable effluent limits must be consistent with the TMDL's wasteload allocation pursuant to 40 CFR §122.44(d)(1)(VII)(B)(2).

Any such permit should be submitted to EPA for review consistent with EPA's letter dated October 1, 1998. Please note that PADEP determined there are currently no permitted PCBs or chlordane point source dischargers to the Ohio River. If you have any questions or concerns, please call me or have your staff contact Mr. Thomas Henry, the TMDL Program Manager, at (215) 814-5752.

Sincerely,

/S/

Rebecca W. Hanmer, Director
Water Protection Division

Enclosure

cc: Mr. Lawrence Tropea, Jr., PADEP
Mr. Terry Fabian, PADEP
Mr. Fred Marrocco, PADEP
Mr. Edward Brezina, PADEP

Decision Rationale
Total Maximum Daily Loads
Polychlorinated Biphenyls (PCBs) and Chlordane
Ohio River
From the Point in Pittsburgh, Pennsylvania to the State Line
4/9/2001

I. Introduction

This document will set forth the Environmental Protection Agency's (EPA) rationale for approving the Total Maximum Daily Load (TMDL) for PCBs and chlordane in the Ohio River in Beaver, Lawrence, Washington, and Allegheny Counties. The document was submitted by the Pennsylvania Department of Environmental Protection (PADEP) for final Agency review, by letter dated March 9, 2001 and received by EPA on March 9, 2001. Our rationale is based on the TMDL document and information contained in Appendices to the document to determine if the TMDL meets the following eight regulatory conditions pursuant to 40 CFR §130.

- 1) The TMDLs are designed to implement applicable water quality standards.
- 2) The TMDLs include a total allowable load as well as individual waste load allocations (WLA) and load allocations (LA).
- 3) The TMDLs consider the impacts of background pollutant contributions.
- 4) The TMDLs consider critical environmental conditions.
- 5) The TMDLs consider seasonal environmental variations.
- 6) The TMDLs include a margin of safety.
- 7) There is reasonable assurance that the TMDLs can be met.
- 8) The TMDLs have been subject to public participation.

II. Summary

The Total Maximum Daily Load (TMDL) applies to the Ohio River (stream code 32317) from the point in Pittsburgh to the state border, listed in Pennsylvania state water plans (SWP) 20-B, D and G (river mile 981 to river mile 941). The Ohio River was listed on Pennsylvania's 1996 Section 303(d) list of impaired waters as impaired by priority organics and pesticides (chlordane) based on information in the state's Section 305(b) report, and fish consumption advisories. The sources were listed as combined sewer overflow and other non-point sources. The 1998 Section 303(d) list added additional mileages and identified impaired segments with identification numbers. The 1998 list indicates the source of impairment as source unknown. This TMDL, for PCBs and chlordane in the Ohio River, applies to the river mile and segment identification below:

Table 1 - Segments of the Ohio River Identified as Impaired by PCBs and chlordane		
Location	Segment Identification Code	River Mile
From the point in Pittsburgh to the Beaver River	9917 (SWP 20-G)	981 to 955.5
From the Beaver River to Raccoon Creek	9918 (SWP 20-B)	955.5 to 949.29
From Raccoon Creek to Montgomery Dam	9918 (SWP 20-B)	949.29 to 948
From Montgomery Dam to Ohio/Pennsylvania State Line	9918 (20-D)	948 to 940.74

The first fish advisory for the Ohio River was issued on December 12, 1979. The public was warned not to eat carp taken near Brunot Island due to PCB contamination (6.0 ppm). A statewide release on June 6, 1986, included the same advice for carp at the Dashields and Montgomery Locks and Dams due to chlordane levels of 0.40 ppm and 0.28 ppm respectively, and for channel catfish at Dashields due to PCB concentrations of 2.45 ppm and 3.43 ppm respectively. These advisories were re-issued a number of times in cooperation with the Ohio River Valley Sanitation Commission (ORSANCO) and other states. The carp and channel catfish advice remained generally unchanged until application of the Great Lakes protocol for 1998. At that time, the downstream segment limit was changed to the Montgomery Lock and Dam. The 1998 “Do Not Eat” advice remains for carp and channel catfish. Since implementation of the Great Lakes protocol, the public is advised to eat no more than one meal per month of walleye, sauger, white bass and freshwater drum from the point in Pittsburgh to the Montgomery Lock and Dam. The advisory issued by Ohio and West Virginia is in place for the remainder of the Ohio River main stem in Pennsylvania. In this reach, one meal per month advice applies to white bass, hybrid striped bass and freshwater drum. Flathead catfish and channel catfish are limited to six meals per year.

According to EPA regulations and guidance, TMDLs must include specific waste load allocations (WLA) to all significant point sources of a pollutant and load allocations to nonpoint sources. According to Federal regulations at 40 CFR §130.2(g), load allocations are best estimates of the loading, which may range from reasonably accurate estimates to gross allotments, depending on the availability of data and appropriate techniques for predicting the loading. Table 2 below summarizes the elements of the TMDLs for PCB and chlordane developed by PADEP. Despite the fact that EPA believes that annual loads are an appropriate measure for these TMDLs, for the sake of consistency we are breaking the annual TMDL loads down into daily loads. The TMDL calls for a 99.9% reduction in PCB and a 97.3% reduction in chlordane from existing levels. Pennsylvania did not provide specific allocations for the following tributaries: 1) Allegheny River, 2) Beaver River, 3) Chartiers, and 4) the Monongahela River. TMDLs for PCBs have just been completed for these tributaries.

Table 2 - TMDL Summary for PCBs and chlordanes in the Ohio River (lbs/day)				
Pollutant	TMDL	WLA	LA	MOS
PCB	0.00442	0	0.00398	0.000442
Chlordane	0.0553	0	0.0497	0.00553

The TMDL is a written plan and analysis established to ensure that a waterbody will attain and maintain water quality standards. The TMDL is a scientifically-based strategy which considers current and foreseeable conditions, the best available data, and accounts for uncertainty with the inclusion of a “margin of safety” value. Conditions, available data and the understanding of the natural processes can change more than anticipated by the margin of safety. The option is always available to refine the TMDL for re-submittal to EPA for approval. The unassessed waters protocol, a method of conducting biological assessments of Pennsylvania’s waters, was developed in 1996 and began implementation in 1997. PADEP’s goal is a statewide assessment of surface waters in Pennsylvania. After completion of the initial assessments, the long-range goal is to re-assess all waters on a five-year cycle. Therefore, while the TMDL should not be modified at the expense of achieving water quality standards expeditiously, the TMDL may be modified when warranted.

III. Discussion of Regulatory Conditions

EPA finds that Pennsylvania has provided sufficient information to meet all of the eight basic requirements for establishing PCB and chlordanes TMDLs for the Ohio River. EPA therefore approves the TMDLs. EPA’s rationale for approval is set forth according to the regulatory requirements listed below.

1) The TMDLs are designed to implement the applicable water quality standards.

A TMDL is required to assure that appropriate water quality standards are attained and maintained. Water quality standards include numeric criteria, narrative criteria and designated uses. The fish consumption advisories indicate the use designations are not being met in this segment of the Ohio River. In addition, the translation of fish tissue data to water column concentrations can indicate whether the numeric standard for chlordanes and PCBs are being met. Pennsylvania’s calculations estimate that water column concentrations exceed applicable numeric criteria for PCBs and chlordanes.

The goal of a TMDL is to outline a plan to achieve water quality standards in the water body. For this segment of the Ohio River, the TMDL goal is for levels of PCB and chlordanes in the water column to be reduced to levels equal to or less than the Commonwealth's water quality criteria. The human health criteria, found in the "Water Quality Toxics Management Strategy - Statement of Policy" (PA Title 25, 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 chlordanes.

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}).

Pennsylvania found limited water column data for the Ohio River for PCB and chlordane. No water column data were found near Montgomery. A number of data points collected at WQN Station # 902 (1970 and 1977) and at Montgomery (1970 and 1979) were found. All samples were less than detection except for one sample that showed PCB 1260 at 0.4 ug/l.

In order to compare current conditions to the water quality criteria, Pennsylvania estimated water column concentrations based on existing fish tissue concentrations and bioconcentration factors (BCF). The calculation involved dividing the average fish tissue concentration by the factor to obtain a projected water column concentration.

The equation used by Pennsylvania is:

$$\frac{TC}{BCF} = WC \times 1000$$

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 g/L

The average concentration was used for two main reasons: 1) the fish tissue samples are composites, and 2) use of an average value considers the natural variation in tissue burden found in wild fish populations. The PCB 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. The BCFs were used because no Bioaccumulation Factors (BAFs) are available for statewide use. The use of the BCFs is consistent with the provisions of Pennsylvania's water quality toxics management strategy and were used to derive the water quality standard for PCBs, so this method is acceptable.

Based on Pennsylvania's calculations, the following in-stream concentrations were estimated. As can be seen in Table 3, the estimated in-stream concentrations greatly exceed the state's water quality standard for each pollutant. However, Pennsylvania notes that while the actual concentrations in the water column are not known, they are likely to be lower than the calculated estimates. These estimates still show a need for the development of a TMDL.

Table 3 - PADEP Estimated Stream Column Concentrations		
Pollutant	Column Concentration	Water Quality Standard

PCB	0.04577 ug/l	0.0005 ug/l
Chlordane	0.01830 ug/l	0.00004 ug/l

2) The TMDLs include a total allowable load as well as individual waste load allocations and load allocation.

Source Identification

In order to determine the allocations for each pollutant, significant sources must be identified. Pennsylvania conducted a source assessment using various methods. The EPA Permit Compliance System (PCS) database was searched for any major discharge permits containing PCB or chlordane as an effluent limitation. No known point sources were identified from this search.

Both PCB and chlordane have been banned for over 10 years (since 1979 for PCB and 1989 for chlordane). However, contaminated soils and water sediments may still contribute to instream concentrations of the pollutants. There are NPDES permitted discharges that also contribute PCBs to the environment. In addition, Superfund sites may also provide a source for both chlordane and PCBs. PCBs are very resistant to breakdown and thus remain in river and lake bottom sediments for many years. Air deposition may also be a pathway for PCBs entering surface waters.

PADEP's search of the PCS and other information showed no point sources of either PCB or chlordane. No non-point sources of chlordane were found in this study.

Pennsylvania conducted a search for potential sources of PCB related to uncontrolled waste sites through the use of EPA's Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS), a search of records within EPA's remedial and removal programs, and telephone interviews with representatives of PADEP's hazardous sites cleanup program. Other searches included USGS reports and data, and literature searches of scientific journals. This search of records indicated the following potential sites for sources of PCB: 1) the Breslube-Penn site, 2) the former H.K. Porter site, 3) the former Allis Chalmers site, 4) the Texas Eastern Holbrook compressor station, and 5) the Ohio River Park Site.

Former H.K. Porter Site

The H.K. Porter site is located in Hopewell Township, Beaver County on Shouse Run (stream code 36638, RMI 0.2 miles). Shouse Run is tributary to the Ohio River at RMI 966.2. PCB concentrations in the soils are documented to be as high as 130 mg/Kg. This site is being addressed under the state's HSCA program. Analytical results from the associated soils and wastes collected from October 1990 through January 1993 revealed the presence of lead and PCB at elevated concentrations.

In 1991, H.K. Porter excavated approximately 7,875 tons of non-hazardous wastes and 4,260 tons of hazardous wastes from the disposal area. In the late 1990s, PADEP conducted additional cleanup activities under HSCA that included the excavation and off-site disposal of approximately 50,000 cubic yards of hazardous waste. PADEP then installed a soil cover and re-vegetated the entire site. Pennsylvania determined that this site does not represent a source of contaminated soil erosion to Four Mile Run or to the Ohio River. EPA agrees.

Breslube-Penn Site

The Breslube-Penn site is located in Coraopolis, Allegheny County, Pennsylvania. The site is situated along Montour Run, which is a tributary to the Ohio River. The facility site, identified by EPA identification number PAD089667695, site comprises approximately 11.1 acres and borders Montour Creek. The facility historically operated as a solvent recovery and oil recycling facility and currently is inactive. Elevated levels of PCB have been found in soil and groundwater at a soil staging area and filter cake area, where soils and filter cake wastes from past remedial activities have been stockpiled on site. Sampling of this pile, which is 90 feet wide, 145 feet long and 30 feet high revealed an average PCB concentration of 52 mg/kg.

The Breslube-Penn site is undergoing investigation and cleanup under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The members of the Breslube Joint Steering Committee have entered into an Administrative Order on Consent with the EPA to conduct a Remedial Investigation/Feasibility Study at the site (RI/FS). After approval and implementation of the RI/FS, remediation activities will be implemented. Pennsylvania determined that this site may be a contributor but insufficient data were available to quantify that contribution. EPA believes there is sufficient information to include a load from this site for this TMDL; this matter is discussed later in this document.

Former Allis Chalmers Site

The Allis Chalmers site is located in Pittsburgh, Allegheny County on the North Bank of the Ohio River (RMI 979) across from Brunot island. During the 1970s, EPA conducted an investigation and it was documented that a 30,000 gallon vault of PCBs was present at this site. Based on information provided by EPA, the 30,000 gallon vault of PCB contaminated oil at this site has since been removed. Pennsylvania concluded that there is no evidence to suggest this is currently a source of PCB contamination in the Ohio River basin. EPA concurs with this determination.

Texas Eastern Holbrook Compressor Station

The Texas Eastern Holbrook Compressor Station is located in Richhill Township, Greene County and is covered by NPDES permit PA0216593 in the Ohio River watershed (North Fork of Dunkard Fork Creek at RMI 1.96). This site was an historic nonpoint source of PCBs in the watershed. As a result of a statewide consent order and agreement with Texas Eastern, this site and others were required to remove PCB contaminated soil and to collect and treat contaminated groundwater. The facility currently discharges treated groundwater to Dunkard Fork Creek, an Ohio River tributary at River Mile 1.96, under National Pollutant Discharge Elimination System NPDES permit No. PA0216593 with “not detectable” limits, and the groundwater is treated with

carbon. Because of the remedial actions conducted, Pennsylvania determined that the site no longer is a source of PCB contamination in the watershed. EPA concurs with this determination.

Ohio River Park

This site is located approximately 10 miles downstream of Pittsburgh, Pennsylvania on the western end of Neville Island, which is situated on the Ohio River. This site has a NPL status of final. Remedial actions have been completed under CERCLA and a sports complex has been developed on the site, thereby covering any remaining contaminated soil that could serve as a potential nonpoint source of PCB. Pennsylvania determined that this site is not a source of PCB to the Ohio River. EPA concurs with this determination

Sediment

PADEP did not identify river sediments as a source of either PCB or chlordane in their Source Identification discussions. However, allocations were assigned to sediment in the TMDL calculations.

Atmospheric deposition

Atmospheric deposition can contribute to background concentrations of PCB in water bodies. Studies have shown that air deposition can be a significant source of PCB load to a water. However, other studies are inconclusive and suggest that 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. EPA concurs with PADEP that air sources of PCBs need not be quantified for this TMDL. However, EPA recommends that PADEP continue to review the impact of air deposition and, if the need arises, revisit this TMDL to consider the impacts of air sources.

Total Allowable Loads

The calculation of the Ohio River TMDLs utilizes the water quality criteria and flow data from the U.S. Geological Survey (USGS) surface water discharge station 11.8 miles downstream from confluence of Allegheny and Monongahela Rivers [03086000]. 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). The Segment Qhm for the Ohio River is 20,500 cfs (based on ORSANCO's Report Appendix B – Critical Flow Values Montgomery Dam to Willow Island Dam). EPA agrees with this approach for calculating the TMDL. The total allowable loadings are presented below:

<u>Pollutant</u>	<u>TMDL</u>	<u>% Reduction</u>
PCB	0.00442 lb/day	99.91
Chlordane	0.0553 lb/day	97.27

Wasteload Allocations

Pennsylvania found no permitted point sources contributing to the load of either chlordane or PCBs to the Ohio River. Therefore the WLA was assigned a value of 0. EPA concurs with this determination.

Load Allocations

PADEP found that insufficient information was available for the Breslube-Penn site. The Department also concluded that because there is no way to accurately quantify loadings from groundwater or erosion from the site, the PCB TMDL, minus the margin of safety, is assigned to a Load Allocation (LA) for the instream sediment and tributaries of the Ohio River.

Although PADEP does not specifically allocate a load to the Superfund site, PADEP's TMDL includes an explicit margin of safety and an allocation of the remainder of the TMDL to sediment providing an implicit allocation of zero to the known PCB source. EPA finds this allocation acceptable.

Using detailed information from our Superfund site files, we have calculated the PCB loadings coming from the sites (see Appendices A, B and C) and believe an existing loading rate and the reduction required to meet the implicit allocation of zero to the sites, can be determined. Based on the information reviewed by EPA and the subsequent calculations completed by EPA, we believe an allocation of zero to the site would be feasible. The elimination of any possible erosion of contaminated soil from the sites removes the pathway for the runoff of PCBs. Therefore, the zero allocation, or 100% reduction, for the sites is reasonable.

EPA believes that such an allocation for the Breslube-Penn Site serves as a goal that can be used by the Superfund program as the specific site is addressed. A TMDL is a planning tool that may change over time as the data improves and the watershed change. If additional data are collected and the identified sources of PCBs are re-evaluated, a determination can be made as to whether the new data are significant and a TMDL revision is necessary. While it is expected that a TMDL will serve as a decision tool for those remediation plans, it may be found that the removal of the sediment/runoff pathway may not be feasible or acceptable for other reasons. If this should be the case, the TMDL could be revisited and the allocations re-distributed, while still meeting the total allowable load from all sources to take into consideration the final remediation plan. It is important at this time to provide a goal that is based on the need to meet water quality standards to serve as a focal point for site plan development.

Based on EPA's analysis of this TMDL, in which we find an implicit allocation of zero to the Breslube-Penn Site included, EPA finds PADEP's TMDL for PCBs to be acceptable. We believe that the allocation of zero to the site is consistent with the state's allocation (i.e., it does not add any PCB to the state's load allocation for PCB of 0.00398lbs/day).

Because there are no known point or non-point sources of chlordane in this Ohio River segment, it is also treated as a non-point source contaminant that may be introduced to surface water

through contaminated ground water or surface runoff. The TMDL for chlordane is assigned to the LA, that portion of the load contributed by non-point sources. Chlordane also becomes associated with soil particles and sediments in a water body, and fish tissue contamination results from this sediment load. As a result of this contaminated sediment load, the chlordane TMDL, minus the margin of safety of 0.000260 pounds per day, in this reach of the Ohio River is assigned as a LA for the instream sediment. EPA concurs with this approach for chlordane. The TMDL calls for a reduction from existing levels of 99.9% for PCBs and 97.3% for chlordane.

Table 4 - Summary of Load Allocations Determined by PADEP				
Pollutant	TMDL	WLA	LA-sediment	MOS
PCB	0.00442 lb/day	0	0.00398 lb/day	0.000442 lb/day
Chlordane	0.0553 lb/day	0	0.0497 lb/day	0.00553 lb/day

The major tributaries that have TMDLs completed for PCBs should have specific allocations assigned. However, since Pennsylvania did not provide this level of allocation, EPA believes that these loadings from the tributaries must come from the load allocation assigned by the state to the sediment. See Appendix A for EPA’s suggested allocation to these tributaries and sediment.

3) The TMDLs consider the impacts of background pollutant contributions.

Development of TMDLs includes consideration of background pollutant contributions, appropriate and/or critical stream flow, and seasonal variation. Pennsylvania’s TMDL report indicates that, “Development of the TMDLs for the Ohio River considers background pollutant contributions. The natural instream 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 exist 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.” EPA agrees with the assumption of zero background for chlordane and the need to further consider background concentrations for PCBs.

PADEP assumed a zero background concentration for PCBs in its calculations. PADEP’s assumption for use of a zero background value is that further stream specific data need to be developed before a background concentration can be calculated with sufficient scientific certainty for PCBs. EPA agrees that more information should be collected to determine what the background contribution of PCBs is for this water body.

In order to address the pervasiveness of PCBs, PADEP has committed to collecting instream data to either support an assumption of zero concentration or some other value in the future (commitment provided by PADEP in a letter from Mr. Frederick Marrocco to Mr. Joseph Piotrowski, April 2, 2001). The commitment which Pennsylvania has made is as follows: “PADEP will review the basis for the zero background assumption to determine if it continues to be valid. If the review determines that the zero background assumption is no longer valid, PADEP will assess available and practical options for conducting background monitoring for PCB. Factors to be considered in this assessment include, the on-going water quality monitoring program and priorities, fish tissue sampling, sediment sampling, water quality sampling, and the availability of EPA approved analytical methods. PADEP will consider the results of this assessment in establishing a plan for the conduct of additional PCB data collection efforts. Any new data collected under this plan will be assessed for possible revision to the PCB TMDLs.”

The Toxics Advisory Committee of the Delaware River Basin Committee is now involved in the preliminary data collection program for the development of a TMDL for PCBs for the Delaware Estuary. This same committee has recommended the use of the method 1668A for data analysis. As of yet, the 1668A data analysis method has not completed the EPA approval process. However, EPA Headquarters has recommended the use of this method as appropriate for a variety of PCB measurement uses under the Clean Water Act on a case-by-case basis and is prepared to assist regulatory agencies that choose to use the method.

In addition to the Delaware Estuary PCB TMDL, EPA is using the 1668A method for the development of a PCB TMDL for the Shenandoah River in Virginia. EPA has used more sensitive methods, not yet approved for dioxin analysis, in the development of a TMDL for the Kanawha River, Pocatalico River and Armour Creek in West Virginia and for the development of a dioxin TMDL for the Ohio River. The Ohio River Valley Sanitary Commission (ORSANCO) and the states of West Virginia and Virginia have accepted these non-approved approaches in the development of TMDLs. Furthermore, the regulated and environmental communities have accepted the final TMDLs for the Kanawha River, Pocatalico River and Armour Creek and the Ohio River based on data analyzed using methods not yet approved by EPA.

Calculating the TMDL for PCBs based on a zero background or a value greater than zero will have no noticeable impact on the reductions necessary for the various sources of the pollutant for this watershed. Therefore, we accept the state’s approach to the use of a zero background for PCBs. However, as will be discussed later, the consideration of background loads to this water segment may have an impact of reasonable assurances that the TMDL can be met.

4) The TMDLs consider critical environmental conditions.

EPA regulations at 40 CFR §130.7(c)(1) require TMDLs to take into account critical conditions for streamflow, loading, and water quality parameters. The intent of this requirement is to ensure that the water quality of the Ohio River is protected during times when it is most vulnerable.

Critical conditions are important because they describe the factors that combine to cause a violation of water quality standards and will help in identifying the actions that may have to be undertaken to meet water quality standards.¹ In specifying critical conditions in the waterbody, an attempt is made to use a reasonable “worst-case” scenario condition. Critical conditions are the combination of environmental factors (e.g., flow, temperature, etc.) that results in attaining and maintaining the water quality criterion and has an acceptably low frequency of occurrence. For example, stream analysis often uses a low-flow (7Q10) design condition as critical because the ability of the waterbody to assimilate pollutants without exhibiting adverse impacts is at a minimum.

PCB and chlordane are probable human carcinogens. Carcinogenesis is a non-threshold 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 TMDL, 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 the critical environmental conditions and seasonal variations in PCB and chlordane concentrations. EPA believes that this approach satisfies the requirement to consider critical environmental conditions.

5) *The TMDLs consider seasonal environmental variations.*

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. EPA believes that this approach satisfies the requirement to consider seasonal environmental variations.

EPA Memorandum regarding EPA Actions to Support High Quality TMDLS from Robert H. Wayland III, Director, Office of Wetlands, Oceans, and Watersheds to the Regional Water Management Division Directors, August 9, 1999.

6) The TMDLs include a margin of safety.

This requirement is intended to add a level of safety to the modeling process to account for any uncertainty. Margins of safety (MOS) may be implicit, built into the modeling process, or explicit, taken as a percentage of the wasteload allocation, load allocation, or TMDL.

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 results in an explicit margin of safety for PCB of 0.000442 pounds per day and for chlordane 0.00553 pounds per day. EPA concurs with this approach to considering a MOS.

7) There is reasonable assurance that the TMDLs can be met.

There are two options for the abatement of PCBs and chlordane from the stream sediment: 1) dredge and remove the contaminated sediment, or 2) allow natural attenuation to remove the source. PADEP recommends the option of natural attenuation. If the sources are removed, such as the soil erosion from the Breslube-Penn Site, eventually natural forces, such as overburden by clean sediments, will remove the threat of stream and fish contamination by PCBs.

Pennsylvania intends to continue periodic fish tissue sampling for the Ohio River to determine if contamination continues. EPA agrees with this monitoring activity, however, we also believe that additional monitoring is necessary. The combination of removing the pathway of the PCBs from the known sources, and the natural recovery of the instream sediments provides some reasonable assurance that the TMDL, and hence the applicable water quality standard, can be met. EPA believes that the state should undertake additional monitoring to provide some further assurances. This would include measuring background concentrations of PCBs. If it is found that PCB concentrations entering the segment are significant, natural clean-up of existing sediment contamination may not occur or may be delayed, or the incoming concentrations themselves may exceed applicable water quality standards. These issues need to be addressed. In order to assure that sampling/analysis provides useful information, EPA further recommends the use of testing method 1668A. EPA also recommends that the state continue to analyze the impacts of air deposition of PCBs to this water.

8) The TMDLs have been subject to public participation.

Notice of the draft TMDL for the Ohio 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 *Pennsylvania Bulletin* on September 29, 2000. A public meeting was held on November 14, 2000 at PADEP'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.

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