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

Richard Eskin, Ph.D., Director
Technical and Regulatory Service Administration
Maryland Department of the Environment
1800 Washington Blvd., Suite 540
Baltimore, Maryland 21230-1718

MAR 18 2011

Dear Dr. Eskin:

The U.S. Environmental Protection Agency (EPA), Region III, is pleased to approve *Total Maximum Daily Loads (TMDLs) of Polychlorinated Biphenyls in the Bohemia River, Oligohaline Segment, Cecil County, Maryland.* The TMDL report was submitted via the Maryland Department of the Environment's (MDE) letter dated September 28, 2009, for review and approval by EPA. Also, based on EPA's comments, MDE sent a final revised TMDL report via electronic mail on March 4, 2011. The TMDL was established and submitted in accordance with Section 303(d)(1)(c) and (2) of the Clean Water Act to address impairments of water quality as identified in Maryland's Section 303(d) List. The Bohemia River, Oligohaline Segment (MD-BOHOH) was included on Maryland's Section 303(d) List as impaired by: sediments (1996 – later changed to a total suspended solids (TSS) listing), nutrients (1996), and polychlorinated biphenyls (PCBs) in fish tissue (2002). A nutrient TMDL has been approved by EPA in January 2001. In 2008 the TSS listing was moved from Category 5 of the Integrated Report (waterbody is impaired, does not attain the water quality standard, and a TMDL is required) to Category 2 (waterbody is meeting some (in this case TSS) water quality standards, but with insufficient data to determine if other water quality standards are being met). This TMDL addresses the PCBs impairment only.

In accordance with Federal regulations at 40 CFR §130.7, a TMDL must comply with the following requirements: (1) be designed to attain and maintain the applicable water quality standards; (2) include a total allowable loading and as appropriate, wasteload allocations for point sources and load allocations for nonpoint sources; (3) consider the impacts of background pollutant contributions; (4) take critical stream conditions into account (the conditions when water quality is most likely to be violated); (5) consider seasonal variations; (6) include a margin of safety (which accounts for uncertainties in the relationship between pollutant loads and instream water quality); and (7) be subject to public participation. In addition, these TMDLs considered reasonable assurance that the TMDL allocations assigned to the nonpoint sources can be reasonably met. The enclosure to this letter describes how the PCBs TMDLs for the Bohemia River, Oligohaline Segment, satisfy each of these requirements.

As you know, all new or revised National Pollutant Discharge Elimination System permits must be consistent with the TMDL wasteload allocation pursuant to 40 CFR §122.44 (d)(1)(vii)(B). Please submit all such permits to EPA for review as per EPA's letter dated October 1, 1998.

If you have any questions or comments concerning this letter, please do not hesitate to contact María García, at 215-814-3199.

Sincerely,

/s/ Signed

Jon M. Capacasa, Director
Water Protection Division

Enclosure

cc: Lee Currey, MDE-TARSA
Melissa Chatham, MDE-TARSA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
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Decision Rationale
Total Maximum Daily Loads of Polychlorinated Biphenyls in the Bohemia River Oligohaline Segment, Cecil County, Maryland

Signed

Jon M. Capacasa, Director
Water Protection Division

Date: 3/12/04

Decision Rationale
Total Maximum Daily Loads
Polychlorinated Biphenyls in Bohemia River, Oligohaline Segment
Cecil County, Maryland

I. Introduction

The Clean Water Act (CWA) requires a Total Maximum Daily Load (TMDL) be developed for those waterbodies identified as impaired by the State where technology based and other controls will not provide for attainment of water quality standards. A TMDL is a determination of the amount of a pollutant from point, nonpoint, and natural background sources, including a Margin of Safety (MOS), that may be discharged to a waterbody without exceeding water quality standards.

This document sets forth the U.S. Environmental Protection Agency's (EPA) rationale for approving the TMDLs for total polychlorinated biphenyls (tPCB) in the Bohemia River, Oligohaline Segment (also referred to as the Bohemia River embayment). The TMDL was established to address impairments of water quality, caused by tPCB in fish tissue, as identified in Maryland's 2002 Section 303(d) List for water quality limited segments. The Maryland Department of the Environment (MDE) submitted the report, *Total Maximum Daily Loads of Polychlorinated Biphenyls in the Bohemia River, Oligohaline Segment, Cecil County, Maryland,* dated September 2009, to EPA for final review on September 28, 2009. Based on EPA's comments, MDE sent a final revised TMDL report to EPA for review and approval on March 4, 2011. The TMDL in this report addresses the tPCB impairment in the Bohemia River, Oligohaline Segment, as identified on Maryland's Section 303(d) List. The Integrated Report Assessment Unit Identification for the Bohemia River, Oligohaline Segment is MD-BOHOH.

EPA's rationale is based on the TMDL Report and information contained in the computer files provided to EPA by MDE. EPA's review determined that the TMDLs meet the following seven regulatory requirements pursuant to 40 CFR Part 130.

1. The TMDL is designed to implement applicable water quality standards.
2. The TMDL includes a total allowable load as well as individual wasteload allocations (WLAs) and load allocations (LAs).
3. The TMDL considers the impacts of background pollutant contributions.
4. The TMDL considers critical environmental conditions.
5. The TMDL considers seasonal environmental variations.
6. The TMDL includes a MOS.
7. The TMDL has been subject to public participation.

In addition, these TMDLs considered reasonable assurance that the TMDL allocations assigned to nonpoint sources can be reasonably met.

II. Summary

The TMDL specifically allocates the allowable tPCB loading to the Bohemia River, Oligohaline Segment. There are three permitted point sources of tPCB that are included in the WLA. However, the loads were considered *de minimis*. The fact that the TMDL does not assign WLAs to any other sources in the watershed should not be construed as a determination by either EPA or MDE that there are no additional sources in the watershed that are subject to the NPDES program. In addition, the fact that EPA is approving this TMDL does not mean that EPA has determined whether some of the sources discussed in the TMDL, under appropriate conditions, might be subject to the NPDES program. The annual average TMDL and Maximum Daily Load (MDL) for tPCBs are presented in Tables 1 and 2, respectively. The TMDLs include an upstream load generated from Delaware. Individual annual and maximum daily WLAs for permitted point sources are provided in Table 3. TMDLs were developed based on EPA guidance and the methods used are specific to each source as described in Appendix G of the TMDL document.

Table 1. Bohemia River Oligohaline Segment Watershed Annual Average TMDL (grams/year)

TMDL		LA			+	WLA			+	
	=	LA_{DE} [1]	+	LA	+	NPDES Stormwater WLA	+	WWTP WLA[2]		MOS
876		10.7	+	775	+	2.8	+	0.06	+	87.6
		Upstream Load Allocation		Bohemia River, Oligohaline Segment Load Allocation (778)						

(1) Although the upstream load is reported here as a single value, it could include point and nonpoint sources.
(2) WWTP Loads were considered to be *de minimis*.

Table 2. Bohemia River Oligohaline Segment Watershed Maximum Daily Load (grams/day)

MDL		LA			+	WLA			+	
	=	LA_{DE} [1]	+	LA	+	NPDES Stormwater WLA	+	WWTP WLA[2]		MOS
4.05		0.049	+	3.58	+	0.0013	+	0.0005	+	0.405
		Upstream Load Allocation		Bohemia River Oligohaline Segment Load Allocation (3.6)						

Table 3. Wasteload Allocations for Permitted Point Sources in the Bohemia River Oligohaline Segment Watershed

Facility		NPDES Permit Number	County/ Subwatershed	Annual Average TMDL (grams/year)	Maximum Daily Load (grams/day)
Cecilton WWTP[1]		MD0020575	Cecil County	0.06	0.0005
NPDES[2] Regulated Stormwater	Cecil County MS4	MDR055500	Cecil County	2.8	0.0013
	MDE General Permit to Construct	MDR10	Cecil County		

[1] WWTP Loads were considered to be *de minimis*.

[2] Although not listed in this table, some individual process water permits for municipal and industrial discharges may also incorporate stormwater requirements. Loads from such facilities as well as from general Phase II state and federal MS4s (e.g., military bases, hospitals, etc.) within the Cecil County portion of the watershed are inherently included as part of the NPDES stormwater WLA.

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 that considers current and foreseeable conditions, the best available data, and accounts for uncertainty with the inclusion of a MOS value. The option is always available to refine the TMDL for resubmittal to EPA for approval if environmental conditions, new data, or the understanding of the natural processes change more than what was anticipated by the MOS.

III. Background

The Bohemia River watershed is located in Cecil County with the eastern most portion of the watershed extending through Delaware. It drains to the Lower Elk River, which eventually drains to the Upper Chesapeake Bay. Additionally, Bohemia River embayment also exchange water and the associated PCBs with the Delaware River Estuary via the Chesapeake and Delaware (C&D) Canal which is hydrologically connected wit the Elk River. The tidal influence extends as far east as Bohemia Mills. The tidal range is 1.6 feet (0.49m) based on the United States National Oceanic and Atmospheric Administration tidal station in Betterton, MD. The depths of the river range from about 6 inches (0.15m) at the headwaters of the tidal embayment to greater than 7 feet (2.1) at the confluence of the Lower Elk River and Bohemia River.

There are no Tier II (i.e., high quality) stream segments (Benthic Index of Biotic Integrity/Fish Index of Biotic Integrity aquatic health scores > 4 – scale 1 to 5) located within the watershed requiring the implementation of Maryland's antidegradation policy procedures (COMAR 2007d; MDE 2009c). The total population in the Maryland portion of the Bohemia River watershed is approximately 7,000 (US Census Bureau 2000).

The entire Bohemia River watershed stretches over approximately 55 square miles (142 km^2). The length of the river is approximately 8.7 miles (14 km). The watershed is predominately rural in nature consisting of 54.8% agricultural land and 25.8% forest.

The Maryland Department of the Environment (MDE) has identified the waters of the

Bohemia River, Oligohaline Segment (Integrated Report Assessment Unit Identification: MD-BOHOH) on the State's Integrated Report as impaired by the following pollutants: sediments (1996 – later changed to a total suspended solids (TSS) listing), nutrients (1996), and polychlorinated biphenyls (PCBs) in fish tissue (2002). A nutrient TMDL has been approved by EPA in January 2001. In 2008 the TSS listing was moved from Category 5 of the Integrated Report (waterbody is impaired, does not attain the water quality standard, and a TMDL is required) to Category 2 (waterbody is meeting some [in this case TSS] water quality standards, but with insufficient data to determine if other water quality standards are being met). This TMDL addresses the PCBs impairment only.

The Maryland water quality regulations state that all surface waters of Maryland shall be protected for water contact recreation, fishing, and protection of aquatic life and wildlife (COMAR 2007a). The specific designated use for Bohemia River, Oligohaline Segment is Use II-Support of Estuarine and Marine Aquatic Life and Shellfish Harvesting (COMAR 2007b). The Bohemia River, Oligohaline Segment is identified as impaired by PCBs on the State's Integrated Report based on fish tissue PCB data from MDE's monitoring program that exceeded the tPCB fish tissue listing threshold of 39 nanograms/gram (ng/g, ppb) - wet weight.

CWA Section 303(d) and its implementing regulations require that TMDLs be developed for waterbodies identified as impaired by the State where technology based and other required controls do not provide for attainment of water quality standards. The tPCB TMDL submitted by MDE is designed to allow for the attainment of the Bohemia River, Oligohaline Segment watershed's designated uses and to ensure that there will be no tPCB impacts affecting aquatic health in the watershed. Refer to Tables 1 and 2 above for a summary of allowable loads.

To establish baseline and allowable pollutant loads for this TMDL, a tidal prism model, which incorporates the influences of both fresh water discharge and tidal flushing, was used to simulate the tPCB dynamic interactions between the water column and bottom sediments within the Bohemia River embayment and the Lower Elk River. In general, tidal waters are exchanged through their connecting boundaries. Within the Bohemia River embayment, the dominant processes affecting the transport of PCBs throughout the water column include: the tidal influence, fresh water discharge, atmospheric exchange (i.e. volatilization and deposition), and the exchange with the bottom sediments. Burial to the deeper inactive layers and the exchange with the water column (through diffusion, resuspension, and settling) are the dominant processes affecting the transport of PCBs in the bottom sediments.

Both point and non-point sources were identified as contributing tPCB loads to the Bohemia River embayment. Non-point sources include:

- *Lower Elk River Influence.* Based on the tPCB concentrations measured at the mouth of Bohemia River and the relatively high quantity of water flowing from the Lower Elk River to the embayment during the flood tides (conveying tPCB loads from the Upper Chesapeake Bay and Delaware River Estuary), the Lower Elk River tPCB Baseline Load of 11,879.0 g/year is major source of tPCBs to the Bohemia River embayment.
- *Bottom Sediments (Resuspension and Diffusion).* Because PCBs tend to bind to sediments, a large portion of the tPCB loads delivered to the embayment from

various sources will quickly end up in the bottom sediments. This accumulation of PCBs can subsequently become a significant source of PCBs to the water column in the embayment. Based on the measured tPCB concentrations in the water column and bottom sediments, the Bottom Sediment tPCB Baseline Load of 2,560.8 g/year is the second largest source of tPCBs to the Bohemia River embayment.

- *Atmospheric Deposition.* Based on previous research conducted in the Chesapeake Bay area, a relatively small portion of the tPCB load to the Bohemia River embayment can be attributed to atmospheric deposition. However, a net loss of tPCB occurs due to volatilization of the dissolved PCBs in the water column to the atmosphere. The TMDL analysis accounts for both atmospheric deposition and volatilization. The estimated direct tPCB atmospheric deposition to the surface of the Bohemia River embayment is 43.6 g/yr. The watershed runoff calculation (see below) accounts for the atmospheric deposition load to the watershed land surface.
- *Watershed Runoff.* The Total Watershed tPCB Baseline Load of the Bohemia River was estimated by multiplying the mean ambient water column tPCB concentration (0.87 ng/L) observed at the nontidal watershed stations by the average watershed stream flow. The watershed tPCB baseline loads are: Delaware Load: 10.7 g/yr; Maryland Load: 50.2 g/yr.

Point sources include: one wastewater treatment plant (WWTP), and NPDES Regulated Stormwater discharges. For the WWTP since no data have been identified, the tPCB concentration for the facility was estimated as the median tPCB concentration of 31 samples from 13 WWTPs monitored by MDE in the Chesapeake Bay watershed. The baseline tPCB loading was calculated based on the permit design flow and the estimated median tPCB concentration. The baseline load is 0.06 g/year. The stormwater permits within the Bohemia River watershed include: (i) the area covered under Cecil County's Phase II jurisdictional municipal separate storm sewer system (MS4) permit, and (ii) state and federal general MS4s, industrial facilities, and construction site, collectively termed "Other NPDES Regulated Stormwater Baseline Load." The areas regulated by the NPDES stormwater permits are represented by the CBP P5 urban land use associated with MDP residential, commercial, open urban, industrial, and institutional land use classifications. The resulting NPDES regulated stormwater tPCB baseline load of 2.8 g/year was estimated by multiplying the proportion of the CBP P5 urban land use within the watershed that is considered regulated out of the total watershed land use area (5.5%) by the total Maryland watershed baseline load (50.2%).

The average observed tPCB concentrations were used as inputs to the model representing baseline (2003) conditions. Based on the available literature, the TMDL methodology assumes that on average the tPCB concentrations at the Bohemia open boundary with the Bay are decreasing at a rate of 6.5% per year.

The model was run for 35,000 days to predict the time needed for the water column tPCB concentration to meet the site-specific tPCB water column TMDL endpoint. The results indicated that when the site-specific water column TMDL endpoint (0.11 ng/L) and the site-specific sediment TMDL endpoint (0.18 ng/g) were met, the tPCB sediment concentration was still higher than the site-specific sediment TMDL endpoint (1.5 ng/g). Consequently, the model was run again for 35,000 days to predict the time needed for the sediment concentrations to reach the TMDL endpoint. After 47 years the tPCB sediment concentration reached 1.5 ng/g, at which

time the water column tPCB concentration was equal to 0.17 ng/L.

The tPCB long-term annual average TMDL for the Bohemia River, Oligohaline Segment is 876 grams/year, which includes a load allocation for subwatersheds located in Delaware (LA_{DE}). The LA_{DE} (10.7 grams/year) was the same as the baseline Delaware load as no reductions were required as part of the TMDL condition. The TMDL represents a 94.0 percent reduction from the baseline load (14,544 grams/year).

IV. Discussion of Regulatory Conditions

EPA finds that MDE has provided sufficient information to meet all seven of the basic requirements for establishing a tPCB TMDL for the Bohemia River Oligohaline segment watershed. EPA, therefore, approves this tPCB TMDL for the Bohemia River Oligohaline segment watershed. This approval is outlined below according to the seven regulatory requirements.

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

Water Quality Standards consist of three components: designated and existing uses; narrative and/or numerical water quality criteria necessary to support those uses; and an anti-degradation Statement. The specific designated use for Bohemia River, Oligohaline Segment is Use II – Support of Estuarine and Marine Aquatic Life and Shellfish Harvesting (COMAR 2007b). The State of Maryland adopted three separate water column tPCB criteria: human health criterion for protection of human health associated with consumption of PCB contaminated fish, as well as fresh and salt water chronic tPCB criteria for protection of aquatic life. The Maryland water column human health tPCB criterion is set at 0.64 nanograms/liter (ng/L, ppt) (COMAR 2007c; US EPA 2006). The Maryland fresh and salt water chronic aquatic life tPCB criteria are set at 14 ng/L and 30 ng/L, respectively (COMAR 2007c; US EPA 2006). A sediment tPCB criterion has not been established within Maryland water quality standards.

The overall objective of the tPCB TMDL is to ensure that the "fishing" designated use in the Bohemia River embayment is protected. MDE evaluates PCB water quality conditions with the use of either the tPCB fish tissue listing threshold (39 ng/g) or the Maryland water column human health tPCB criterion (0.64 ng/L). In order to determine which one of these targets is more environmentally protective, the tPCB fish tissue listing threshold was converted to a corresponding tPCB water column concentration. This was done with the use of a site-specific Adjusted Total Bioaccumulation Factor (Adj-tBAF) of 214,790 L/kg following the method of the Tidal Potomac River PCB TMDLs (MDE 2007b). Based on this analysis, the water column tPCB target of 0.18 ng/L derived from the tPCB fish tissue listing threshold is more environmentally protective than the Maryland water column human health tPCB criterion of 0.64 ng/L, and therefore was applied as the site-specific tPCB water column TMDL endpoint. Similarly, in order to establish whether levels of PCBs in the sediment are protective of the "fishing" designated use, a site-specific tPCB sediment target for the Bohemia River embayment was derived based on the tPCB fish tissue listing threshold. This was done with the use of a site-specific adjusted sediment bioaccumulation factor (Adj-SediBAF) of 25.9 (unitless) following the method of the Tidal Potomac River PCB TMDLs (MDE 2007b). The site-specific tPCB sediment target for the Bohemia River embayment was determined to be 1.5 ng/g. EPA believes

the derived tPCB water column and sediment endpoints are reasonable and appropriate for the development of tPCB TMDLs for the Bohemia River, Oligohaline Segment.

2) ***The TMDLs include a total allowable load as well as individual wasteload allocations and load allocations.***

Total Allowable Load

As described above, the allowable load was determined by first estimating a baseline load from current monitoring data. The baseline load was estimated using a tidally averaged multi-segment one-dimensional transport model that was applied to simulate the tPCB dynamic interactions between the water column and bottom sediments within the Bohemia River embayment and the Chesapeake Bay. The model was run for 35,000 days to predict the time needed for the water column tPCB concentration to meet the site-specific tPCB water column TMDL endpoint. The results indicated that when the site-specific water column TMDL endpoint (0.11 ng/L) was met and the site-specific sediment TMDL endpoint (0.18 ng/g) was met, the tPCB sediment concentration was still higher than the site-specific sediment TMDL endpoint (1.5 ng/g). Consequently, the model was run again for 35,000 days to predict the time needed for the sediment concentrations to reach the TMDL endpoint. After 47 years the tPCB sediment concentration reached 1.5 ng/g, at which time the water column tPCB concentration was equal to 0.17 ng/L. The TMDL load is considered the maximum allowable load the watershed can assimilate and still attain water quality standards. The allowable load was reported in units of grams/year for the average annual load and in grams/day for the long term maximum daily load. Expressing TMDLs using these units is consistent with Federal regulations at 40 CFR §130.2(i), which states that *TMDLs can be expressed in terms of either mass per time, or other appropriate measure*. The average annual and long term daily tPCB TMDLs are presented in Tables 1 and 2, respectively.

EPA regulations at 40 CFR §130.2(i) state *that the total allowable load shall be the sum of individual WLAs for point sources, LAs for nonpoint sources, and natural background concentrations*. The TMDL for tPCB for the Bohemia River, Oligohaline, Segment watershed is consistent with 40 CFR §130.2(i) because the total loads provided by MDE equal the sum of the individual WLAs for point sources and the land based LAs for nonpoint sources.

Load Allocations

According to Federal regulations at 40 CFR §130.2(g), LAs 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. Wherever possible, natural and nonpoint source loadings should be distinguished. As describe above, resuspension and diffusion from the bottom sediments and the Lower Elk River influence were determined to be the major sources of tPCBs to the Bohemia River embayment. Other nonpoint sources include atmospheric deposition to the embayment and runoff from watershed sources in Maryland and upstream in Delaware. Table 7 of the TMDL Report provides a breakdown of the existing average annual tPCB loads from these source categories. In this analysis, the upstream load (LA_{DE}) was reported as a single value, but it could include point and nonpoint sources.

Wasteload Allocations

There are 3 permitted point sources regulating the discharge of tPCB in this watershed. These point sources include one active municipal NPDES permitted facilities (WWTPs). The WWTP load was considered to be *de minimis*, therefore no appreciable environmental benefit would be gained by reducing this load. Also, NPDES stormwater permits within the watershed include: (1) the area covered under Cecil County's Phase II jurisdictional MS4 permit, and the (2) state and federal general MS4s, industrial, and construction permits in both counties, collectively termed "Other NPDES Regulated Stormwater." The NPDES Regulated stormwater tPCB baseline load to the Bohemia River embayment was considered to be insignificant relative to the resuspension and diffusion from the bottom sediments and loads from the Lower Elk River. Therefore, no reductions were applied to this source category and the stormwater WLA was set as equivalent to the baseline load.

Federal regulations at 40 CFR §122.44(d)(1)(vii)(B) require that, for an NPDES permit for an individual point source, the effluent limitations must be consistent with the assumptions and requirements of any available WLA for the discharge prepared by the State and approved by EPA.

There is no express or implied statutory requirement that effluent limitations in NPDES permits necessarily be expressed in daily terms. The CWA definition of "effluent limitation" is quite broad (effluent limitation is "any restriction...on quantities, rates, and concentrations of chemical, physical, biological, and other constituents which are discharged from point sources..." See CWA 502(11). Unlike the CWA's definition of TMDL, the CWA definition of "effluent limitation" does not contain a "daily" temporal restriction. NPDES permit regulations do not require that effluent limits in permits be expressed as maximum daily limits or even as numeric limitations in all circumstances, and such discretion exists regardless of the time increment chosen to express the TMDL. For further guidance, refer to Benjamin H. Grumbles memo (November 15, 2006) titled *Establishing TMDL Daily Loads in Light of the Decision by the U.S. Court of Appeals for the D.C. Circuit in Friends of the Earth, Inc. v. EPA, et al., No. 05-5015 (April 25, 2006) and implications for NPDES Permits.*

EPA has authority to object to the issuance of an NPDES permit that is inconsistent with WLAs established for that point source. Based on the foregoing, EPA has determined that the TMDLs are consistent with the regulations and requirements of 40 CFR Part 130.

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

The TMDLs consider the impact of background pollutants by considering the tPCB loads from sources such as atmospheric deposition and bottom sediments.

4) The TMDLs consider critical environmental conditions.

EPA regulations at 40 CFR §130.7(c)(1) require TMDLs to account for critical conditions for stream flow, loading, and water quality parameters. The intent of the regulations is to ensure that (1) the TMDLs are protective of human health, and (2) the water quality of the waterbodies is protected during the times when they are 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]. Critical conditions are a combination of environmental factors (e.g., flow, temperature, etc.), which have an acceptably low frequency of occurrence. In specifying critical conditions in the waterbody, an attempt is made to use a reasonable worst-case scenario condition. For this TMDL, the critical condition was determined to be associated with the long-term exposure of fish to ambient environmental conditions. tPCB levels in fish become elevated due to long-term exposure, rather than temporary spikes in water column tPCB concentration. The selection of the average tPCB concentrations within each model segments as representing the baseline conditions adequately considers the impact of seasonal variations and critical conditions on the "fishing" designated use in the Bohemia River embayment.

5) The TMDLs consider seasonal environmental variations.

Seasonality was considered by using the average tPCB concentrations within each model segments as representing the baseline conditions.

6) The TMDLs include a Margin of Safety.

The requirement for a MOS is intended to add a level of conservatism to the modeling process in order to account for uncertainty. Based on EPA guidance, the MOS can be achieved through two approaches. One approach is to reserve a portion of the loading capacity as a separate term, and the other approach is to incorporate the MOS as part of the design conditions. MDE adopted an explicit MOS of 10 percent of the TMDL condition (87.6 grams/year).

7) The TMDLs have been subject to public participation.

MDE provided an opportunity for public review and comment on the tPCB TMDL for the Bohemia River Oligohaline, Segment watershed. The public review and comment period was open from July 24, 2009 through August 24, 2009. MDE received no written comments.

A letter was sent to the U.S. Fish and Wildlife Service pursuant to Section 7(c) of the Endangered Species Act, requesting the Service's concurrence with EPA's findings that approval of this TMDL does not adversely affect any listed endangered and threatened species, and their critical habitats.

V. Discussion of Reasonable Assurance

EPA requires that there be a reasonable assurance that the TMDLs can be implemented. WLAs will be implemented through the NPDES permit process. According to 40 CFR §122.44(d)(1)(vii)(B), the effluent limitations for an NPDES permit must be consistent

[1] 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 Management Division Directors, August 9, 1999.

with the assumptions and requirements of any available WLA for the discharge prepared by the State and approved by EPA. Furthermore, EPA has the authority to object to issuance of an NPDES permit that is inconsistent with WLAs established for the point source.

As discussed above, the Lower Elk River influence (conveying tPCB loads from the Upper Chesapeake Bay and Delaware River Estuary) and resuspension and diffusion from the bottom sediments have been identified as the two major sources of tPCBs to the Bohemia River embayment. It has been estimated that on average the tPCB concentrations in the Upper Chesapeake Bay are decreasing at a rate of 6.5% per year. Given this rate of decline, the tPCB levels in the Bohemia River embayment are expected to decline over time due to natural attenuation, such as the burial of contaminated sediments with newer, less contaminated materials, flushing of sediments during periods of high stream flow, and biodegradation.

For the Bohemia River, Oligohaline Segment natural attenuation is the best implementation method. Discovering and minimizing any existing PCB land sources throughout the Upper Chesapeake Bay watershed via future TMDL development and implementation efforts will further help to meet water quality goals in the Bohemia River embayment. MDE stated that they will continue to monitor PCB levels in Maryland fish. This information will be used to evaluate the PCB impairment in the Bohemia River embayment on an ongoing basis.