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
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Dear Dr. Eskin:

The U.S. Environmental Protection Agency (EPA), Region III, is pleased to approve *Total Maximum Daily Load (TMDL) of Mercury for Watersheds draining to Millington Wildlife Management Area Ponds, Kent County, Maryland.* The Maryland Department of the Environment (MDE) submitted the TMDL report to EPA for review and approval on September 28, 2010. The TMDL was established and submitted in accordance with Section 303(d)(1)(c) and (2) of the Clean Water Act to address mercury impairments as identified in Maryland's Section 2002 303(d) List.

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, the TMDL considered reasonable assurance that the TMDL allocations assigned to the nonpoint sources can be reasonably met. The enclosure to this letter describes how the mercury TMDL for the Millington Wildlife Management Area Ponds satisfies 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.

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Decision Rationale
Total Maximum Daily Load of Mercury
Millington Wildlife Management Area Ponds
Kent County, Maryland

Catherine A. Libertz for

Jon M. Capacasa, Director
Water Protection Division

Date: 3/18/11

II. Summary

Millington Wildlife Management Area (WMA) is located in a watershed in which the mercury impairment is driven entirely by nonpoint source mercury contributions from atmospheric deposition. Therefore, the TMDL allocation consists only of an LA. The fact that the TMDL does not assign WLAs to any point 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 National Pollutant Discharge Elimination System (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 TMDL developed for the mercury impairment in Millington WMA Ponds is presented in grams per year (g/yr) in Tables 1 and 2. On average, the TMDL will result in a maximum daily load of approximately 0.04698 grams per day.

Table 1. Summary of Mercury TMDL for Millington WMA Ponds expressed as an Average Annual Load.

TMDL (g/yr)	=	WLA (g/yr)	+	LA (g/yr)	+	MOS
15.220		0.0		15.220		Implicit

Table 1. Summary of Mercury TMDL for Millington WMA Ponds expressed as an Average Daily Load.

TMDL (g/day)	=	WLA (g/day)	+	LA (g/day)	+	MOS
0.04698		0.0		0.04698		Implicit

This 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

Millington WMA Ponds are located in rural, northeastern Kent County on Maryland's Eastern Shore within the Maryland 8-digit Upper Chester River Basin. Millington WMA covers 3,800 acres in Kent County, Maryland and adjacent New Castle County, Delaware. There are four individual and distinct ponds located within the WMA. Pond Two (impounded via the damming of an unnamed tributary to Cypress Branch) is the only pond in the WMA that supports a trophic-level four fish population. The remaining three ponds are intermittent, occasionally drying up completely, and are too small to appear on certain maps. For this reason, the TMDL analysis for Millington WMA Ponds includes the drainage area surrounding Pond Two only. The land use in the

Gaussian meteorological and air quality modeling system. CALPUFF was used by MDE to determine the sources of the mercury impairment in Millington WMA Pond Two and to determine the specific loadings for each source. CALPUFF was made available to MDE via the Maryland Department of Natural Resources (DNR) Power Plant Research Program (PPRP). Through the use of the CALPUFF model, the baseline mercury load to Millington WMA Pond Two was estimated to be 21.70 g/yr. The specific sources of the mercury impairment are presented in Section IV of this Decision Rationale.

The TMDL analysis framework for Millington WMA Pond Two is based on establishing an allowable load for the watershed that will ensure that the fish tissue mercury concentration in the impaired pond (Table 3) be in attainment with the fish consumption threshold protective of human health, 235 µg/kg. The percent reduction currently required to reach the TMDL endpoint of 235 µg/kg is approximately 29.86 percent. Through the use of the principal of proportionality, the 29.86 percent reduction was applied to the modeled baseline load of mercury in Millington WMA Pond Two. The principal of proportionality assumes that within a given water body, a proportional reduction in fish tissue mercury concentration results in a proportional reduction in mercury loadings within a waterbody. Thus, the application of this principal was used to calculate a maximum allowable load for Millington WMA Pond Two which equates to a maximum mercury load to the watershed that is 70.14 percent of the baseline load. This works out to about 15.22 g/yr for the entire drainage area.

IV. Discussion of Regulatory Conditions

EPA finds that MDE has provided sufficient information to meet all seven of the basic requirements for establishing a mercury TMDL for Millington WMA Pond Two. Therefore, EPA approves the mercury TMDL for Millington WMA Pond Two. 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 antidegradation policy. There are two high quality, or Tier II, stream segments located in Millington WMA requiring the use of Maryland's antidegradation policy. The location of the two stream segments in the WMA are 1) Cypress Branch directly above Mill Pond; and 2) Cypress Branch extending from the stream's confluence with Black Bottom Branch upstream to the Maryland – Delaware State line. The Designated Use for Millington WMA Ponds is Use I: *Water Contact Recreation and Protection of Aquatic Life* (COMAR, 2010).

MDE interprets the Use I Designation to be "suitable for … fishing" or "fishable" (COMAR 2010d). These terms relate to the general populations ability to eat at least four meals per month of any single common recreational fish species from a given water body. The threshold concentration of fish tissue reflective of the consumption of four meals per month is 235 µg/kg for mercury. The risk assessment used by MDE to determine this concentration threshold incorporates the same risk level, reference dose

Load Allocations

The LA is the portion of the TMDL that is assigned to nonpoint sources. In Millington WMA Pond Two, the LA was assigned entirely to the atmospheric deposition of mercury from point sources located outside of the watershed. The loadings for the mercury deposition were allocated to the surface of the pond and to the drainage area surrounding the pond. Table 5 presents the breakdown of the loads allocated to address the mercury impairment in Millington WMA Pond Two. The methods used to calculate the LA are described in Appendix A of the TMDL Report.

Table 5. Load Allocations for Mercury in the Millington WMA Pond Two

Sources of Mercury	Load Allocation
Atmospheric Deposition to Millington WMA Pond Two	0.59 g/yr
Atmospheric Deposition to the Drainage Area of Millington WMA Pond Two	14.63 g/yr
Total	15.22 g/yr

Wasteload Allocations

As indicated in the TMDL Report, the CALPUFF model was used to determine the major sources of mercury in the watershed. The major sources of mercury were calculated as follows: 19.1 percent can be attributed to electrical generating units (EGUs) in-state; 27.3 percent attributed to out-of-state EGUs; 1.6 percent attributed to in-state non-EGU sources; 20.1 percent attributed to out-of-state non-EGU sources (i.e., Portland cement plants and medical waste incinerators); and 32 percent to global sources. These sources are all considered to be impacting the watershed through atmospheric deposition. There are no permitted point sources located within the Millington WMA (i.e., no individual or industrial permits, Wastewater Treatment Plants (WWTPs) or NPDES regulated stormwater dischargers). Therefore, there are no contributions from point sources in the Millington WMA to the impairment.

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

6. *The TMDLs include a Margin of Safety.*

The MOS is the portion of the pollutant loading reserved to account for uncertainty in the TMDL development process. There are two ways to incorporate the MOS: (1) implicitly, by using conservative model assumptions to develop allocations, or (2) explicitly specify a portion of the TMDL as the MOS and use the remainder for allocations. For the Millington WMA Pond Two Mercury TMDL, the MOS was implicitly incorporated into the TMDL. The following are several components of the implicit MOS:

- The analyses presented in this TMDL assume that anglers consume only trophic level four fish. Trophic level four fish are near the top of the food chain and thus consistently have the highest observed fish tissue mercury concentrations due to bioaccumulation and biomagnification. Adopting the assumption that people eat only trophic level four fish represents a conservative assumption of mercury exposure to humans.

- EPA's recommended threshold for mercury in fish tissue is 300 µg/kg, and MDE uses this value as a threshold for determining impairment. However, MDE is using a value of 235 µg/kg as the TMDL goal. This lower threshold is based on a risk analysis used for Maryland's fish consumption procedures. The analysis assumes that some people consume more meals of fish over a given period of time than is assumed by EPA. This constitutes an implicit MOS of about 21.67 percent.

- Methylated mercury, not total mercury, is the actual impairing substance as per Maryland's 2008 Integrated Report. For the purposes of issuing fish consumption advisories, however, Maryland now analyzes fish tissue for total mercury rather than methylmercury. This adds the equivalent of a 5% - 10% additional MOS to the TMDL, since best estimates are that about 90% - 95% of the total mercury content in fish tissue is in its methylated form.

- The calculations involve deposition to the watershed as a whole, not making a distinction between the actual waterbody and the area surrounding it. This effectively assumes that land deposition has the same impact as deposition to the surface water itself. While it can be assumed that under steady state conditions, a large portion of the mercury deposited to the watershed reaches the waterbody, it is also true that a portion of the mercury is bound to sediments; and therefore not all of it will reach the actual lake due to sediment deposition within the watershed. This adds another conservative assumption.

7) *The TMDLs have been subject to public participation.*

MDE provided an opportunity for public review and comment on the mercury TMDL for the Millington WMA Ponds watershed. The public review and comment period was open from August 19, 2010 through September 17, 2010. MDE received no written comments.