Permitting strategy for addressing mercury in municipal and industrial wastewater permits

This document describes the Minnesota Pollution Control Agency (MPCA) strategy for addressing mercury in municipal and industrial wastewater permits. The statewide mercury Total Maximum Daily Load (TMDL) was approved by the U.S. Environmental Protection Agency (EPA) on March 27, 2007. The 2008 TMDL implementation plan incorporated the MPCA interim permitting strategy, plus described how the MPCA would monitor mercury reduction and available reserve capacity. The permitting strategy was reviewed and revised in June 2013.

The MPCA's key implementation consideration continues to be to ensure that National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS) permits:

- are consistent with overall Waste Load Allocations (WLAs) for the northeast and southwest regions of the state
- verify that wastewater point source discharges are insignificant on local and regional levels
- avoid creation of mercury concentrations in fish or water that are (1) higher than other concentrations in the area and (2) caused by a local source

The strategy will be used to issue new and reissue existing NPDES/SDS wastewater permits. Although this is a statewide TMDL, all waters of the state are not listed in the TMDL. Areas of the state impaired for mercury and not included in the statewide TMDL are listed in the spreadsheet available on the MPCA website in the document titled, Draft List of Waters Needing TMDLs.

The attached map (Attachment B) highlights waters that are and are not included in the statewide TMDL. The strategy applies to all areas of the state; however, permitted facilities discharging to waters not covered by the TMDL may have different requirements and timelines specific to their situation.

It is important to note that the MPCA will only consider variance requests based solely on the infeasibility of technology to remove total mercury if pilot or bench scale testing verifies the infeasibility. Several technologies, such as sand filters, membrane filtration and adsorbents have shown promise or are effective in removing mercury.

New or existing wastewater permits to be issued or reissued to municipal and/or industrial facilities will, at a minimum, include the requirements listed on the following pages. Additional requirements may be added. Exceptions to this strategy will be determined on a case-by-case basis via discussion between effluent limit staff, permit writers and their supervisors.

Existing municipal facilities

Major municipal facilities—average wet weather design flow of 1.0 million gallons per day (mgd) or more

Existing municipal major facilities with no reasonable potential to exceed the applicable mercury standard:

- Will not be assigned an interim or a final mercury limit.
- Will be assigned twice annual effluent total and dissolved mercury and concurrent total suspended solids (TSS) grab sample monitoring throughout the five-year permit cycle.
- Will be required to submit new or updated Mercury Minimization Plans (MMP) to the MPCA within 180 days of permit reissuance/issuance. See Attachment A for MMP permit requirements.
- Lake Superior Basin only: will be required to submit annual MMP updates per Minn. R. 7052.0250, subp. 4.

Existing municipal major facilities with reasonable potential to exceed the applicable mercury standard:

- Will be assigned a water quality-based mercury effluent limit. If the facility cannot immediately comply with the limit, a schedule of compliance that includes interim limits may be developed to allow for upgrades to the facility with the ultimate compliance date occurring no longer than five years from permit issuance. If a schedule of compliance is included in a permit, interim mercury limits should be included along with influent and effluent monitoring throughout the five-year permit cycle. If applicable, interim limits will be determined using existing discharge data to prevent an increase in mass loading during the interim period.
- Will be assigned bi-monthly influent total mercury and effluent total and dissolved mercury and concurrent TSS grab sample monitoring throughout the five-year permit cycle.
- Will be required to submit new or updated MMPs to the MPCA within 180 days of permit reissuance/issuance. See Attachment A for MMP permit requirements.
- Lake Superior Basin only:
    - Will be assigned bi-monthly influent dissolved mercury and concurrent TSS grab sample monitoring in addition to total mercury monitoring throughout the five-year permit cycle.
    - Will be required to submit annual MMP updates per Minn. R. 7052.0250, subp. 4.

Municipal minor facilities—average wet weather design flow ≥0.2 < 1.0 mgd

Existing facilities with no reasonable potential to exceed the applicable mercury standard:

- Will be required to monitor effluent total and dissolved mercury and concurrent TSS grab sample once per year for throughout the five-year permit cycle.
- Will be required to submit new or updated MMPs to the MPCA 180 days prior to permit expiration. See attachment A for MMP permit requirements.
- Lake Superior Basin only: Will be required to submit annual MMP updates per Minn. R. 7052.0250, subp. 4.

Existing facilities with reasonable potential to exceed the applicable mercury standard:

- Will be assigned a water quality-based mercury effluent limit. If the facility cannot immediately comply with the limit, a schedule of compliance that includes interim limits may be developed to allow for upgrades to the facility with the ultimate compliance date occurring no longer than five years from permit issuance. If applicable, interim limits will be determined using existing discharge data to prevent an increase in mass loading during the interim period.
- Will be assigned influent total mercury and effluent total and dissolved mercury and concurrent TSS grab sample monitoring four times per year throughout the five-year permit cycle.
- Will be required to submit new or updated MMPs to the MPCA 180 days prior to permit expiration. See attachment A for MMP permit requirements.

- Lake Superior Basin only:
    - Will be assigned influent dissolved mercury and concurrent TSS grab sample monitoring four times per year in addition to total mercury monitoring throughout the five-year permit cycle.
    - Will be required to submit annual MMP updates per Minn. R. 7052.0250, subp. 4.

Municipal minor facilities—average wet weather design flow <0.2 mgd

- No requirements will apply unless specific circumstances warrant. In specific instances, requirements will be determined on a case-by-case basis and may include MMPs, monitoring, and interim and final total mercury limits.

Existing industrial facilities

The strategy is to focus on activities and sectors with the potential to add or release mercury. Sectors likely to be subject to requirements include: metallic mining, refineries, peat mining, and power plants.

Industrial facilities not in the Lake Superior Basin

- Requirements and/or monitoring/limits will be determined on a case-by-case basis via discussion between effluent limits staff, permit writers and their supervisors, and reasonable potential calculations.
- MMP requirements and/or monitoring/limits are dependent on specific sector or permittee.

Industrial facilities in the Lake Superior Basin

- Must comply with the requirements of Minn. R. 7052 and the Great Lakes Initiative. These requirements may include a final total mercury concentration limit of 1.3 ng/L (or equivalent) by the end of the five-year permit cycle if reasonable potential exists.
- Required to submit new or updated MMPs to the MPCA within 180 days of permit reissuance/issuance (see attachment A) and annual MMP updates per Minn. R. 7052.0250, subp. 4.

New or expanding facilities

- Facilities with reasonable potential and/or nondegradation (antidegradation) considerations will have limits and monitoring determined on a case-by-case basis.
- Interim mercury concentration limits and a schedule of compliance may be applicable at permit issuance for expanding facilities unable to meet a water quality based effluent limit immediately.
- Final mercury limits for expanding facilities must take effect no later than five years from permit issuance. Final limits for new facilities are effective upon start up of the facility.
- If no limit applies based on reasonable potential and/or antidegradation, will be assigned influent total mercury and effluent total and dissolved mercury and concurrent TSS grab sample monitoring four times per year throughout the five-year permit cycle.
- Will be required to submit new or updated MMPs to MPCA within 180 days of permit reissuance/issuance. See attachment A for MMP permit requirements.
- Lake Superior Basin only:
    - Will be assigned influent dissolved mercury and concurrent TSS grab sample monitoring in addition to total mercury monitoring four times per year throughout the five-year permit cycle.
    - Will be required to submit annual MMP updates per Minn. R. 7052.0250, subp. 4.
- Facilities that increase average wet weather design flow to 1.0 mgd or more and have no reasonable potential and/or antidegradation considerations will be assigned influent total

mercury and effluent total and dissolved mercury and concurrent TSS grab sample monitoring four times per year during the first five-year permit cycle following the flow increase.

- Facilities in the Lake Superior Basin will be assigned influent dissolved mercury and concurrent TSS grab sample monitoring in addition to total mercury monitoring four times per year during the first five-year permit cycle.
- Facilities that increase average wet weather design flow ≥ 0.2 < 1.0 mgd and have no reasonable potential and/or antidegradation considerations will be required to monitor influent total mercury and effluent total and dissolved mercury and concurrent TSS grab sample twice per year during the first five–year permit cycle to establish a baseline. Facilities in the Lake Superior Basin will be assigned influent dissolved mercury and concurrent TSS grab sample monitoring in addition to total mercury monitoring twice per year during the first five-year permit cycle.

Concentration/mass limits and monitoring

In accordance with EPA reasonable potential procedures, the need for water quality based effluent limits and the numeric value of effluent limits are calculated using a "Reasonable Potential" determination that accounts for variability in the effluent. MPCA staff evaluates reasonable potential on concentration-basis. The results are total mercury limits expressed as concentration values.

Unless exception circumstances warrant a different type of limit, MPCA staff will assign daily maximum and/or monthly average concentration limits. Mass limits are also required for facilities in the Lake Superior Basin per Minn. R. 7052.0220, Item G.

Mass limits may also appear in permits as a result of an antidegradation analysis for new facilities or existing facilities. An expanding facility that sustains current mercury concentrations can lead to increased mercury loading. Municipal and some industrial effluents contain mercury which is primarily associated with TSS in secondary effluents.

Expanding facilities must demonstrate to the MPCA that TSS loadings are not expected to increase because of an expansion. Absent that demonstration, an expanding facility is required to complete a nondegradation demonstration to evaluate additional treatment, socio-economic impacts, and the effects of the proposed discharge on the receiving water (see Minn. R. 7050, Subp. 4). The facility must also submit an MMP.

Alternately, a freeze on TSS loadings (annual basis) could serve the same purpose. A third choice would be to accept a mass freeze for mercury.

Total maximum daily load progress and reserve capacity

The TMDL states that as long as actual loads are less than those specified in regional WLAs, new and expanding discharges may be permitted. The implementation plan recommends that MPCA permit new/expanding discharges that may include mercury as long as sufficient WLA remains.

The MPCA will review loads on an annual basis, compare them to the WLAs, and calculate the NPDES/SDS permittee contribution on an eight-digit hydraulic unit code (HUC) watershed level. If the sum of the permittee mercury contribution reaches the WLA, the MPCA may need to reevaluate discharges from a specific watershed to see if WLAs can be traded or reduced by another permittee.

If you have questions regarding this strategy or its implementation, you may contact the MPCA at 651-296-6300 or toll free at 800-657-3864.

Mercury and priority pollutant scans

To eliminate duplicate sampling, facilities required to conduct priority pollutant scans per their NPDES/SDS permits can choose to submit the mercury results from the scan in lieu of their regular scheduled mercury sampling. These facilities need to make the MPCA aware that this is their intent when submitting the sampling results and priority pollutant scans.

Attachment A: Mercury Minimization Plan requirements

Mercury is present in all municipal and many industrial wastewater discharges. It is a powerful neurotoxin that affects human health and the environment. A naturally-occurring element, mercury does not breakdown into less-harmful substances over time. Instead, mercury released into the environment accumulates in fish and animal tissues, a process known as bioaccumulation. Widespread mercury contamination has prompted the Minnesota Department of Health to issue fish consumption advisories throughout the state. Most of Minnesota's impaired waters are contaminated by mercury and other bioaccumulative toxins. The MPCA is carefully evaluating all mercury discharges in the state.

You are required to complete and submit an MMP to the MPCA as detailed in this section. If you have previously submitted an MMP, you must update it and submit the updated version to the MPCA. The purpose of the MMP is to evaluate collection and treatment systems to determine possible sources of mercury as well as potential mercury reduction options. Guidelines for developing an MMP are detailed in this section.

The specific discharge limits for mercury assigned to your facility are detailed in the limits and monitoring section of your permit. Information gained through the MMP process can be used to reduce mercury concentrations to achieve the specified discharge limit. If your facility is currently achieving this limit, the information gained through the MMP can be used to further reduce mercury in your discharge. As part of its mercury control strategy, you should consider selecting activities based on the potential of those activities to reduce mercury loadings to the wastewater treatment facility.

At a minimum, the MMP must include the following:

- A summary of mercury influent and effluent concentrations and biosolids monitoring data using the most recent five years of monitoring data, if available.
- Identification of existing and potential sources of mercury concentrations and/or loading to the facility. As appropriate for your facility, you should consider residential, institutional, municipal, and commercial sources (such as dental clinics, hospitals, medical clinics, nursing homes, schools, laundries, and industries with potential for mercury contributions). You should also consider other influent mercury sources, such as stormwater inputs, groundwater (inflow and infiltration) inputs, and waste streams or sewer tributaries to the wastewater treatment facility.
- An evaluation of past and present wastewater treatment facility operations to determine those operating procedures that maximize mercury removal.
- A summary of any mercury reduction activities implemented during the last five years.
- A plan to implement mercury management and reduction measures during the next five years.

Annual report submittal (required in Lake Superior Basin permits only, if MMP is required)

If your facility's discharge is located in the Lake Superior basin, you must submit an annual update of the MMP to the MPCA Water Quality Submittals Center for each year following MPCA approval of the MMP. The annual report must include, but is not limited to:

- all minimization program monitoring results for the year
- a list of potential sources of mercury
- a summary of all actions taken to meet the effluent limit for mercury
- any updates of the control strategy

All mercury monitoring collected during the previous year should be included with the annual report. This includes tracking of source reduction activities; influent, effluent and biosolids data; and data collected from potential sources.

Attachment B: 2008 lakes and rivers with mercury impairments