

Multiple Discharger Variance and Permitting Strategy for Mercury  
Fiscal Years 2015-2019  
March 5, 2015

Introduction

The Mercury Permitting Strategy (Strategy) developed by the Michigan Department of Environmental Quality (MDEQ), Water Bureau (now Water Resources Division [WRD]), in February 2000, updated in May 2004, and December 2009, established multiple discharger variances (MDV) for mercury consistent with R 323.1103, Variances, of the Part 4 Rules, Water Quality Standards (WQS), promulgated under Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA) (Attachment 1). Rule 323.1103 allows for a variance from a WQS that is the basis for a water quality-based effluent limit (WQBEL) in a National Pollutant Discharge Elimination System (NPDES) permit where various conditions prevent the attainment of WQS. The MDEQ is reapplying for a MDV for mercury for Fiscal Years (FY) 2015-2019.

Background

The need for a mercury variance became apparent when it was determined, through the implementation of a lower quantification level in 1999, that the majority of ambient waters sampled for mercury, as well as most NPDES permitted discharges, exceeded the mercury WQS of 1.3 nanograms per liter (ng/L). The WQS of 1.3 ng/L, developed to protect wildlife, also ensures protection of human health and aquatic life. To address potential widespread noncompliance with the mercury WQS in NPDES permits, a mercury permitting strategy, including an MDV consistent with the requirements of the variance rule, R 323.1103(9), was developed.

Establishment of an MDV requires including in the NPDES permit an effluent limitation that represents a level currently achievable (LCA) by the permittee, consistent with R 323.1103(6), and implementation of a Pollutant Minimization Program (PMP) that furthers efforts to meet the mercury WQS of 1.3 ng/L. The February 2000 Strategy, effective through FY 2003, included a statewide LCA of 30 ng/L, based primarily on effluent data from the state of Maine. The May 2004 Strategy lowered the statewide LCA to 10 ng/L, as it was determined that mercury concentrations in most Michigan NPDES permitted discharges were significantly less than 30 ng/L. As a result of a 2007 lawsuit filed by the National Wildlife Federation on behalf of the Lone Tree Council that questioned the legality of the statewide 10 ng/L LCA, the MDEQ established Policy and Procedure WB-016 for developing discharge-specific LCAs (MDEQ, 2008a). MDEQ Policy and Procedure WB-016 was revised in 2011, updating the process by which discharge-specific LCA's are calculated in the MDEQ established Policy and Procedure WRD-004 (MDEQ, 2011). The revision included incorporating the mercury monitoring frequency into the site-specific LCA calculation for those datasets with ten or more representative data points.

The MDEQ is applying for a mercury variance for FY 2015-2019. The goal is to continue to move NPDES permitted discharges towards meeting the mercury WQS of 1.3 ng/L. Average effluent data collected since the last evaluation indicates that many point source discharges and ambient waters do not comply with the mercury WQS of 1.3 ng/L. The MDV will further the goal

of attaining the mercury WQS through a discharge-specific LCA and continued implementation of PMPs.

The draft MDV was announced in the November 3, November 17, and December 1, 2014, MDEQ Calendars and was available on the MDEQ Website for public comment. Notice that the MDV would be available for comment was mailed to all NPDES permittees with mercury limits and/or monitoring requirements, stakeholder groups, Federally Recognized Tribes, and the other Great Lakes states' environmental agencies on October 23, 2014. A summary of the comments received as part of the public notice period and the MDEQ's responses are included in Attachment 2.

Based on R 323.1082(6)(a) and (b) of the Part 4 Rules, new discharges of bioaccumulative chemicals of concern (BCCs) (including mercury) to the surface waters of the state are not allowed mixing zones. Existing discharges are no longer allowed a mixing zone for BCCs, since this provision in the rules included a sunset clause of November 14, 2010. The subparts of Rule R323.1082 further the goal of the MDEQ to move all discharges towards the mercury WQS of 1.3 ng/L.

### Overview of Point Source and Environmental Data for Mercury

The State of Michigan has worked diligently over the last two decades to reduce mercury entering the environment. In order to track levels of mercury in the environment, the MDEQ has collected mercury data in facility effluent, ambient waters, fish, wildlife, and air. The following sections summarize the levels of mercury that exist in Michigan based on this data:

#### **NPDES Effluent Data**

There are approximately 229 Individual NPDES permits that contain mercury limits and/or low-level monitoring requirements; a net increase of 38 facilities from 2009. Low-level mercury analyses continue to indicate that the level of mercury in many point source discharges can be expected to routinely exceed the water quality standard of 1.3 ng/L (Figure 1). Data obtained from compliance monitoring for point source discharges indicate that 145 out of 229 (63%) facilities with mercury limits or monitoring requirements have arithmetic mean mercury concentrations that exceed the WQS of 1.3 ng/L (Figures 1 and 2). However, 209 facilities (91%) had an average effluent concentration at or below 5 ng/L (Figure 1). Figure 3 represents average concentrations from 2009-2014 according to the following sectors: Wastewater Treatment Plants (WWTP), electric power plants, paper mills, and industrial facilities.

#### **Ambient Water Data**

The Water Chemistry Monitoring Program (WCMP) began in 1998 with fixed sampling in Michigan's Great Lakes Connecting Channels, Saginaw Bay, Grand Traverse Bay, and selected tributary stations. A probabilistic design, or statistical sampling, was added to the WCMP in 2005 to gain the ability to extrapolate the data for statewide and regional analyses.

This evaluation will discuss each component of the WCMP using the most recent quality assured five-year dataset, 2008-2012.

### Great Lakes Connecting Channels

Total mercury concentrations are measured monthly from April through November at single upstream and downstream locations in each Great Lakes Connecting Channel: St. Marys River, St. Clair River, and Detroit River. These locations, one near the head and one near the mouth, are used to determine WQS attainment and measure water quality changes over time. Geometric means of the 2008-2012 data at the St. Marys and St. Clair River stations met WQS with a range of 0.28-0.40 ng/L. Geometric mean concentrations in the Detroit River from 2008-2012 exceeded WQS at 2.2 ng/L in the upstream station and 1.5 ng/L in the downstream station.

### Selected Tributaries Stations

The 2008-2012 data collected at 31 WCMP tributary stations indicate many Michigan rivers in their downstream reaches exceed the total mercury WQS of 1.3 ng/l. Twenty-seven of these stations are located near the mouths of rivers and the remaining four are sampled mid-reach. The geometric mean of the total mercury data collected from 2008-2012 was calculated for each station, with results ranging from less than the quantification level (<0.50 ng/L) to 5.2 ng/L. The WQS of 1.3 ng/L was exceeded at 24 of the 31 stations (77% of the tributary stations).

### Probabilistic River and Stream Analysis

This analysis includes 250 sites that are monitored over a five-year period, resulting in 50 sites sampled per year. The geometric mean of the total mercury data collected from 2008-2012 was calculated at each station. The WQS of 1.3 ng/L was exceeded at 97 of the 250 stations (39% of the probabilistic stations). The statewide median value of total mercury is 1.1 ng/l, with median total mercury values ranging from less than the quantification level (<0.50 ng/L) to 8.65 ng/L. Approximately 50 percent of the river miles in Michigan are exceeding the WQS of 1.3 ng/L based on probabilistic data collected from 2009-2013 (Varricchione, personal communication, August 29, 2014).

### **Fish Tissue Data**

Michigan has a statewide fish consumption advisory, which was first issued by the Michigan Department of Community Health (MDCH) in 1988. The advisory applies to certain species from all inland lakes and reservoirs, based on a preponderance of data indicating mercury concentrations were elevated in those species in most lakes and impoundments. The MDCH historically used a trigger level for mercury of 0.5 mg/kg to determine issuance of statewide mercury fish consumption advisory guidelines when developing public health advisories for the Michigan Fish Consumption Advisory Program (MDCH, 2013). In 2013, a change to the approach used by the MDCH for developing fish consumption advisories was completed. The MDCH developed a range of fish consumption screening values for mercury (FCSVs) that are used to recommend meal consumption categories (e.g., 1 meal per month versus 2 meals per month, etc.), and are protective for everyone, including vulnerable populations such as people with existing medical conditions and unborn and young children. Screening values for the meal consumption categories range from 0.07 mg/kg mercury to 2.2 mg/kg (i.e., a “do not eat” meal category trigger). Mercury was quantified in all but one of 1,751 fish fillet samples collected from inland waters between 2008 and 2012. Mercury concentrations exceeded the lowest

MDCH FCSV of 0.07 mg/Kg in 1,580 samples (90%) and in all 104 water bodies sampled during that time period.

Because the MDCH issued a statewide mercury advisory, an alternate method of reviewing fish tissue mercury data was developed by the MDEQ to facilitate the assessment of specific water bodies. The MDEQ derived a Michigan fish tissue mercury residue value using the same methodology that the United States Environmental Protection Agency (USEPA) used to derive a national fish tissue criterion for mercury (USEPA, 2001a). Michigan's fish tissue residue value for mercury is the concentration that is not expected to pose a health concern to people consuming 15 grams or less of fish per day. The methodology used by the MDEQ to derive a fish tissue residue value of 0.35 mg/kg for mercury is consistent with the methodology used by the USEPA to derive a national fish tissue residue value and consistent with federal requirements for the Great Lakes Basin (USEPA, 2001b). The MDEQ does not use the MDCH meal consumption guidelines for determining designated use support. Fish tissue mercury concentrations from specific water bodies are compared to Michigan's fish tissue value for mercury of 0.35 mg/kg. Many of Michigan's surface waters are impaired due to mercury and, consequently, do not support the other indigenous aquatic life and wildlife designated use and/or the fish consumption designated use. For example, average concentrations of mercury in fish tissue for edible portions of fish from inland water bodies in Michigan range from 0.04 mg/kg in black buffalo to 0.576 mg/kg in northern pike, based on the entire fish consumption monitoring program dataset (LimnoTech and MDEQ, 2014).

Long-term trend analysis (1990-2011) for fish tissue data indicates an increasing trend in mercury concentrations in fish from the Great Lakes and Connecting Channels. Inland waters remain static or show a decreasing trend in mercury concentrations. A detailed discussion of the specifics of this analysis is included in Michigan's Fish Contaminant Trend Summary (Bohr, 2013).

### **Wildlife Data**

Wildlife data indicates a reduction in mercury in herring gull eggs across the Great Lakes (from 1967-2009) as a result of reduced mercury emissions (Evers et al., 2011). Wildlife data indicates an increasing trend in mercury concentrations in nesting bald eagles in Michigan from 1999-2003 and 2004-2008 (Wierda, 2009). The increasing trends in mercury concentrations were observed for eagles nesting in inland and Great Lakes territories and were statistically significant from these two time periods for Great Lakes birds and for birds nesting in inland territories in the Upper Peninsula (Wierda, 2009). Data collected from 2002-2010 reports that concentrations of mercury in bald eagles in Great Lake states are at levels that can cause subclinical neurological damage (Rutkiewicz et al., 2011).

### **Air Data**

In Michigan, the majority of mercury pollution is a result of atmospheric deposition. However, not all contributions to mercury deposition originate from Michigan. In-state sources make up 7.8 percent of the state's atmospheric mercury load (Limnotech and MDEQ, 2014). Atmospheric mercury deposition in Michigan comes from local (in-state sources), regional, national, and global sources that are both anthropogenic and natural in origin. Atmospheric mercury deposition originating from sources within and outside of Michigan must be controlled in order to reduce concentrations of mercury in fish tissue to protect human health and wildlife.

Ambient air concentrations of mercury from event precipitation samples were measured over ten years by the University of Michigan Air Quality Laboratory (UMAQL, 2009) in collaboration with the MDEQ at three sites (Dexter, Pellston, and Eagle Harbor, Michigan). There is a clear decreasing spatial trend of wet mercury deposition from south to north (Dexter to Eagle Harbor), but no statistically significant statewide trend has been observed over this same time period (MDEQ, 2008c). Evers et al. (2011) also reported no evidence of appreciable decline in wet deposition in the Great Lakes and Canada between 2002 and 2008. However, a new Minnesota study published in 2014 found a significant decrease in annual mercury wet deposition at two monitoring sites located in northern Minnesota when reviewing data from 1998 to 2012 (Brigham et al., 2014).

An emission inventory was developed in 2002 by the MDEQ, Air Quality Division, for anthropogenic emissions of mercury located within the state of Michigan. An emission inventory compiles emissions from point, area, and mobile sources. Point sources include specific industrial facilities, such as a steel mill or power plant; area sources include small pollution sources like fluorescent light bulb crushers that do not emit sufficient quantities of criteria pollutants to require reporting to the annual point source inventory; and mobile sources include on-road vehicular traffic and off-road equipment, such as agricultural and construction equipment. A mercury emission inventory was developed for 2002 and 2005, and inventories for 2008 and 2011 will be completed by the end of 2014. The 2005 mercury air emissions inventory demonstrated a 10 percent reduction in mercury emissions relative to the 2002 inventory.

#### Basis for Variance

Rule 323.1103(9) of the Part 4 rules provides the conditions under which an MDV may be granted. Specifically, an MDV may be granted due to widespread WQS compliance issues, including the presence of ubiquitous pollutants or naturally high background levels of a pollutant in a watershed.

Due to ubiquitous mercury concentrations in Michigan's inland surface waters, the Great Lakes, and Connecting Channels at levels exceeding 1.3 ng/L WQS, many facilities will not be able to comply with the mercury WQS in a cost-effective manner. In addition, these sources are greatly attributed to air deposition. Based on data from 2001 and 2012; it is estimated that point source dischargers under the NPDES Program contribute 39.3 kg/yr of mercury, while atmospheric deposition contributes 2,734 kg/year to the inland surface waters of Michigan (Limnotech and MDEQ, 2014). Of the total mercury load to inland waters of Michigan, only 1.4 percent can be attributed to discharges regulated by the NPDES Program (Limnotech and MDEQ, 2014). Michigan has concluded that, in general, end-of-pipe treatment for mercury under the NPDES Program is not the most cost-effective method to reduce mercury loadings in Michigan waters to achieve WQS.

Michigan supports the USEPA's position that pollution prevention and waste minimization programs for mercury should be the first steps in restoring water quality before considering extraordinary treatment alternatives. Rule 323.1201 of the Part 8 Rules, Water Quality-Based Effluent Limit Development for Toxic Substances, describes Michigan's commitment to the use of pollution prevention, source control, and other waste minimization programs to achieve compliance with low-level WQBELs. Rule 323.1103(6)(b) states that if a variance for a BCC is approved, then a PMP must be conducted with the provisions in paragraphs (i) through (iv) of

R 323.1213(d) in the Part 8 rules (Attachment 3). As such, each NPDES permit that includes a variance for mercury contains a requirement to develop and implement a PMP for mercury until the facility can demonstrate that the PMP requirement has been completed satisfactorily. Language currently included in NPDES permits relating to the development and implementation of the PMP is included in Attachment 4.

Michigan has reviewed the available information regarding end-of-pipe treatment for mercury, including the effectiveness of the treatment and associated costs. Some of this information was contained in Ohio's 1997 assessment of economic impacts for mercury treatment strategies (Ohio EPA, 1997). The Ohio analysis is applicable to Michigan since the analysis is treatment-specific, not state-specific. The Ohio analysis concluded that end-of-pipe treatment to meet the WQS would cause widespread social and economic impacts and that a general (e.g., statewide) mercury variance was appropriate. A similar conclusion has been reached by the MDEQ, that end-of-pipe controls to meet the mercury WQS would cause substantial and widespread economic impact without guaranteeing removal sufficient to achieve the mercury WQS of 1.3 ng/L. The MDEQ Mercury Strategy Workgroup Report finalized on January 3, 2008, has a goal to eliminate anthropogenic mercury use and emissions within the state of Michigan (MDEQ, 2008b). The report includes a discussion of mercury removal from municipal WWTP effluent, and current practices and technologies available for separation of mercury-containing dental amalgam from sanitary wastewater. A review of this discussion supports the Ohio analysis.

The USEPA has contracted with Battelle to complete a report to review current wastewater treatment technologies for mercury and update the Ohio EPA study (Battelle, 2013). Many of the findings from this draft report reference bench scale and pilot tests results reaching the WQS of 1.3 ng/L; however, little information is available for facilities actually implementing a technology to remove mercury from their effluent. Of the facilities actively using technology referenced in the report (5; the 6<sup>th</sup> facility is using dilution), only two have been in operation for over two years and these facilities have small discharges (0.035 million gallons per day (MGD) and 1.4 MGD). Although technology is advancing, there is limited information on the long-term success of newer technologies at a wide range of facilities with varying influent concentrations and design flows, and no demonstration of the environmental benefits related to the cost of their implementation.

Under the current variance, the MDEQ continues to see reductions in mercury discharges. Based on effluent data from January 2005 to January 2009, only 19 percent of facilities with low-level mercury monitoring had an average effluent concentration below the WQS of 1.3 ng/L. Data from July 2009 to April 2014 shows a significant increase to 37 percent of facilities with low-level mercury monitoring, with an average effluent concentration below the WQS of 1.3 ng/L. During the same timeframe, the number of facilities with an average effluent concentration at or below 5 ng/L increased from 84 percent (2005-2009) to 91 percent (2009-2014). The reduction of mercury in facility effluent data supports the MDEQ's approach to use pollution prevention, source control, and other waste minimization programs to move Michigan toward future compliance with the mercury WQS of 1.3 ng/L.

Pollution prevention efforts continue to decrease mercury in state waters. The MDEQ is developing a statewide mercury Total Maximum Daily Load (TMDL), which assumes that with clean-up of legacy sources, voluntary activities, State and Federal regulatory activities, and the NPDES Program, concentrations of mercury in the surface waters of the state will continue to decrease (LimnoTech and MDEQ, 2014). Over the next five years, reductions are expected to continue in the NPDES Program.

By December 31, 2013, dentists in Michigan were required to follow best management practices and install and maintain amalgam separators on drains used to discharge dental amalgam (Dental Mercury Amalgam Separators, 2008 PA 503). A Dental Amalgam Separator Grant Project was part of a larger grant from the USEPA under the Great Lakes Restoration Initiative (GLRI). Through this federal funding, the State of Michigan, in partnership with the Michigan Dental Association (MDA), issued a total of 1,262 amalgam separator grants through the MDA's outreach efforts. This is a significant number of dental offices across Michigan that proactively installed amalgam separators prior to the mandatory compliance date of December 31, 2013 (LimnoTech and MDEQ, 2014). The average dental office collects approximately two pounds of waste amalgam or one pound of mercury each year. Therefore, the success of this program can be measured by the fact that the dentists who proactively installed amalgam separators are collectively assisting in the removal and recycling of 2,524 pounds of waste amalgam or 1,262 pounds of mercury each year that would otherwise be discharged to Publicly-Owned Treatment Works, with a portion discharged to the environment (LimnoTech and MDEQ, 2014).

In addition, the MDEQ is working with facilities and laboratories on increasing data accuracy and reporting with the Mercury Sampling and Reporting Guidance for NPDES Permit Compliance (Attachment 5).

#### Conformance with Michigan's Antidegradation Requirements

Michigan Rule 98 (R 323.1098), Antidegradation, of the Part 4 Rules, indicates that the antidegradation requirements apply to any action or activity pursuant to Part 31 that is anticipated to result in a new or increased loading of pollutants by any source to the surface waters of the state and where independent regulatory authority exists that requires compliance with WQS.

Rule 103 (R 323.1103), Variances, of the Part 4 Rules, does not apply to new dischargers unless the proposed discharge is necessary to alleviate an imminent and substantial danger to the public health or welfare. Therefore, a new discharger will not be covered by the MDV.

With regards to increased discharges of mercury, Rule 98 (R 323.1098(2)), Antidegradation, of the Part 4 Rules, specifies that there can be no lowering of water quality with respect to the pollutant causing the nonattainment when designated uses of the water body are not attained. Subrules 98(8) and 98(9) describe actions that are not considered a lowering of water quality. A permittee covered by the MDV requesting an increased discharge of mercury that meets the requirements of Subrules 98(8) or 98(9), would continue to be eligible for an MDV at a concentration LCA no greater than the level achieved under their current permit per R 323.1103(6)(a). A permittee not covered by the MDV requesting an increased discharge of mercury that meets the requirements of Subrules 98(8) or 98(9), may apply for an individual variance. To date, the MDEQ has not issued an individual variance for mercury.

#### Implementation of the MDV for Mercury

WQBELs for mercury are developed following provisions contained within R 323.1211, Reasonable Potential for Chemical Specific WQBELs, of the Part 8 Rules. In summary, for each discharge for which mercury data is provided, a statistical analysis is conducted to determine if there is reasonable potential for the proposed discharge concentration to exceed WQS. If a reasonable potential exists, and the facility is eligible for an MDV, a facility-specific

LCA of 1.3 ng/L or higher will be established in the permit as the WQBEL, along with a requirement to develop a PMP per R 323.1103(6)(b). Compliance with the LCA will generally be determined as a 12-month rolling average. In addition, the permit will clearly state that the goal of the PMP is to maintain the effluent concentration of total mercury at or below the WQS of 1.3 ng/L. Language currently included in permits related to compliance with a mercury LCA is found in Attachment 4.

The use of the MDV for mercury will not result in increased mercury levels in point source discharges. The LCA is a value that closely approximates current discharge concentrations, and Rule 103(6)(a) does not allow for discharge of a greater concentration than that achieved under a previous permit. In addition, implementation of an effective PMP will ensure that permittees move towards mercury source elimination. Finally, the PMP includes a goal to meet the WQS of 1.3 ng/L. The goal of 1.3 ng/L, developed to protect wildlife, will ensure this proposed MDV will not jeopardize the continued existence of endangered or threatened species listed under Section 4 of the Endangered Species Act.

#### NPDES Mercury Sampling and Reporting

The MDEQ continuously evaluates mercury data submitted by facilities to determine if appropriate quality assurance and quality control measures are used in the collection and analysis of this data. In 2012, the MDEQ determined that some laboratories and facilities were not following the correct procedure for blank correction and duplicate samples outlined in the USEPA Methods 1631E (Measurement of Mercury in Water) and 1669 (Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels). This resulted in reporting inconsistencies for some facilities. To address this, the MDEQ developed and implemented the Mercury Sampling and Reporting Guidance for NPDES Permit Compliance (Attachment 5) in 2013. In addition, permit language was developed for inclusion in permits with mercury monitoring requirements to clarify USEPA Method 1631E requirements for blanks and duplicates (Attachment 4).

#### Statewide Mercury Total Maximum Daily Load

Due to mercury concentrations in fish tissue, fish consumption advisory guidelines for all inland lakes in Michigan, and specific recommendations for Lakes Huron, Michigan, and Superior, and several hundred miles of rivers and streams continue to be issued by the MDCH. In addition, the state of Michigan lists numerous water bodies as being impaired, due to exceedances in the water column concentration for mercury and exceedance of the 0.35 mg/kg fish tissue value. Because of the widespread impairment of Michigan's waters due to mercury, a statewide Total Maximum Daily Load (TMDL) is being developed for inland waters primarily impacted by atmospheric deposition of mercury. Based on the assumption that fish mercury concentrations will respond proportionally to reductions in atmospheric mercury loadings, a TMDL and reduction goal for inland waters have been developed to meet the fish tissue concentration of 0.35 mg/kg. Anthropogenic atmospheric sources of mercury from Michigan must be reduced by 81 percent from 2001 levels to meet the goal of this TMDL. The TMDL describes the pollutant reductions necessary to attain the fish tissue concentration and provides reasonable assurances that sources of mercury from both NPDES discharges and atmospheric deposition of mercury will be reduced to meet the goals of the TMDL.

## Summary

In summary, the following important points should be noted regarding mercury in the environment and the state's effort to continue controlling mercury in Michigan:

1. Overall, mercury concentrations in the effluent of facilities under the NPDES Program appear to be decreasing.
2. Mercury in Michigan comes primarily from the atmosphere; therefore, further treatment of point sources with costly technology will not solve the nonattainment status of Michigan's surface waters.
3. Air quality rules and directives have been put in place to reduce the major source of mercury to Michigan surface waters – the atmosphere.
4. Reductions from mercury sources are necessary within Michigan, other states, and global sources.
5. Michigan's WQS rules and implementation of an MDV for NPDES discharges of mercury are consistent with federal regulations.
6. The use of an MDV in Michigan is working and moving Michigan towards meeting the WQS of 1.3 ng/L in surface waters.

## References

- Battelle, 2013. A Review of Current Wastewater Treatment Technologies to Meet Great Lakes Water Quality Standards for Mercury. Draft Under Review.
- Bohr, J., 2013. Michigan Fish Contaminant Monitoring Summary. Draft Under Review.
- Bohr, J. and VanDusen, J., 2011. Michigan Fish Contaminant Monitoring Program 2010 Annual Edible Portion Report. MI/DEQ/WRD-11/028.
- Brigham, M.E., Sandheinrich, M.B., Gay, D.A., Maki, R.P., Krabbenhoft, D.P. and Wiener, J.G., 2014. Lacustrine responses to decreasing wet mercury deposition rates—results from a case study in northern Minnesota: *Environmental Science & Technology* 48(11): 6115-6123 [Online]. <http://pubs.acs.org/doi/abs/10.1021/es500301a>
- Dental Mercury Amalgam Separators 2008 PA 2008 (formerly HB 6307 of 2008) [Online]. <http://www.legislature.mi.gov/documents/2007-2008/billenrolled/House/pdf/2008-HNB-6307.pdf>
- Evers, D.C., Wiener, J.G., Driscoll, C.T., Gay, D.A., Basu, N., Monson, B.A., Lambert, K.F., Morrison, H.A., Morgan, J.T., Williams, K.A., and Soehl, A.G., 2011. Great Lakes Mercury Connections: The Extent and Effects of Mercury Pollution in the Great Lakes Region. Biodiversity Research Institute. Gorham, Maine. Report BRI 2011-2018 [Online]. [www.briloon.org/uploads/BRI\\_Documents/Mercury\\_Center/Mercury\\_Connections/GLMC\\_FinalReport.pdf](http://www.briloon.org/uploads/BRI_Documents/Mercury_Center/Mercury_Connections/GLMC_FinalReport.pdf)
- Varricchione, J., August 29, 2014. Personal Communication.
- LimnoTech and MDEQ, 2014. Statewide Michigan Mercury TMDL. Review Draft [Online]. [http://www.michigan.gov/documents/deq/wrd-sw-as-hgtmdl-draft\\_415360\\_7.pdf](http://www.michigan.gov/documents/deq/wrd-sw-as-hgtmdl-draft_415360_7.pdf)
- MDCH, 2013. Michigan Fish Consumption Advisory Program Guidance Document. Final Version [Online]. [www.michigan.gov/documents/mdch/MDCH\\_MFCAP\\_Guidance\\_Document\\_417043\\_7.pdf](http://www.michigan.gov/documents/mdch/MDCH_MFCAP_Guidance_Document_417043_7.pdf)
- MDEQ, 2008a. Policy and Procedure WB-016. Calculation of Level Currently Achievable (LCA) for Mercury in Proposed National Pollutant Discharge Elimination System (NPDES) Permits.
- MDEQ, 2008b. MDEQ Mercury Strategy Workgroup Report. MDEQ's Current Status and Recommended Future Activities Toward the Goal of Eliminating Anthropogenic Mercury Use and Releases in Michigan.
- MDEQ, 2008c. Mercury Strategy Staff Report: MDEQ's Current Status and Recommended Future Activities Toward the Goal of Eliminating Anthropogenic Mercury Use and Releases in Michigan [Online]. [www.michigan.gov/documents/deq/deq-aqd-air-mswg-staffreportssummary\\_223232\\_7.pdf](http://www.michigan.gov/documents/deq/deq-aqd-air-mswg-staffreportssummary_223232_7.pdf)

- MDEQ, 2011. Policy and Procedure WRD-004. Calculation of Level Currently Achievable (LCA) for Mercury in Proposed National Pollutant Discharge Elimination System (NPDES) Permits.
- Ohio EPA, 1997. Assessing the Economic Impacts of the Proposed Ohio EPA Water Rules on the Ohio Economy.
- Rutkiewicz, J., Nam, D., Cooley, T., Neumann, K., Padilla, I., Route, W., Strom, S., Basu, N., 2011. Mercury exposure and neurochemical impacts in bald eagles across several Great Lakes States. *Ecotoxicology* 20(7):1669-1676.
- UMAQL, 2009. Monitoring Atmospheric Mercury Species in Michigan. Prepared for the Great Lakes Protection Fund and the Great Lakes Commission.
- USEPA, 2001a. Water Quality Criterion for the Protection of Human Health: Methylmercury. Office of Science and Technology, Office of Water. EPA-823-R-01-001.
- USEPA, 2001b. Great Lakes Water Quality Initiative Criteria Documents for the Protection of Wildlife. Office of Science and Technology, Office of Water. EPA-820-B-94-008.
- Wierda, M.W., 2009. Using Bald Eagles to Track Spatial and Temporal Trends of Contaminants in Michigan's Aquatic Systems. Unpublished. Ph.D. Dissertation, Clemson University, Clemson, South Carolina.

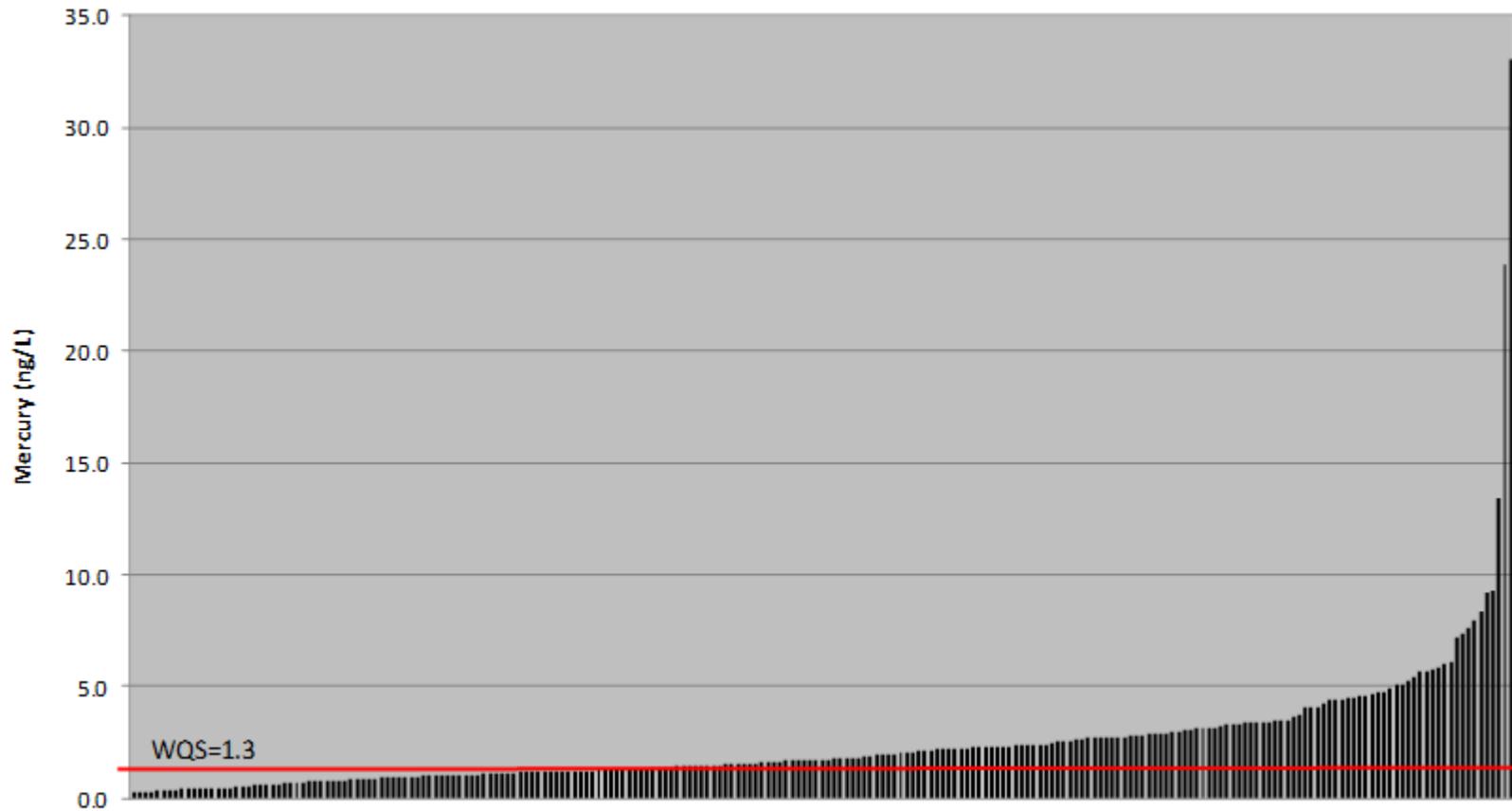


Figure 1. Arithmetic mean effluent mercury concentration for NPDES-permitted facilities (June 2009 – April 2014).

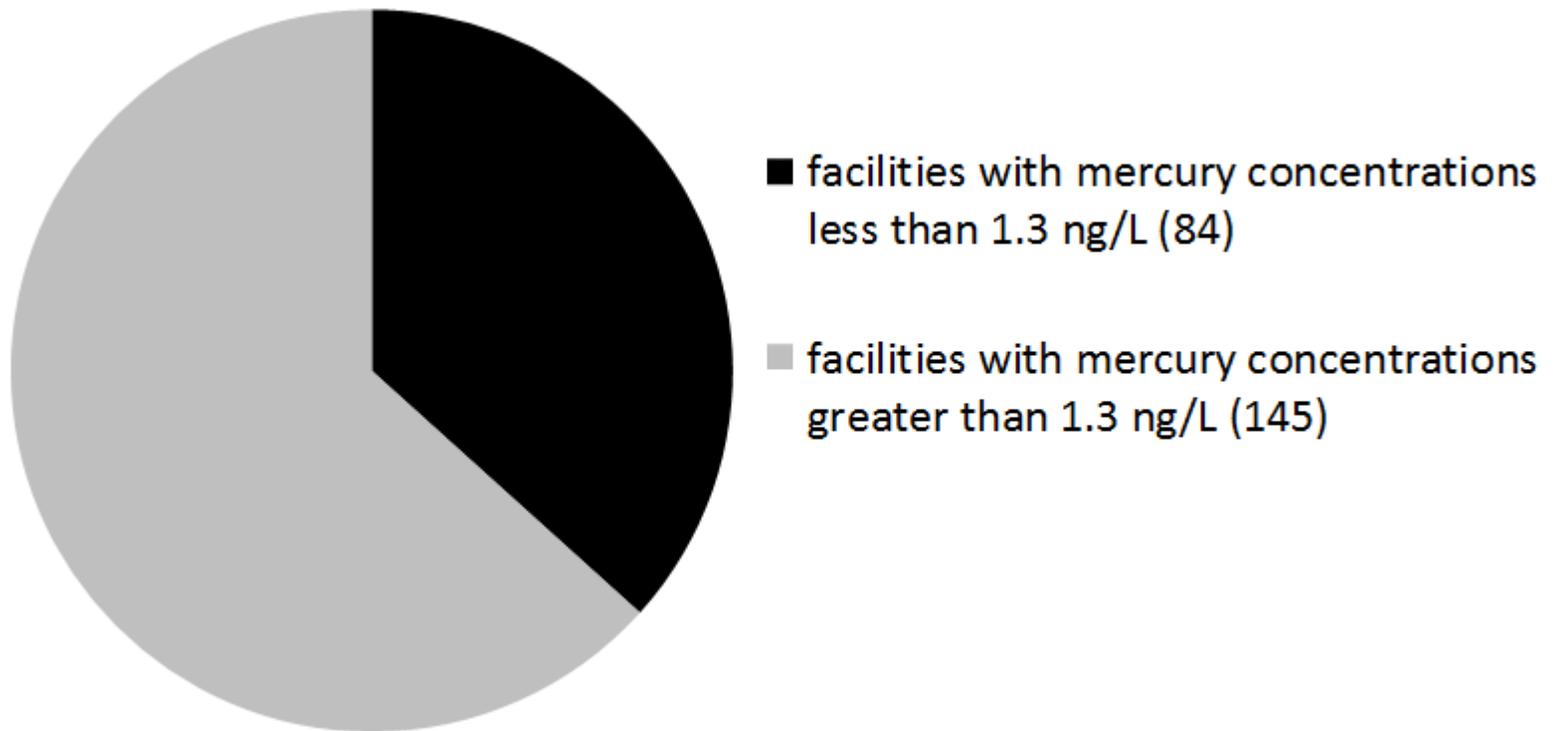


Figure 2. Comparison of NPDES Facilities Exceeding the Mercury Water Quality Standard (June 2009 – April 2014).

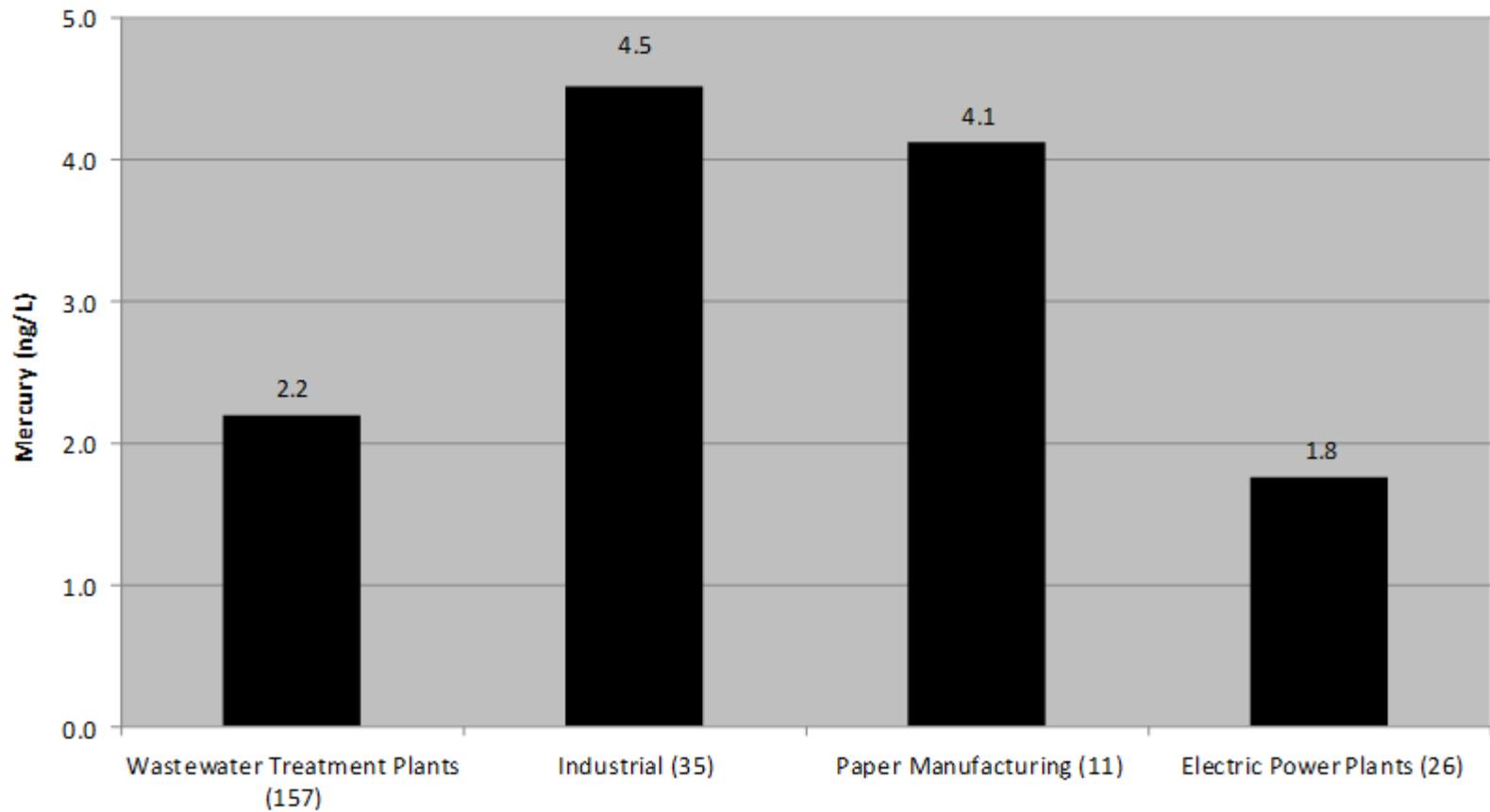


Figure 3. Average Mercury Concentrations by Sector (June 2009 – April 2014).

## Attachment 1

### Michigan Water Quality Standards R 323.1103 – Variances

R 323.1103 Variances.

Rule 103. (1) A variance may be granted from any water quality standard (WQS) that is the basis of a water quality-based effluent limitation in a national pollutant discharge elimination system (NPDES) permit, as restricted by the following provisions:

(a) A WQS variance applies only to the permittee or permittees requesting the variance and only to the pollutant or pollutants specified in the variance. The variance does not modify the water quality standards for the water body as a whole.

(b) A variance shall not apply to new dischargers unless the proposed discharge is necessary to alleviate an imminent and substantial danger to the public health or welfare.

(c) A WQS variance shall not be granted that would likely jeopardize the continued existence of any endangered or threatened species listed under section 4 of the endangered species act or result in the destruction or adverse modification of the species' critical habitat.

(d) A WQS variance shall not be granted if the standard in the receiving water will be attained by implementing the treatment technology requirements under the clean water act of 1972, as amended, 33 U.S.C. §§301(b) and 306, and by the discharger implementing cost-effective and reasonable best management practices for nonpoint sources over which the discharger has control within the vicinity of the facility.

(e) The duration of a WQS variance shall not exceed the term of the NPDES permit. If the time frame of the variance is the same as the permit term, then the variance shall stay in effect until the permit is reissued or revoked.

(2) A variance may be granted if the permittee demonstrates to the department that attaining the WQS is not feasible for any of the following reasons:

(a) Naturally occurring pollutant concentrations prevent the attainment of the WQS.

(b) Natural, ephemeral, intermittent, or low flow conditions or water levels prevent the attainment of the WQS.

(c) Human-caused conditions or sources of pollution prevent the attainment of the WQS and cannot be remedied or more environmental damage would occur in correcting the conditions or sources of pollution than would occur by leaving the conditions or sources in place.

(d) Dams, diversions, or other types of hydrologic modifications preclude the attainment of the WQS, and it is not feasible to restore the water body to its original condition or to operate the modification in a way that would result in the attainment of the WQS.

(e) Physical conditions related to the natural features of the water body preclude attainment of WQS.

(f) Controls more stringent than the treatment technology requirements in the clean water act of 1972, as amended, 33 U.S.C. §§301(b) and 306 would result in unreasonable economic effects on the discharger and affected communities.

(3) In addition to the requirements of subrule (2) of this rule, a permittee shall do both of the following:

(a) Show that the variance requested conforms to the antidegradation demonstration requirements of R 323.1098.

(b) Characterize the extent of any increased risk to human health and the environment associated with granting the variance compared with compliance with WQS without the variance in a way that enables the department to conclude that the increased risk is consistent with the protection of the public health, safety, and welfare.

(4) A permittee may request a variance when a NPDES permit application is submitted or during permit development. A variance request may also be submitted with a request for a permit modification. The variance request to the department shall include the following information:

(a) All relevant information which demonstrates that attaining the WQS is not feasible based on 1 or more of the conditions in subrule (2) of this rule.

(b) All relevant information which demonstrates compliance with subrule (3) of this rule.

(5) The variance request shall be available to the public for review during the public comment period on the draft NPDES permit. The preliminary decision regarding the variance shall be included in the public notice of the draft NPDES permit. The department will notify the other Great Lakes states of the preliminary variance decision.

(6) If the department determines, based on the conditions of subrules (2) and (3) of this rule, that the variance request demonstrates that attaining the WQS is not feasible, then the department shall authorize the variance through issuance of the NPDES permit. The permit shall contain all conditions needed to implement the variance, including, at a minimum, all of the following conditions:

(a) That compliance with an effluent limitation that, at the time the variance is granted, represents the level currently achievable by the permittee. For an existing discharge, the effluent limitation shall be no less stringent than that achieved under the previous permit.

(b) That reasonable progress be made in effluent quality toward attaining the water quality standards. If the variance is approved for any BCC, a pollutant minimization program shall be conducted consistent with the provisions in paragraphs (i) through (iv) of R 323.1213(d). The department shall consider cost-effectiveness during the development and implementation of the pollutant minimization program.

(c) That if the duration of a variance is shorter than the duration of a permit, then compliance with an effluent limitation that is sufficient to meet the underlying water quality standard shall be achieved when the variance expires.

(7) The department shall deny a variance request through action on the NPDES permit if a permittee fails to make the demonstrations required under subrules (2) and (3) of this rule.

(8) A variance may be renewed, subject to the requirements of subrules (1) through (7) of this rule. As part of any renewal application, a permittee shall again demonstrate that attaining WQS is not feasible based on the requirements of subrules (2) and (3) of this rule. A permittee's application shall also contain information concerning the permittee's compliance with the conditions incorporated into the permittee's permit as part of the original variance pursuant to subrule (6) of this rule.

(9) Notwithstanding the provision in subrule (1)(a) of this rule, the department may grant multiple discharger variances. If the department determines that a multiple discharger variance is necessary to address widespread WQS compliance issues, including the presence of ubiquitous pollutants or naturally high background levels of pollutants in a watershed, then the department may waive the variance demonstration requirements in subrules (2), (3), and (4) of this rule. A permittee that is included in the multiple discharger variance will be subject to the permit requirements of subrule (6) of this rule if it is determined under R 323.1211 that there is reasonable potential for the pollutant to exceed a permit limitation developed under to R 323.1209.

## Attachment 2

### Mercury Multiple Discharger Variance (MDV) Comments Received During the Public Comment Period November 3 – December 3, 2014

#### Commenters:

United States Environmental Protection Agency Region 5 (USEPA)  
Consumers Energy Company (CEC)

Comment: The USEPA would appreciate any information, data, analyses, or reports generated by the MDEQ or in the MDEQ's possession that address the impacts of Michigan's mercury MDV on listed species and habitat or lack thereof. The USEPA would also appreciate that the MDEQ share any communication between the Fish and Wildlife Service (FWS) and the MDEQ concerning Michigan's mercury multiple discharger variance.

Response: Of the species federally listed as endangered, threatened, proposed, and candidate species, the following are found in Michigan's surface water: Hine's emerald dragonfly, Hungerford's crawling beetle, Clubshell, Northern riffleshell, Rayed bean, and the Snuffbox mussel. The MDEQ supplied information in the MDV that indicates surface waters are not meeting the WQS. If present, endangered species are already exposed to concentrations of mercury above the WQS. Since most of these inputs are from atmospheric deposition, the MDEQ has met the requirements to show that additions from the NPDES Program will not "likely jeopardize the continued existence of any endangered or threatened species listed under Section 4 of the Endangered Species Act (ESA) or result in the destruction or adverse modification of such species 'critical habitat'" (R323.1103(1)(c)). No changes have been made to the MDV based on this comment.

In addition, based on the following statement in the Memorandum of Agreement (MOA) between the USEPA, the FWS, and the Marine Fisheries Service (66 FR 11202; February 22, 2001), the MDEQ believes that the USEPA would initiate any communication with the FWS on federally-listed species and habitat concerns relating to the Clean Water Act (CWA).

"The MOA cannot, and does not, impose any requirements of section 7 on States and Tribes. Those requirements apply solely to Federal Agencies, and EPA continues to be responsible for fulfilling any applicable requirements of section 7 in its administration of the CWA."

Comment: Michigan's demonstration of unattainability would be more robust and defensible if Michigan revised Figure 1 on Page 12 to identify facilities that have advanced treatment trains that may include non-membrane filtration and/or adsorption similar to that of the facilities identified in Table ES-1 of the October 2013 (USEPA) draft report (Battelle 2013).

Response: R323.1103 (2) in Attachment 1 states that a variance may be granted if the permittee demonstrates to the MDEQ that attaining the WQS is not feasible for any of the following reasons (listed as a through f). The MDEQ demonstrated in the MDV that (a) Naturally occurring pollutant concentrations prevent the attainment of the WQS and (f) Controls more stringent than the treatment technology requirements in the CWA of 1972, as amended, §§33 U.S.C 301(b) and 306, would result in unreasonable economic effects on the discharger and affected communities. Data supplied shows that many inland waters are

not meeting the WQS for mercury due to atmospheric deposition and not sources under the NPDES Program and the Ohio EPA (1997) report demonstrates that treatment is not economically feasible. The MDEQ agrees to submit information regarding this request to the USEPA outside of the MDV process. No changes have been made to the MDV based on this comment.

Comment: Please confirm that the (potential effluent limit (PEL) development) template has been revised to exclude any dilution allowance for bioaccumulative chemicals.

Response: This comment is beyond the scope of the MDV and no changes will be made to the MDV. However, we offer the following information to the commenter:

Rule 323.1082 states: Mixing zones for BCCs may be allowed for existing discharges to the surface waters of the state through November 14, 2010, pursuant to the provisions of this rule. After this date, except as provided in subdivisions (c) and (d) of this subrule, permits shall not authorize mixing zones for existing discharges of BCCs to the surface waters of the state.

The PEL sheet is used to develop all toxic parameter effluent limits. Toxic parameters that are not BCCs are allowed dilution for chronic values and the PEL sheet calculates many parameters with dilution. Employees develop toxic WQBEL and LCA limits under appropriate supervision and are trained on how to use the PEL sheet with BCCs.

Comment: The USEPA suggests that the MDEQ evaluate facility mercury influent loading trends as a means to evaluate mercury PMP effectiveness. If the MDEQ is aware of any case study evidence that demonstrates effective implementation of PMPs, we suggest including this information in the documentation supporting the final MDV.

Response: The MDEQ used a reduction in effluent mean mercury concentrations from the 2009 MDV to the 2015 MDV to show that the PMP program, primarily source reduction, is effective. The MDEQ determined that a reduction in effluent concentrations is the most useful information in determining the effectiveness of the program. The MDEQ does not require facilities submit influent data to our database via DMR reports. Influent data is only required as part of the PMP and included in annual reports. The MDEQ provided several PMPs to the USEPA headquarters on two separate occasions, with the understanding that PMP effectiveness was being evaluated by EPA headquarters' staff. No changes have been made to the MDV based on this comment.

Comment: Pursuant to Procedure F.4, (40 cfr Part 132 Appendix F Procedure 2) the USEPA recommends the MDEQ cite in the MDV the permit language provision "that allows the permitting authority to reopen and modify the permit based on any State or Tribal triennial water quality standards revisions to the variance."

Response: Reopener and expiration permit language has been included as Attachment 4.

Comment: The USEPA recommends the MDEQ provide, as Attachment 5, an example of typical permit language included in the NPDES permits to illustrate the permit conditions needed to implement the variance as determined in Section F (40 cfr Part 232 Appendix F Procedure 2) of this procedure.

Response: Mercury and PMP permit language has been included as Attachment 4.

Comment: The USEPA believes the conclusion on Page 8 that “1. Overall, mercury concentrations in the environment appear to be slowly decreasing” is not sufficiently supported. Evidence that contradicts this statement is also presented in the draft MDV.

Response: The MDEQ changed this statement to: 1. Overall, mercury concentrations in the effluent of facilities under the NPDES Program appear to be decreasing.

Comment: The proposed 2015-2019 strategy document indicates Rule 103 (R 323.1103), Variances, of the Part 4 Rules, does not apply to new dischargers unless the proposed discharge is necessary to alleviate an imminent and substantial danger to the public health and welfare. The MDV for mercury should be available to new dischargers where mercury has the potential to be present in the new discharge and no net increase in ambient mercury concentrations is expected to occur. Alternatively, these new dischargers may be considered exempt from the MDV if they comply with Rule 98 (R 323.1098) Antidegradation, of the Part 4 Rules.

Response: This comment is beyond the scope of the MDV and no changes will be made to the MDV. However, we offer the following information to the commenter:

As described in the comment and R 323.1103 of the Part 4 Rules, a variance shall not apply to new discharger unless the proposed discharge is necessary to alleviate an imminent and substantial danger to the public health or welfare. For a new discharger to be covered under the MDV, the Part 4 WQS Rules would need to be revised. Rule R 324.3103(2), of Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451), prohibits the MDEQ from promulgating any additional rules pursuant to Part 31, after December 31, 2006. Therefore, no revisions to the Part 4 Rules can be made until such time that rule making authority is regained.

Comment: Report of intake, effluent, and net reporting should be accounted for in the MDV to accommodate the potential for increases in ambient mercury concentrations. CEC acknowledges Rule 1211 (R 323.1211), of the Part 8 Rules, allows for this consideration of intake water concentrations of toxic substances and, therefore, would provide for the reporting of and regulation of net concentrations.

Response: This comment is beyond the scope of the MDV and no changes will be made to the MDV. However, we offer the following information to the commenter:

Rule 323.1211, Reasonable potential for chemical –specific WQBELs, of the Part 8 Rules, defines the conditions that apply when considering intake toxic substances establishing limitations in NPDES permits. If a facility meets these conditions, the MDEQ allows for the reporting of intake, effluent, and net concentrations for toxic substances.

Comment: Where no reasonable potential exists for the proposed discharge concentrations to meet the WQS of 1.3 ng/L, due to the influent concentration of mercury and, in turn, where an LCA>1.3 ng/L is established, the MDV required a PMP should be eliminated.

Response: This comment is beyond the scope of the MDV and no changes will be made to the MDV. However, we offer the following information to the commenter:

As stated above, revisions to the Part 4 WQS Rules are not allowed at this time. Therefore, until such time that MDEQ regains rule making authority, R323.1103 states that a PMP is required as part of a variance for bioaccumulative chemicals of concern, like mercury.

Additional Information:

The MDEQ hosted a webinar called the MDEQ's updated NPDES Multiple Discharger Variance for Mercury. Over 180 participants viewed the live or taped version of the webinar. Questions were asked and responded to during the webinar and/or with follow up e-mail responses.

Additional questions were asked during the webinar that related to the Mercury Sampling and Reporting guidance for NPDES Permit Compliance (Attachment 5) or requested other information not related to the MDV. Follow-up for these questions included e-mailing the Guidance and directing questioners to the Low-Level Mercury Sampling, Analysis, and Reporting for NPDES Permits Webinar held on November 25, 2014.

## Attachment 3

### Water Quality-Based Effluent Limit Development for Toxic Substances (R 323.1213) – WQBELs less than quantification level

R 323.1213 WQBELs less than quantification level.

Rule 1213. (1) If a water quality-based effluent limit (WQBEL) for a toxic substance is calculated to be less than the quantification level, then all of the following provisions apply:

(a) The department shall designate, in the national pollutant discharge elimination system (NPDES) permit, the WQBEL as calculated.

(b) The permit shall state, for the purpose of compliance assessment, the analytical method to be used to monitor the amount of toxic substance in the effluent and the quantification level. The analytical method specified shall be the most sensitive, applicable, analytical method specified in or approved under the pollutant testing regulations set forth in 40 C.F.R. §136 (2000), which are adopted by reference in R 323.1221, or other appropriate method that provides confirmation and verification acceptable to the department if one is not available under 40 C.F.R. §136 (2000). The permit shall also state that if an effluent sample is less than the quantification level, then the permittee shall be considered in compliance for the period that the sample represents if the pollutant minimization program (PMP) described in subdivision (d) of this subrule is being fully performed.

(c) The quantification level shall be the minimum level (ML) specified in, or approved under, 40 C.F.R. §136 (2000), which are adopted by reference in R 323.1221, for the method for that toxic substance. If such ML does not exist, or if the method is not specified or approved under 40 C.F.R. §136 (2000), then the quantification level shall be the lowest quantifiable level practicable as established by procedures approved by the department. When establishing a quantification level, the department shall consider the achievability of the value by competent commercial laboratories. The permittee shall be given the opportunity to demonstrate that a higher quantification level is appropriate because of sample matrix interference.

(d) The permit shall contain a special condition requiring the permittee to develop and conduct a PMP for each toxic substance with a WQBEL below the quantification level, unless the permittee can demonstrate to the department that an alternate technique is available and will be used to assess compliance with the WQBEL. The goal of the PMP shall be to maintain the effluent concentration of the toxic substance at or below the WQBEL. The department shall consider cost-effectiveness during the development and implementation of a PMP. The permit shall require the submittal of a PMP by the permittee that describes the control strategy designed to proceed toward achievement of the goal and shall include all of the following:

(i) An annual review and semiannual monitoring of potential sources of the toxic substance.

(ii) Quarterly monitoring for the toxic substance in the influent to the wastewater treatment system.

(iii) A commitment by the permittee that reasonable cost-effective control measures will be implemented when sources of the toxic substance are discovered. Factors to be considered shall include all of the following:

(A) Significance of sources.

(B) Economic considerations.

(C) Technical and treatability considerations.

(iv) An annual status report. The report shall be sent to the department and shall include all of the following:

(A) All minimization program monitoring results for the previous year.

(B) A list of potential sources of the toxic substance.

(C) A summary of all actions taken to reduce or eliminate the identified sources of the toxic substance.

The requirements of paragraphs (i) to (iv) of this subdivision may be modified by the department on a case-by-case basis.

(e) The permit may contain a special condition requiring fish tissue monitoring or other biouptake sampling, or both, or facility sludge monitoring to assess the progress of the PMP.

(f) The permit shall contain a reopener clause indicating that any information generated as a result of the PMP described in subdivision (d) of this subrule may be used to support a request for subsequent permit modification, including revision or removal of the PMP requirement.

(g) The quantification level specified in a NPDES permit pursuant to this rule shall remain in effect until the permit is modified or reissued. If the quantification level is reduced through a permit modification or reissuance, then the permittee may be eligible for a compliance schedule under R 323.1217 and a variance under R 323.1103.

## Attachment 4

### Permit Language: Conditions Needed to Implement the Variance

\*Please note that permit language is tailored to each facility\*

#### **Final Effluent Limitation for Total Mercury**

The final limit for total mercury is the Discharge Specific Level Currently Achievable (LCA) based on a multiple discharger variance from the water quality-based effluent limit of 1.3 ng/l, pursuant to Rule 323.1103(9) of the Water Quality Standards. Compliance with the LCA shall be determined as a 12-month rolling average, the calculation of which may be done using blank-corrected sample results. The 12-month rolling average shall be determined by adding the present monthly average result to the preceding 11 monthly average results then dividing the sum by 12. For facilities without sufficient data needed to calculate the 12-Month Rolling Average, enter “\*E” on your monthly Discharge Monitoring Report (DMR) form until 12 months, or the equivalent of 12 months, of monthly monitoring data have been obtained, then begin reporting the calculated 12-Month Rolling Average as required. For facilities with quarterly monitoring requirements for total mercury, quarterly monitoring shall be equivalent to 3 months of monitoring in calculating the 12-month rolling average. Facilities that monitor more frequently than monthly for total mercury must determine the monthly average result, which is the sum of the results of all data obtained in a given month divided by the total number of samples taken, in order to calculate the 12-month rolling average. If the 12-month rolling average for any month/quarter is less than or equal to the LCA, the permittee will be considered to be in compliance for total mercury for that month/quarter, provided the permittee is also in full compliance with the Pollutant Minimization Program for Total Mercury.

(KEEP ONLY FOR FACILITIES WITH A FINAL MERCURY LIMIT AND MONITORING MORE FREQUENT THAN QUARTERLY): After a minimum of 12 monthly data points have been collected, the permittee may request a reduction in the monitoring frequency for total mercury. This request shall contain an explanation as to why the reduced monitoring is appropriate and shall be submitted to the Department. Upon receipt of written approval and consistent with such approval, the permittee may reduce the monitoring frequency for total mercury of this permit. The Department may revoke the approval for reduced monitoring at any time upon notification to the permittee.

#### **Total Mercury Testing and Additional Reporting Requirements**

The analytical protocol for total mercury shall be in accordance with EPA Method 1631, Revision E, “Mercury in Water by Oxidation, Purge and Trap, and Cold Vapor Atomic Fluorescence Spectrometry,” EPA-821-R-02-019, August 2002. The quantification level for total mercury shall be 0.5 ng/l, unless a higher level is appropriate because of sample matrix interference. Justification for higher quantification levels shall be submitted to the Department within 30 days of such determination.

The use of clean technique sampling procedures is required unless the permittee can demonstrate to the Department that an alternative sampling procedure is representative of the discharge. Guidance for clean technique sampling is contained in EPA Method 1669, “Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels,” EPA-821-R96-001, July 1996. Information and data documenting the permittee's sampling and analytical protocols and data acceptability shall be submitted to the Department upon request.

In order to demonstrate compliance with EPA Method 1631E and EPA Method 1669, the permittee shall report, on the daily sheet, the analytical results of all field blanks and field duplicates collected in conjunction with each sampling event, as well as laboratory method blanks when used for blank correction. The permittee shall collect at least one field blank and at least one field duplicate per sampling event. If more than ten samples are collected during a sampling event, the permittee shall collect at least one additional field blank AND field duplicate for every ten samples collected. Only field blanks or laboratory method blanks may be used to calculate a concentration lower than the actual sample analytical results (i.e. a blank correction). Only one blank (field OR laboratory method) may be used for blank correction of a given sample result, and only if the blank meets the quality control acceptance criteria. If blank correction is not performed on a given sample analytical result, the permittee shall report under 'Total Mercury – Corrected' the same value reported under 'Total Mercury – Uncorrected.' The field duplicate is for quality control purposes only; its analytical result shall not be averaged with the sample result.

(MONITORING ONLY)The permittee shall submit to the Department a report summarizing the mercury monitoring data. The Department will review the report using the reasonable potential process described in R 323.1211 of the Michigan Administrative Code to determine if there is a reasonable potential for the Water Quality Standard of 1.3 ng/l of total mercury to be exceeded in the effluent.

- 1) If it is determined that the effluent has a reasonable potential to exceed 1.3 ng/l of total mercury, upon written notification by the Department, the permittee shall develop a Pollutant Minimization Program for Total Mercury.
- 2) If it is determined that the effluent does not have a reasonable potential to exceed 1.3 ng/l of total mercury and upon receipt of written approval and consistent with such approval, the permittee may reduce the monitoring frequency for total mercury. The Department may revoke the approval for reduced monitoring at any time upon notification to the permittee.
- 3) If, at any time during the life of the permit, the final effluent concentration exceeds 5 ng/l, the permittee shall notify the Department with its next regular monthly monitoring report and shall develop and implement the Pollutant Minimization Program for Total Mercury.

### **Pollutant Minimization Program for Total Mercury**

The goal of the Pollutant Minimization Program is to maintain the effluent concentration of total mercury at or below 1.3 ng/l. The permittee shall develop and implement a Pollutant Minimization Program in accordance with the following schedule.

For facilities with an existing limit and PMP: The permittee shall continue to implement the Pollutant Minimization Program and modifications thereto, to proceed toward the goal. The Pollutant Minimization Program includes the following: (OR) The permittee shall submit to the Department a modified Pollutant Minimization Program on or before 60 days from the effective date of the permit to include the following minimum requirements:

For facilities with a new limit and PMP requirement: The permittee shall submit to the Department an approvable Pollutant Minimization Program for mercury designed to proceed toward the goal. The Pollutant Minimization Program shall include the following:

- a. an annual review and semi-annual monitoring of potential sources of mercury entering the wastewater collection system;
- b. a program for quarterly monitoring of influent and periodic monitoring of sludge for mercury; and
- c. implementation of reasonable cost-effective control measures when sources of mercury are discovered. Factors to be considered include significance of sources, economic considerations, and technical and treatability considerations.

The Pollutant Minimization Program shall be implemented upon approval by the Department.

On or before March 31 of each year following approval of the Pollutant Minimization Program, the permittee shall submit a status report for the previous calendar year to the Department that includes 1) the monitoring results for the previous year, 2) an updated list of potential mercury sources, and 3) a summary of all actions taken to reduce or eliminate identified sources of mercury.

Any information generated as a result of the Pollutant Minimization Program set forth in this permit may be used to support a request to modify the approved program or to demonstrate that the Pollutant Minimization Program requirement has been completed satisfactorily.

A request for modification of the approved program and supporting documentation shall be submitted in writing to the Department for review and approval. The Department may approve modifications to the approved program (approval of a program modification does not require a permit modification), including a reduction in the frequency of the requirements under items a. and b.

This permit may be modified in accordance with applicable laws and rules to include additional mercury conditions and/or limitations as necessary.

### **Permit Reopener and Expiration**

The provisions of this permit are severable. After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term in accordance with applicable laws and rules. On its effective date this permit shall supersede the previous permit, which is hereby revoked upon the effective date of this permit.

This permit and the authorization to discharge shall expire no more than 5 years from effective date. In order to receive authorization to discharge beyond the date of expiration, the permittee shall submit an application which contains such information, forms, and fees as are required by the Department of Environmental Quality by April 1 of the year of expiration.

## Attachment 5

# MERCURY SAMPLING AND REPORTING GUIDANCE For NPDES Permit Compliance

### I. EXECUTIVE SUMMARY

The Water Resources Division (WRD) has determined that some contract labs were reporting analytical results to their clients (permitted facilities) that did not meet the quality control (QC) acceptance criteria for USEPA Methods 1631 Revision E (1631E) and 1669. In order to ensure and verify that the reported mercury monitoring data is valid and acceptable, permittees with mercury monitoring in their NPDES permit will be required to provide the mercury QC data when they report their effluent data to us (on the daily sheets also known as the Daily DMR).

### II. BACKGROUND

The WRD identified a number of inconsistencies with how permittees and their contract labs collect, use, and report field duplicate, field blank, and trip blank data; much of which is inconsistent with the QC requirements of USEPA Methods 1631E and 1669 as described in 40 CFR Part 136.

### III. WHAT YOU NEED TO KNOW

1. USEPA Methods 1631E and 1669 require that at least one field blank and one field duplicate be collected for each ten samples per sampling event at a given site.
  - a) A permittee collecting their **own** sample(s) needs to collect one field blank and one field duplicate (assuming they collect ten or less samples) **each date/time they collect a sample**, regardless of the number of outfalls being collected at their facility/site.
  - b) A contract lab collecting mercury samples for multiple facilities/sites needs to collect one field blank and one field duplicate **at each facility/site** (assuming they collect ten or less samples at a single facility/site location.)
2. A field duplicate is a second sample collected at the same time and place as the sample for quality control purposes. The results of the field duplicate should be reported separately on the daily sheets and **NOT** averaged with the sample result for reporting purposes.
3. A field blank is reagent water that has been transported to the field and **treated as a sample in all respects**, including contact with the sampling devices and exposure to sampling site conditions, filtration, storage, preservation and analytical procedures. The field blank is used to demonstrate that samples have not been contaminated by the sample collection and transport activities.
4. The Method 1631E acceptance criteria for field blanks is <0.5 ng/L or no greater than one-fifth (1/5) of the Hg in the associated sample(s), whichever is greater. If the field blank results exceed these criteria, the sample results cannot be reported for NPDES permit compliance purposes (but the field blank should be reported on the daily sheet). We recommend that permittees take their mercury samples early in the month (or quarter if the permit only requires quarterly sampling) so they will have time to resample if the field blanks do not meet the Method 1631E acceptance criteria.

5. The results of the field blank and the field duplicate should be reported in the columns provided on the daily sheets (these columns will be available from June 2014 forward).
6. A method blank is reagent water that is placed in a sample bottle in the lab and analyzed using reagents and procedures that are identical to those used to prepare and analyze the corresponding sample.
7. **Only** field blanks or method blanks may be used to report something lower than the actual sample analytical results (a blank correction). Only one blank (field or method) can be used for blank correction of a given sample result (not both), and only if they meet the acceptance criteria (see *Quality Control Guidance Information for the sampling and analysis of Low Level Mercury in Water following USEPA Method 1631 Revision E, August 2002*).
8. If the results are blank corrected using the method blank, the method blank results must be reported separately in the column provided on the daily sheet.
9. There is nothing in Method 1631E or Method 1669 that prohibits the use of trip blanks or any other type of blanks as additional QC measures, but they are **NOT** acceptable substitutes for field blanks and cannot be used for blank correction of sample results.

#### IV. BLANK CORRECTION EXAMPLES

1. A permittee got the following analytical results: 12 ng/L in the sample and 10 ng/L in the corresponding field blank.

As stated above, acceptance criteria for field blanks is <0.5 ng/L or no greater than one-fifth (1/5) of the Hg in the associated sample(s), whichever is greater. In this example 1/5 of the sample value  $1/5 \times 12 \text{ ng/L}$  is 2.4 ng/L. Since 2.4 ng/L (1/5 of the sample value) is greater than 0.5 ng/L, the acceptance criteria for this sample is 1/5 of the sample value (2.4 ng/L). Because the field blank (10 ng/L) is greater than 1/5 of the Hg in the associated sample, the sample is invalid and may not be reported or otherwise used for regulatory compliance purposes. The permittee should resample to comply with NPDES permit monitoring requirements. The field blank result should be reported on the daily sheets, even though the sample result was invalid.

The permittee and/or lab should find the source of the field-blank contamination and reduce it to acceptable levels before the next sampling event. The Method 1669 and Method 1631E guidance documents provide suggestions for reducing blank contamination. If the contamination cannot be reduced to this level, the permittee should retain a sampling team and/or lab capable of meeting acceptable QC requirements.

2. A permittee got the following analytical results: 5.6 ng/L in the sample and 0.7 ng/L in the field blank.

Applying the same approach as above, first determine 1/5 of the Hg in the sample.  $1/5 \times 5.6 \text{ ng/L} = 1.12 \text{ ng/L}$ , which is greater than 0.5 ng/L. Since the blank is  $\leq 1/5$  of the sample result, the sample result may be blank corrected and the result reported as 4.9 ng/L. The sample and field blank results should be reported on the daily sheets. Only the corrected sample result is reported on the Discharge Monitoring Report.

3. A permittee got the following analytical results: 1.5 ng/L in the sample and 0.4 ng/L in the field blank.

First determine 1/5 of the Hg in the sample.  $1/5 \times 1.5 \text{ ng/L} = 0.3 \text{ ng/L}$ . This is less than 0.5 ng/L. Since the blank is less than 0.5 ng/L, the sample results may be blank corrected and reported as 1.1 ng/L. The sample and field blank results should be reported on the daily sheet. The corrected sample result is reported on the DMR.