Mercury Permitting Strategy
Implementation of Method 1631
For Fiscal Years 2005-2009
May 14, 2004

Background

The United States Environmental Protection Agency (USEPA) promulgated a new method, Method 1631, on July 8, 1999, for measuring mercury in water. The method was published as a revision of Title 40 of the Code of Federal Regulations (CFR), Part 136, Guidelines Establishing Test Procedures for the Analysis of Pollutants, in the June 8, 1999, *Federal Register*, Volume 64, No. 109, pp. 30417-30434.

Method 1631 substantially increased measurement sensitivity for mercury in water. The quantification level for the method is 0.5 nanograms per liter (ng/l), which is 400 times more sensitive than the previously used method, USEPA Method 245.1. It is the first USEPA promulgated method to enable the measurement of mercury at levels lower than Michigan's water quality standard for mercury of 1.3 ng/l, which is based on protection of wildlife.

The majority of ambient waters sampled for mercury, as well as most National Pollutant Discharge Elimination System (NPDES) permitted discharges, were shown to exceed the water quality standard with the advent of the new method (see detailed discussion below). To address this situation in NPDES permits, a multiple discharger variance was developed consistent with the requirements of the variance rule, R 323.1103(9). Rule 1103 allows for a variance from a water quality standard that is the basis for a water quality-based effluent limit (WQBEL) in an NPDES permit where various conditions (e.g., naturally occurring or human-caused pollutant concentrations) prevent the attainment of water quality standards.

The Mercury Permitting Strategy (Strategy), developed by the Michigan Department of Environmental Quality (MDEQ), Water Division, in February 2000, established a multiple discharger variance for mercury and outlined an approach for implementing Method 1631 in existing NPDES permits without causing widespread noncompliance with NPDES permit limits for mercury. The Strategy was submitted to Ms. Jo Lynn Traub, Director, Water Division, USEPA, on February 18, 2000, and approved by the USEPA on May 24, 2002.

The February 2000 Strategy included a Level Currently Achievable (LCA) of 30 ng/l, based primarily on effluent data from the state of Maine, and a pollutant minimization plan requirement to continue efforts to meet the water quality standard of 1.3 ng/l for mercury. The LCA was established consistent with R 323.1103(6), which requires that the permit establish a WQBEL that represents a level achievable by the permittee. A pollutant minimization plan is also required by R 323.1103(6) and requires the permittee to identify and eliminate sources of mercury in the discharge. A permittee is considered to be in compliance with the mercury limit if they do not exceed the LCA and are implementing the pollutant minimization plan. The Strategy provided permittees a period of time to switch from Method 245.1 to Method 1631, allowing for the development of laboratory capabilities and the collection of additional mercury data.

The MDEQ is updating its approach to implementing Method 1631 in NPDES permits for Fiscal Years (FYs) 2005-2009. The goal of this revised Strategy is to move NPDES permitted discharges towards meeting the mercury water quality standard of 1.3 ng/l. Current effluent data continue to indicate that most point source discharges do not meet the mercury water quality standard. However, mercury data collected using Method 1631 under the February 2000

Strategy documents that mercury concentrations in most NPDES permitted discharges are significantly less than the 30 ng/l LCA. Therefore, the revised Strategy lowers the LCA to 10 ng/l. The revised Strategy will further the goal of attaining the mercury water quality standard through a reduced LCA and continued implementation of pollutant minimization plans.

The Strategy was announced in the February 9 and February 23, 2004, MDEQ Calendars and was available on the MDEQ Web site for public comment. Notice that the Strategy was available for comment was mailed to all NPDES permittees with mercury limits and/or monitoring requirements, eleven stakeholder groups, and the other Great Lakes states' environmental agencies on February 3, 2004. The MDEQ held a public meeting on the draft Strategy on February 18, 2004 in Lansing, Michigan. The meeting provided an open forum for discussion, as well as an opportunity to accept public comments. A summary of the comments and responses are included in Attachment 1.

Results Using Low-Level Mercury Techniques

There are at least 45 individual NPDES permits that contain mercury limits and/or low-level monitoring requirements. 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 (Table 1). However, data obtained from compliance monitoring for point source discharges indicate that 42 out of 45 facilities with mercury limits or monitoring requirements have arithmetic mean mercury concentrations below 10 ng/l, with 35 facilities less than 5 ng/l (Table 1 and Figure 1).

The effluent data were also evaluated using the reasonable potential provisions of the Part 8 Rules, Water Quality-Based Effluent Limit Development for Toxic Substances, pursuant to Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451). Reasonable potential is a statistical approach for predicting the expected discharge concentration of a pollutant. There are two approaches for determining reasonable potential: 1) If ten or more quantifiable facility-specific effluent samples are available, the predicted average effluent concentration equals the upper ninety-fifth percentile of all representative data points (Approach 1); 2) If less than ten quantifiable samples are available, the predicted average effluent concentration is equal to the maximum effluent concentration multiplied by a "multiplying factor" provided in R 323.1211 (Approach 2). Approach 2 is more conservative than Approach 1 and generally produces higher predicted effluent concentrations. If either approach demonstrates reasonable potential for the discharge to exceed the water quality standard of 1.3 ng/l, a mercury limit based on the LCA will be included in the permit.

For all facilities (except 2) with 10 or more quantifiable data points, the predicted average mercury effluent concentration, calculated using Approach 1, was less than 10 ng/l (Table 2 and Figure 2). For the 18 facilities with less than 10 quantifiable data points, the predicted effluent concentration, calculated using Approach 2, was less than 10 ng/l for 8 facilities (Table 3). As additional low-level mercury data are collected for these 18 facilities such that a minimum of 10 quantifiable data points are available, the less conservative reasonable potential approach (Approach 1) will likely predict lower effluent concentrations.

Low-level mercury analyses of 41 Great Lakes tributaries suggest that Michigan inland waters continue to exceed the water quality standard of 1.3 ng/l for mercury. Based on 1998-2002 data, 38 of 41 tributaries showed exceedances of the water quality standards (range 0-107 ng/l) (Aiello and Smith, 2002; Aiello, 2002; Aiello, 2003a; and Aiello, 2003b). Mean mercury

concentrations in Great Lakes connecting channels exceeded the water quality standards between 1998 and 2002. Mercury concentrations in the Detroit River varied between an upstream mean of 7.4 ng/l (n=33) and downstream mean of 2.4 ng/l (n=35). Upstream mean values in the St. Clair River were 1.3 ng/l (n=34); the downstream mean concentration was similar (1.6 ng/l, n=34). A similar pattern was found in the St. Mary's River with a mean upstream concentration of 1.3 ng/l (n=29) and downstream mean concentration of 1.7 ng/l (n=29) (MDEQ, 2002 and GLEC, 2003).

Open water stations of Saginaw Bay and Grand Traverse Bay indicate mercury exceedances (GLEC, 2002). Mean concentrations in Saginaw Bay exceeded the water quality standards in 1998 (2.1 ng/l, n=3) and 1999 (5.5 ng/l, n=4). Mean mercury concentrations at four stations in Grand Traverse Bay met water quality standards in 1998 (mean = 0.26 ng/l, n=4) and 2002 (mean = 0.19 ng/l, n=4), but exceedances were found in 1999 (2.2 ng/l, n=4).

Fish tissue and wildlife data do not indicate any consistent statewide trend in mercury concentrations. For example, in 14 of 18 Great Lakes or connecting channel data sets, no detectable changes in fish tissue mercury concentrations were found. A detailed discussion of the specifics of this analysis is included in Michigan's Fish Contaminant Monitoring 2002 Annual Report (Day, 2003). In addition, low-level data on mercury levels in bald eagle feathers were reviewed. Researchers found that mercury concentrations in bald eagle feathers collected during 1985-1989 and 1999-2000 revealed no statistically significant differences (Roe, et al., 2003) between the two time periods.

Method 1631 in NPDES Permits

Several factors were considered in developing this proposed Strategy for the use of Method 1631 in NPDES permits:

1. Michigan is authorized to administer the NPDES program and must require the use of methods listed in 40 CFR, Part 136, for compliance monitoring. Method 1631 is one of several mercury methods approved for compliance monitoring. However, it is the only approved method with a quantification level below the mercury water quality standard. The USEPA regulations do not require that permits be reopened to include a new analytical method. States have the option to reopen the permit, or wait until the permit is reissued to include a new, more sensitive method where applicable.

2. Several laboratories now have the expertise and infrastructure to conduct analyses using Method 1631 (Attachment 2).

3. Michigan develops WQBELs for mercury following the requirements of the Part 8 Rules. A permit limit is needed if a determination is made that mercury is being discharged at a level that has the reasonable potential to cause or contribute to an exceedance of the mercury water quality standards. This determination requires the use of representative facility-specific effluent samples for mercury.

4. Due to ubiquitous mercury concentrations in Michigan's surface water at levels exceeding water quality standards, most facilities will not be able to comply with the mercury water quality standard in a cost-effective manner. Michigan has concluded that, in general, end-of-pipe treatment for mercury is not the most cost-effective method to reduce mercury loadings to achieve water quality standards. 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 indicates Michigan's committment to the use of pollution prevention, source control, and other waste minimization programs to achieve compliance with low WQBELs. As such, each individual NPDES permit that contains a mercury WQBEL also contains a requirement to develop and implement a pollutant minimization plan for mercury.

Michigan has reviewed the available information regarding end-of-pipe treatment for mercury, including the effectiveness of the treatment and associated costs. Most 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. Therefore, we conclude that end-of-pipe controls to meet the mercury water quality standard would cause substantial and widespread economic impact without guaranteeing removal sufficient to achieve the mercury water quality standard.

5. Data from Michigan facilities using low-level mercury analyses (Table 1) indicate that an LCA of 10 ng/l is achievable. Data indicate that numerous facilities have below 5 ng/l of mercury in their effluent (Tables 1-3).

6. The use of the multiple discharger variance for mercury will not result in an increase of mercury levels in point source discharges. Rather, with the use of Method 1631, pollutant minimization plans will be more effective in reducing mercury effluent levels with a resultant lowering of risk levels for both human health and the environment. It remains clear in the permit requirements that the goal of the reduction efforts is to attain the mercury water quality standard, which is based on the protection of wildlife in Michigan. Therefore, this proposed Strategy will not jeopardize the continued existence of endangered or threatened species listed under Section 4 of the Endangered Species Act.

Permitting Strategy

The MDEQ will continue to use a multiple discharger variance for mercury developed consistent with R 323.1103(9) for use in reviewing individual municipal and industrial permits to be reissued during FYs 2005-2009. This decision is appropriate because of ubiquitous mercury levels in Michigan waters at levels that exceed the water quality standard and because immediate enforcement of a 1.3 ng/l WQBEL for mercury would force extraordinary end-of-pipe treatment at many existing facilities. This end-of-pipe treatment would result in an unreasonable economic burden for these facilities. The MDEQ is committed to the use of pollution prevention, source control, and other waste minimization programs to achieve compliance with the low mercury WQBELs. The multiple discharger variance will require that a limit for mercury be set at an LCA, and that reasonable progress be made during the term of the permit toward achieving the water quality standard where a reasonable potential analysis indicates that a mercury WQBEL is necessary in a permit. A requirement to develop and implement a pollutant minimization plan will be included in the permit to address the reduction efforts for mercury. The MDEQ will establish the LCA of 10 ng/l, as a rolling 12-month average, as the permit limit for the FYs 2005-2009 permits. Dischargers that desire a site-specific LCA will need to submit representative effluent data using Method 1631 covering a 12-month period and a justification for the request. Dischargers that achieve an average mercury concentration in their effluent of less than 5 ng/l will be considered for less frequent effluent and pollutant minimization plan monitoring requirements.

The use of this proposed multiple discharger variance for mercury will result in decreased mercury levels in point source discharges. It is important to note that a majority of the mercury loading to Michigan water bodies comes from the atmosphere and that the multiple discharger variance does not apply to this or other nonpoint sources.

The following specific actions will be implemented for NPDES permits issued during FYs 2005-2009:

For reissuance of permits with reasonable potential and existing mercury limits:

- The mercury permit limit will be set at the LCA of 10 ng/l for the life of the permit.
- Require monitoring using Method 1631.
- Monitoring frequency may be reduced for facilities that average less than 5 ng/l of mercury in their discharge over a 12-month period, based on representative discharge data. Allowing an annual (vs. semiannual) review and monitoring of sources, and semiannual (vs. quarterly) monitoring of the influent pursuant to the pollutant minimization plan will be considered.
- Require a mercury pollutant minimization plan for the duration of the permit so that reasonable progress is made toward attaining the water quality standard.
- A facility desiring a site-specific LCA that is greater than 10 ng/l will need to make the request at the time of permit reissuance and provide effluent data analyzed using method 1631 representative of a 12-month period and justification in the permit application. At a minimum, this data would be one sample per month.

For reissuance of permits with reasonable potential but without previous mercury limits:

- Monitor with Method 1631 monthly for two years of the permit.
- Set the mercury permit limit at the LCA of 10 ng/l effective at Year 3 (allow 2 years of monitoring before the limit takes effect).
- Require monitoring using Method 1631.
- Require a mercury pollutant minimization plan for the duration of the permit so that reasonable progress is made toward attaining the WQS.
- A facility desiring an LCA that is greater than 10 ng/l will need to submit justification for the higher LCA, a request for a permit modification, and data using Method 1631 representative of the first 12-month period.

For reissuance of permits with insufficient data for mercury limit determination:

- Require monthly monitoring with Method 1631 to start at permit issuance and continue for the permit duration.
- Include a Special Condition that triggers a mercury pollutant minimization plan if the monitoring data after one year indicates the presence of mercury at levels indicating reasonable potential to cause or contribute to exceedances of water quality standards.
- Evaluate the need for a permit modification to include a mercury limit, or include a mercury limit at the time of permit reissuance, if reasonable potential exists.

For issuance of permits for new discharges*:

- Set the permit limit at 1.3 ng/l as a monthly average with monitoring using Method 1631 effective upon issuance if data indicate reasonable potential to exceed the water quality standard. A new discharge is not eligible for a variance unless the proposed discharge is necessary to alleviate an imminent and substantial danger to the public health or welfare, as described in R 323.1103(1)(b).
- If there is reason to believe that mercury may be present in the discharge but there are insufficient data to make a reasonable potential determination:

    - Require monitoring with Method 1631 to start at permit issuance and continue for the permit duration.
    - Include a Special Condition that triggers a mercury pollutant minimization plan if the monitoring data after Year 1 indicates the presence of mercury at levels indicating reasonable potential to cause or contribute to exceedances of water quality standards.
    - Evaluate the need for a permit modification to include a mercury limit or include a mercury limit at the time of permit reissuance if reasonable potential exists.

*New use is defined as any building, structure, facility, or installation from which there is or may be a discharge of toxic substances to the surface waters of the state, the construction of which commenced after July 28, 1997. Any facility constructed after July 28, 1997, is considered new for the duration of its operation.

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Ohio EPA. 1997. Assessing the Economic Impacts of the Proposed Ohio EPA Water Rules on the Ohio Economy.

Roe, A.S., J.M. Wing, C.L. Summer, D.A. Best, J.G. Sikarskie, and W.W. Bowerman. 2003. Feathers of Nesting Eagles as an Indicator of Mercury in the Great Lakes. (Unpublished - Submitted to the Journal of Wildlife Management).

Table 1. Summary of mercury data available through 2003, for Michigan NPDES permitted facilities.

Facility	Permit Number	N	Arithmetic Mean (ng/l)	Median (ng/l)	Range (ng/l)
Albion WWTP	MI0022161	17	1.5	1.3	<0.5 - 5.7
Alpena WWTP	MI0022195	12	3.4	3.0	1.8 - 5.5
Battle Creek WWTP	MI0022276	18	4.1	2.9	<0.5 - 9.8
Bay City WWTP	MI0022284	3	4.8	4.7	1.0 - 8.7
Brighton WWTP	MI0020877	3	1.8	1.8	1.7 - 2.0
Buchanan WWTP	MI0022489	10	2.4	2.2	1.0 - 5.7
Cheboygan WWTP	MI0020303	5	6.1	6.4	2.9 - 8.6
Coldwater WWTP	MI0020117	4	0.5	0.6	<0.5 - 0.9
Coopersville WWTP	MI0022730	24	1.7	1.6	<0.5 - 4.6
Copper Range Co.	MI0006114	15	2.2	1.4	<0.5 - 7.6
DECO-River Rouge (002A)	MI0001724	4	4.3	4.3	<0.5 - 8.6
Escanaba WWTP	MI0025381	8	3.3	2.9	1.1 - 7.8
Genesee County #3 WWTP	MI0022993	7	0.7	0.7	0.6 - 0.9
Grand Haven-Spring Lake WWTP	MI0021245	28	2.9	2.7	1.4 - 5.3
Grand Rapids WWTP	MI0026069	8	2.7	2.3	1.6 - 6.0
Grandville WWTP	MI0023027	32	7.0	5.1	2.2 - 24.4
Great Lakes Tissue	MI0002496	6	30.0	27	13.0 - 52.0
Hemlock Semiconductor	MI0027375	7	1.0	0.9	0.8 - 1.3
Holland WWTP	MI0023108	39	4.5	3.5	1.0 – 20.0
Holly WWTP	MI0020184	8	1.5	1.4	0.9 - 3.3
Kalamazoo WWTP	MI0023299	61	1.0	0.8	<0.5 - 4.5
Kimberly Clark WWTP	MI0000892	12	2.2	1.4	0.7 - 5.2
LaFarge Midwest	MI0001988	17	2.0	1.8	<0.5 - 3.8
LP Corporation-Alpena	MI0002500	10	4.6	4.1	<0.5 - 9.8
Ludington WWTP	MI0021334	4	3.4	2.4	2.1 - 6.8
Manchester WWTP	MI0023507	12	2.5	2.7	0.8 - 5.7
Manistee WWTP	MI0020362	25	2.2	1.5	0.9 - 7.5
Marquette WWTP	MI0023531	10	8.4	7.2	4.4 - 13.2
Meadwestvaco-Escanaba Paper	MI0000027	6	6.7	6.5	4.0 - 9.0
Michigan South Central Power Agency	MI0039608	15	80.0	60.0	25.0 - 265.0
Milford WWTP	MI0023604	4	2.2	2.3	0.8 - 3.2
Mt. Clemens WWTP	MI0023647	24	0.9	<0.5	<0.5 - 16.3

Table 1. continued.

Facility	Permit Number	N	Arithmetic Mean (ng/l)	Median (ng/l)	Range (ng/l)
Oakland Co. Walled Lake/Novi WWTP	MI0024287	23	2.7	1.4	<0.5 - 25.4
Petoskey WWTP	MI0023787	18	5.2	3.0	1.1 - 20.6
Pontiac WWTP	MI0023825	15	1.6	1.6	0.5 - 2.9
Portage Lake Water & Sewage Authority	MI0020061	8	8.9	8.7	5.6 - 13.5
Richmond WWTP	MI0023906	26	2.4	2.0	0.8 9.5
Romeo WWTP	MI0021679	4	1.3	1.0	0.9 - 2.1
Saline WWTP	MI0024023	17	1.2	1.0	<0.5 - 3.9
Sandusky WWTP	MI0020222	11	23.0	18.0	<0.5 – 53.0
Traverse City WWTP	MI0027481	18	4.0	3.6	1.6 – 10.0
Trenton WWTP	MI0021164	3	7.3	7.5	2.88 - 11.5
Wyandotte Electric	MI0038105	11	0.7	0.6	<0.5 - 2.6
Wyoming WWTP	MI0024392	17	2.1	2.0	1.2 - 3.2
YCUA Regional WWTP	MI0042676	4	0.9	0.9	0.5 - 1.5

Table 2. Summary of effluent mercury data available through 2003, for Michigan NPDES permitted facilities with greater than or equal to 10 quantifiable data points.

Facility	Permit Number	Predicted Effluent Concentration	N
Albion WWTP	MI0022161	1.9	17
Alpena WWTP	MI0022195	3.8	12
Battle Creek WWTP	MI0022276	5.0	18
Buchanan WWTP	MI0022489	2.8	10
Coopersville WWTP	MI0022730	2.1	24
Copper Range Co.	MI0006114	2.9	15
Grand Haven-Spring Lake WWTP	MI0021245	3.3	28
Grandville WWTP	MI0023027	8.6	32
Holland WWTP	MI0023108	5.7	39
Kalamazoo WWTP	MI0023299	1.6	61
Kimberly Clark WWTP	MI0000892	2.7	12
LaFarge Midwest	MI0001988	2.3	17
LP Corporation-Alpena	MI0002500	5.6	10
Manchester WWTP	MI0023507	3.0	12
Manistee WWTP	MI0020362	2.8	25
Marquette WWTP	MI0023531	9.3	10
Michigan South Central Power Agency	MI0039608	102	14
Mt. Clemans WWTP	MI0023647	2.2	24
Oakland Co. Walled Lake/Novi WWTP	MI0024287	4.5	23
Petoskey WWTP	MI0023787	7.0	18
Pontiac WWTP	MI0023825	1.9	15
Richmond WWTP	MI0023906	3.0	26
Saline WWTP	MI0024023	1.4	17
Sandusky WWTP	MI0020222	28.0	11
Traverse City WWTP	MI0027481	4.8	18
Wyandotte Electric	MI0038105	1.0	11
Wyoming WWTP	MI0024392	2.9	17

Table 3. NPDES permitted facility low-level effluent mercury data available through 2003 – less than 10 quantifiable data points.

Facility	Permit Number	Arithmetic Mean (ng/l)	Predicted Effluent Concentration	N
Bay City WWTP	MI0022284	4.8	26.0	3
Brighton WWTP	MI0020877	1.8	6.0	3
Cheboygan WWTP	MI0020303	6.1	20.0	5
Coldwater WWTP	MI0020117	0.5	2.3	4
DECO-River Rouge (002A)	MI0001724	4.3	22.0	4
Escanaba WWTP	MI0025381	3.3	15.0	8
Genesee County #3 WWTP	MI0022993	0.7	1.8	7
Grand Rapids WWTP	MI0026069	2.7	11.0	8
Great Lakes Tissue	MI0002496	30.0	110	6
Hemlock Semiconductor	MI0027375	1.0	2.6	7
Holly WWTP	MI0020184	1.5	6.3	8
Ludington WWTP	MI0021334	3.4	18.0	4
Meadwestvaco-Escanaba Paper	MI0000027	6.7	19.0	6
Milford WWTP	MI0023604	2.2	8.3	4
Portage Lake Water & Sewage Authority	MI0020061	8.9	26.0	8
Romeo WWTP	MI0021679	1.3	5.5	4
Trenton WWTP	MI0021164	7.3	35.0	3
YCUA Regional WWTP	MI0042676	0.9	3.9	4

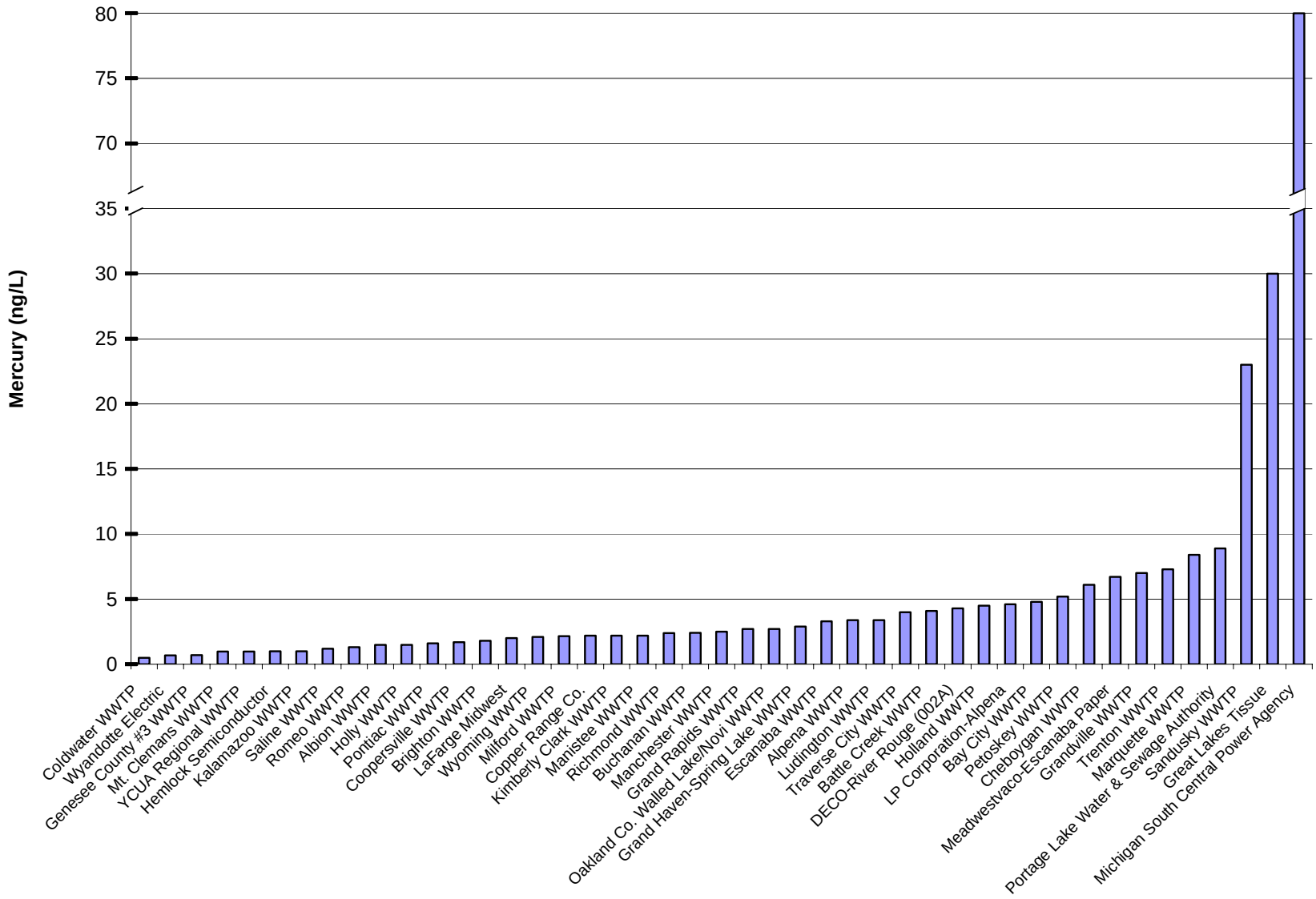

Figure 1. Arithmetic mean effluent mercury concentration for NPDES permitted facilities.

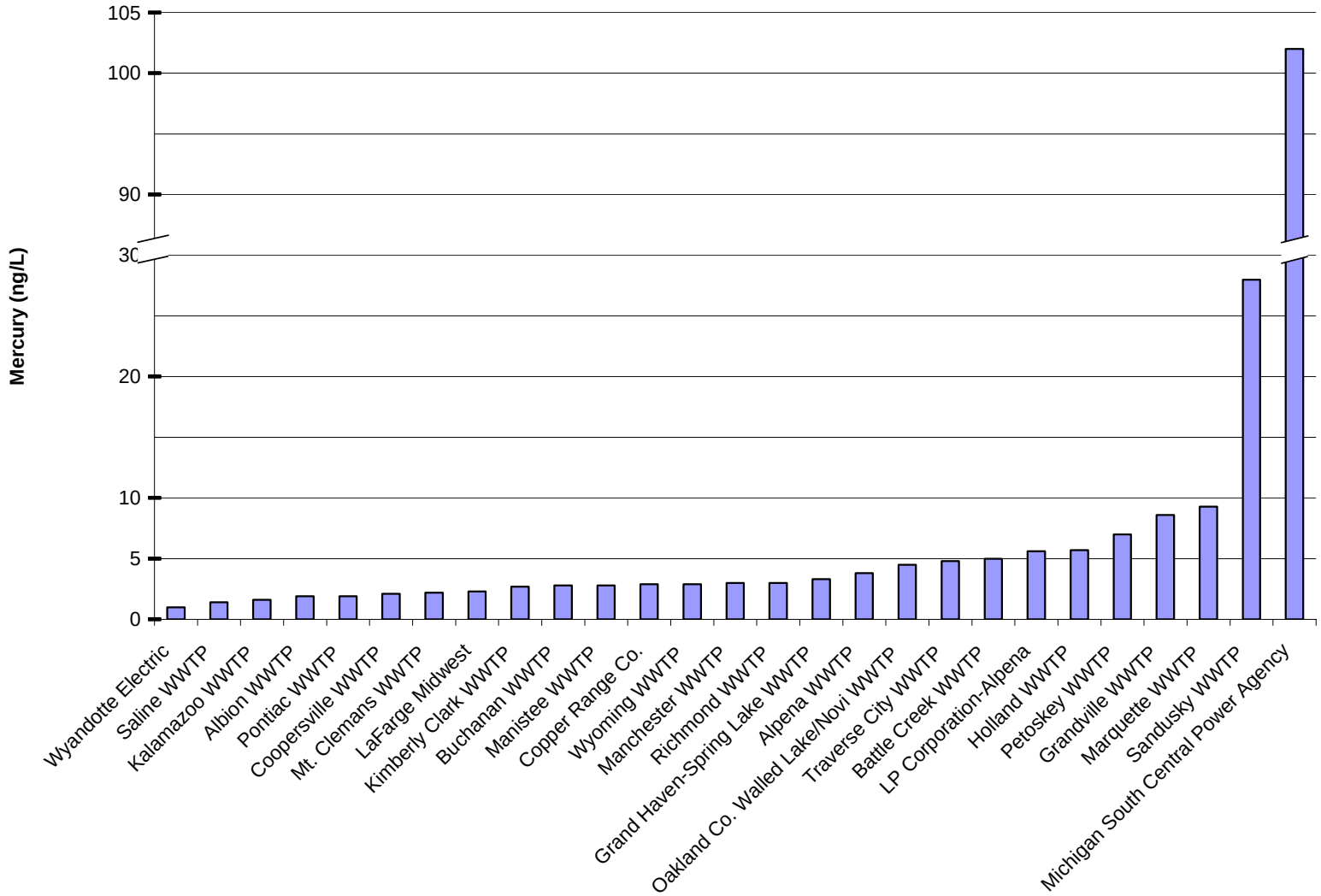

Figure 2. Predicted 95th percentile for data sets with greater than or equal to 10 quantifiable data points.

Attachment 1

Mercury Permitting Strategy (Strategy)
Comments Received During the Public Comment Period
February 1 to March 1, 2004

Commenters:

City of Cadillac (CC)
City of Flint (CF)
City of Owosso (CO)
City of Grand Rapids (CG)
General Motors (GM)
Michigan Municipal League (MML)
Michigan Manufacturers Association (MMA)
Delphi (D)

1. **Comment:** The data supports lowering the Multiple Discharger Variance (MDV) level to lower than 30 nanograms per liter (ng/l). The annual average limit of 10 ng/l should be achievable. (CO, MML, CG)

Response: The Michigan Department of Environmental Quality (MDEQ) agrees.

2. **Comment:** Agree with some of the fundamental principles adopted by the MDEQ and reflected in the proposed Strategy. (MMA, MML, GM, CF)

Response: The MDEQ agrees.

3. **Comment:** Proposed modifications to the permitting Strategy are consistent with the initial Strategy and the intent of the Great Lakes Initiative (GLI). (CO)

Response: The MDEQ agrees.

4. **Comment:** The MDV continues to be the most appropriate action for the MDEQ to pursue given the ubiquitous background mercury levels in surface water. (MMA)

Response: The MDEQ agrees.

5. **Comment:** Little notice of the proposed revised Strategy was given to the regulated community. (CC, CF)

Response: The MDEQ believes adequate notice and opportunity to comment (30 days) was given. The draft Strategy was sent to all National Pollutant Discharge Elimination System (NPDES) permittees with mercury limits or monitoring requirements on February 3, 2003. The availability of the draft Strategy public comment was also announced in the February 9 and February 24, 2004, MDEQ Calendars, a publication that is mailed to over 1,000 subscribers, and was also available on the MDEQ Web site.

6. **Comment:** It is not clear whether any stakeholders were involved in developing the Strategy. (CF)

Response: The MDV, including the Strategy, was first implemented in February 2000. This Strategy was developed with the assistance of five stakeholder groups: the Michigan United

Conservation Club (MUCC), National Wildlife Federation (NWF), Michigan Chamber of Commerce (MCC), MMA, and the MML. In addition, the draft Strategy was made available for public comment. The 2004 Strategy represents an update to the 2000 Strategy. The updated Strategy was developed by the MDEQ and provided to the public as indicated in Response #5. In addition, the Strategy was sent to eleven stakeholder groups for comment – MMA, Michigan Chemistry Council, MCC, MML, Michigan Environmental Council, Michigan Water Environment Association, NWF, MUCCs, U.S. Fish and Wildlife Service, League of Women Voters of Michigan, and Michigan Aggregates Association, as well as the other Great Lakes states.

7. **Comment:** The MDEQ is urged to extend the comment period for a few weeks and mail copies to potentially affected permittees. (CF)

Response: The Strategy was mailed to permittees with mercury limits and/or monitoring requirements in their NPDES permits as indicated in Response #5. Additional time to respond was also granted to those who requested it.

8. **Comment:** The reduction in the Level Currently Achievable (LCA) from 30 nanograms per liter (ng/l) to 10 ng/l is opposed – the 10 ng/l LCA will put Publicly Owned Treatment Works (POTWs) too close to noncompliance. Lowering the LCA from 30 ng/l to 10 ng/l on NPDES permitted discharges will not bring Michigan's water into attainment with water quality standards (WQS) and will result in significant burden and undue hardship for facilities. (GM, MMA, CC,)

Response: Available data from NPDES facilities with mercury limits or monitoring requirements indicate most facilities (93%, or 42 out of 45 facilities) will be able to achieve the LCA of 10 ng/l. For a facility unable to achieve the LCA of 10 ng/l, a site-specific LCA will be developed by the MDEQ that allows the facility to attain compliance while continuing with mercury reduction efforts through a pollutant minimization plan.

9. **Comment:** Why not seek a discharge "goal" of 1.3 ng/l, the WQS, while retaining the LCA of 30 ng/l? (CC, D)

Response: The LCA of 30 ng/l established in the February 2000 Strategy, was based primarily upon discharge data from facilities in the state of Maine due to lack of adequate low level mercury data from Michigan facilities at that time. Data since collected from Michigan facilities have shown the value of 30 ng/l to be excessive as described in Response #8. A more appropriate LCA for most Michigan facilities is 10 ng/l, with the ultimate goal of attaining the WQS of 1.3 ng/l.

10. **Comment:** A cost/benefit analysis should be performed. Reducing the LCA to 10 ng/l would be a burden for the manufacturing community. (CC, CF, D)

Response: Through the MDV, the MDEQ is not requiring the 1.3 ng/l WQS to be met because it would pose an unreasonable economic burden for permittees. Forty-two out of forty-five facilities are presently meeting 10 ng/l through mercury source reduction, standard municipal pollutant removal technologies, and without costly end-of-pipe treatment; therefore, the MDEQ does not believe a cost benefit analysis is necessary. Please also see Response #8.

11. **Comment:** Is Michigan the only GLI state enforcing low mercury limits? We are at a true economic disadvantage. The Environmental Protection Agency (EPA) shouldn't require Michigan to be more protective than our GLI partners. (CC, CF, D)

Response: Michigan rules (Part 4. Water Quality Standards, and Part 8. Water Quality-Based Effluent Limit (WQBEL) Development for Toxic Substances promulgated pursuant to Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended) define the conditions by which a WQBEL must be established in an NPDES permit. If reasonable potential exists for a pollutant discharge concentration to exceed WQS, a WQBEL must be established in the permit. The MDV for mercury was developed to ensure that imposition of a mercury limit would not be economically burdensome. The EPA is not requiring that the MDEQ use the proposed Strategy or an MDV. The use of an MDV is consistent with MDEQ R 323.1103(9), which allows the establishment of an MDV to avoid widespread noncompliance with a low WQBEL.

With regards to other Great Lake states implementing mercury limits in NPDES permits, the following states were contacted: Wisconsin, Minnesota, Indiana, Illinois, and Ohio. Indiana, Minnesota, Ohio, and Wisconsin are utilizing various approaches for addressing mercury in discharges, which include determining reasonable potential and including limits in permits where applicable. Minnesota, Ohio, and Wisconsin currently employ the use of a variance, while Indiana is in the process of developing a streamlined mercury variance rule. The state of Illinois is not currently regulating mercury in NPDES permits.

12. **Comment:** Pollution prevention and mercury elimination programs are more effective at eliminating mercury sources than imposing effluent limits. (CC, CO, MML)

Response: The MDEQ agrees that pollution prevention is the most cost-effective means for reducing mercury discharge concentrations; however, as described in Response #11, Michigan regulations require that adequate progress be made toward attaining the WQS through imposition of WQBELs, as needed, in addition to source reduction measures.

13. **Comment:** Method 1631 has inherent errors, the greatest of which is sample collection, and is costly. The use of 'clean room' sampling techniques is prudent and successful in laboratories but using these techniques for man-hole sampling is difficult. (CC)

Response: The MDEQ does not agree that there are inherent errors with EPA approved Method 1631. With regards to sample collection, the MDEQ highly recommends the use of Method 1669, Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels (July, 1996). With regards to the analytical cost burden, the proposed Strategy includes a provision to allow for reduced compliance monitoring frequency if the 12-month rolling average mercury concentration is less than 5 ng/l.

14. **Comment**: Industrial and larger municipalities were not well represented by the mercury data in the draft Strategy. A realistic assessment of a much broader segment of the regulated community is needed before any conclusions can be drawn regarding achievability of the proposed LCA. (CF) (MMA) (D)

Response: The MDEQ has modified the Strategy to include mercury data from an additional 15 facilities. These data indicate that 42 out of 45 facilities will be able to comply with the LCA of 10 ng/l.

15. **Comment:** There are insufficient data from some facilities to use them in the database for revising the LCA. (CF, MMA, D)

Response: There are 18 facilities with less than 10 quantifiable data points for mercury (Table 3 of the Strategy). These facilities discharge mercury at average concentrations

comparable to facilities with 10 or more quantifiable data points (see Figure 1 of the Strategy). There is no reason to expect that additional data for these facilities would greatly affect the distribution of mercury concentrations (as shown in Figure 1) or would result in fewer facilities being able to meet the 10 ng/l LCA. In addition, if necessary, a facility has the option of requesting a site-specific LCA.

16. **Comment:** The Strategy does not specify what permit compliance status will be, pending the MDEQ determination of a site-specific LCA. Continue to allow a 12-month monitor-only period to enable a facility to establish a site-specific LCA. (MMA, CF)

Response: The commenters raise a valid point. The Strategy has been revised to allow a two-year compliance period for an existing discharger with a new mercury limit. In this situation, a reissued permit will contain two years of monthly mercury monitoring. At the end of the first year (12 months of data), the permittee has the option of requesting a site-specific LCA along with a permit modification. If the MDEQ determines that a site-specific LCA is appropriate, the permit will be modified to contain the site-specific LCA, which will take effect upon modification.

17. **Comment:** The previous strategy of having a two-year phase-in for Method 1631, whenever it is required for assessing compliance, is recommended. During the phase-in, Method 1631 may be required but the limitation should be based upon the quantification level of Method 245.1 (200 ng/l). (CF)

Response: The previous phase-in period for Method 1631 was to allow facilities time to adjust to the new method and for laboratory capabilities to be developed. Method 1631 is the only method available with the sensitivity necessary to determine compliance with the WQS or LCA. Method 245.1 would be of little use for either compliance purposes or source reduction efforts. In addition, Method 245.1 data would be of no value in establishing a site-specific LCA, if necessary, due to the high quantification level.

18. **Comment:** The current proposal to impose the WQBEL without a variance on new discharges is extreme. (CF, CO, MMA)

Response: New discharges are not eligible for variances as stated in R 323.1103(1)(b), which is consistent with Title 40 of the Code of Federal Regulations (CFR), Part 132, Water Quality Guidance for the Great Lakes System (1995). This provision has been in Michigan regulations since 1997, and is not a new requirement of the proposed Strategy.

19. **Comment:** Further source controls may marginally reduce loadings to POTWs, but will not result in further decreases in effluent concentrations. Given the background concentration of mercury in normal domestic wastewater of 80 to 100 ng/l, it is unlikely that any near-term (5 to 10 years) source controls will result in any reduction in effluent concentrations. (CO, MML)

Response: The MDEQ acknowledges that for some facilities, the commenter may be correct. For this reason, the MDEQ chose to invoke the MDV in 2000, and proposes to continue use of an MDV for mercury.

20. **Comment:** Continued allowance for a permittee to demonstrate a facility-specific LCA is supported, but the LCA should be a least twice the mean. (CO, MML)

Response: Site-specific LCAs will be developed on a case-by-case basis, considering the quantity and variability of data, to provide an achievable discharge limitation.

21. **Comment:** Only “cost-effective” mercury minimization efforts for facilities with less than 10 ng/l in their effluent should be imposed. (CO, MML)

Response: The MDEQ intends that only cost-effective approaches be used for complying with mercury WQBELs. R 323.1201 states that in some effluents, low level pollutant concentrations may not be amenable to regulatory control through end-of-pipe treatment technology in a cost-effective manner. In order to achieve low WQBELs and associated regulatory requirements, the MDEQ is committed to the use of pollution prevention, source control, and other waste minimization programs. In addition, R 323.1213(d)(iii) states that only reasonable cost-effective measures will be implemented when sources of the toxic substances are discovered. The MDEQ encourages partnerships between municipalities with mercury limitations and other agencies to educate the public through mercury collections, etc., to provide cost-effective means for reducing mercury in the environment.

22. **Comment:** The MDEQ is encouraged to pursue the best science in updating the ambient water quality criteria for mercury. The EPA has revised the science behind the standard, but the standard itself has not been updated. The MDEQ should undertake a revision of the mercury WQS as required under Rule 57(7), MAC R 323.1057(7). (CO, MMA, D)

Response: The MDEQ will consider reevaluating the mercury WQS during the next triennial review of the WQS.

23. **Comment:** Wastewater treatment for mercury is cost prohibitive and would increase the cost disadvantage already imposed on industry in this state. The MDEQ has not presented an analysis of the technical feasibility and treatment options available to meet such a stringent limit. (GM, MMA, D)

Response: The Strategy does not require additional wastewater treatment for mercury. As indicated in Response #19, R 323.1201 recognizes that in some effluents, low levels may not be amenable to regulatory control through end-of-pipe treatment technology in a cost-effective manor. The MDEQ expects source control to be the most important mechanism for reducing mercury concentrations in effluents. Please also see Response #10.

24. **Comment:** The MDEQ is proposing the change in LCA outside the administrative rules process. (MMA)

Response: Authority to develop an LCA is granted in R 323.1103(6)(a). The current LCA of 30 ng/l is not in a rule but is described in the Strategy developed by the MDEQ in February 2000.

25. **Comment:** The MDEQ has not presented a case study or analysis of how a site-specific LCA is conducted. How does a facility demonstrate the need for a site-specific limit, how many data points are required, how frequent is the sampling, what statistical techniques and confidence limits are used to arrive at a reasonable potential determination. (MMA, D)

Response: The MDEQ will review requests for a site-specific LCA on a case-by-case basis. Since the LCA has been implemented as a rolling 12-month average, the sampling frequency and minimum data points required for requesting a site-specific LCA are 12 monthly data points covering a 1-year period as described in the Strategy.

26. **Comment:** The LCA is proposed as a 12-month rolling average limit. Anomalies would average out provided there are numerous samples. (CG)

Response: The MDEQ agrees.

27. **Comment:** There are concerns with decreased monitoring frequency. Suggest dynamic sampling frequency to address data anomalies. (CG)

Response: We assume the commenter is referring to the provision in the draft Strategy that allows reduced monitoring for facilities with a rolling 12-month average of less than 5 ng/l. Facilities are not restricted to the permit required monitoring frequency but may conduct additional monitoring at their discretion. With regards to data anomalies, the MDEQ will take into consideration anomalies due to matrix interference or plant upset in its compliance determinations if an explanation as to the anomaly is provided by the permittee.

28. **Comment:** Participation in multimedia water quality trading initiative, in lieu of mercury minimization plan requirements, is suggested. (CG)

Response: MDEQ's trading rules (R 323.3001 – 323.3027) do not authorize multimedia (e.g., water and air) trading.

29. **Comment:** The MDEQ is regulating mercury below background concentrations by proposing enforcement of WQS and LCA limits that exceed natural background concentrations. (D)

Response: Mercury concentrations in many waters of the state exceed the WQS of 1.3 ng/l, which is why the MDEQ chose to invoke the MDV. Most facilities are meeting the LCA of 10 ng/l.

30. **Comment:** Implement a testing period to determine where facilities stand with the new procedure, Method 1631 (revision E). The EPA does not require use of Method 1631. Consider alternate test procedures if the alternate method is better suited for site-specific factors. (D)

Response: Method 1631 has been in use for several years now and is reliable for measuring mercury at levels below the WQS of 1.3 ng/l. No other EPA approved methods for mercury are capable of this level of sensitivity; therefore, this method must be utilized for compliance sampling.

31. **Comment:** Implement full approval of Mercury Minimization Programs for POTWs prior to local limits being imposed on users. (D)

Response: Local limits, in addition to source reduction efforts through pollutant minimization plans, work in combination to reduce mercury discharge concentrations. An industrial user may choose to voluntarily reduce mercury discharge concentrations prior to implementation of either a pollutant minimization plan or local limits.

32. **Comment:** The MDEQ has not presented an impact analysis of the probable impacts of the Strategy on the total maximum daily load, stormwater, compliance, biosolids, and industrial pretreatment programs. Strict enforcement of stringent limits, along with increasing requirements to use 'ultraclean' analytical methods, will result in a substantial increase in perceived "impaired" water bodies, as well as a cascading practice of treatment facilities passing their inability to attain the LCA 'up the pipe.' (D)

Response: The advent of Method 1631 allows mercury to be measured in water below the WQS of 1.3 ng/l, and is used by the MDEQ for compliance and ambient water monitoring. Having accurate analytical information is a valuable aid in efforts to reduce and eliminate mercury sources.

33. **Comment:** The position of the MDEQ and the EPA that pollution prevention and waste minimization programs for mercury should be the first steps in restoring water quality before considering extraordinary treatment alternatives is supported. (GM, CF, MML, MMA)

Response: The MDEQ agrees.

Attachment 2

Laboratories Currently Providing Contract Analytical Services Using EPA Method 1631 for Mercury

This list was updated in November 2003. It does not represent a quote for analytical services. The laboratories are identified for informational purposes only. This may not be an exhaustive list and it does not constitute an endorsement.

The Academy of Natural Sciences
Estuarine Research Center
10545 Mackall Road
St. Leonard, MD 20685
Phone: 410-586-9700
Fax: 410-586-9705

AEP Pro Serv Analytical Chemistry Services
4001 Bixby Road
Groveport, OH
Contact: Lannie Rowe
Phone: 614-836-4214
Fax: 614-836-4168
E-mail: ldrowe@aep.com

Alberta Research Council
Analytical Chemistry
Highway 16A, 75 Street
P.O. Bag 4000
Vegreville, Alberta T9C 1T4 Canada
Phone: 780-632-8211
Contact: Xin Banj Feng
E-mail: bond@arc.ab.ca

Battelle/Marine Sciences Laboratory
1529 West Sequim Bay Road
Sequim, WA 98382
Contact: Brenda Lasorsa
Phone: 360-681-3650
E-mail: brenda.lasorsa@pnl.gov

Brooks Rand Ltd.
3950 Sixth Avenue NW
Seattle, WA 98107
Contact: Rebecca Wood
Phone: 206-632-6206
E-mail: rebecca@brooksrand.com
Web page: www.brooksrand.com

Cebam Analytical, Inc.
3927 Aurora Avenue North
Seattle, WA 98103
Contact: Steve Nazosf
Phone: 206-632-9097

CT & E Environmental Services*
1200 Conrad Industrial Drive
Ludington, MI 49431
Phone: 231-843-1877

En Chem, Inc.
1241 Bellevue Street
Green Bay, WI 54302
Contact: Mary Christie
Phone: 715-693-1953
E-mail: mchristie@enchem.com
Web page: www.enchem.com

Environmental Quality Labs
44075 Phoenix Drive
Sterling Heights, MI 48314
Phone: 586-731-1818
Fax: 586-731-2590
Contact: Tom Megna
E-mail: Tmegna@ameritech.net

Flett Research Ltd.
440 DeSalaberry Avenue
Winnipeg, Manitoba R2L OY7 Canada
Phone: 204-667-2505
Contact: Bob Flett
E-mail: flett@cc.umanitoba.ca

Frontier Geosciences
414 Pontius Avenue North
Seattle, WA 98109
Contacts: Nicholas Bloom, Eric Vondergeest
Phone: 206-622-6960
Web page: www.frontiergeosciences.com

Ginosko Laboratory, Inc.
17875 Cherokee Street
Harpster, OH 43323-9302
Contact: Bill Pfeiffer
Phone: 740-496-4571

Jones & Henry Labs, Inc.
2567 Tracy Road
Northwood, OH 43619
Contact: Dave Collins
Phone: 419-666-0411

KAR Laboratories, Inc.
4425 Manchester Road
Kalamazoo, MI 49001
Contact: Mike Jaeger
Phone: 616-381-9666, Ext. 218
Fax: 616-381-9698
E-mail: jaeger@karlabs.com

North Shore Analytical
5612 Miller Trunk Highway, Suite 1
Duluth, MN 55811
Contact: Linda Christensen/Christopher Gross
Phone: 218-729-4658
Fax: 218-729-4659
E-mail: info@northshoreanalytical.com

Northern Lake Service, Inc.
400 North Lake Avenue
Crandon, WI 54520-1298
Contact: Mal Gross, Sales/Marketing Director
Phone: 715-478-2777/1-800-278-1254
Fax: 715-478-3060
E-mail: norlake@northernlakeservice.com

Severn Trent Laboratories (STL) Michigan
6095 Jackson Road
P.O. Box 3726
Ann Arbor, MI 48103
Phone: 734-205-2530
Fax: 734-205-2533
E-mail: stl-inc.com

Skidaway Institute of Oceanography
10 Ocean Science Circle
Savannah, GA 31411
Contact: Herb Windom
Phone: 912-598-2490
E-mail: herb@skio.peachnet.edu

State of Michigan Laboratory**
3350 North Martin Luther King Boulevard
Lansing, MI 48906
Phone: 517-335-9800

Summit Environmental Technologies, Inc.
595 East Tallmadge Avenue
Akron, OH 44310
Contact: Mo Osman
Phone: 330-253-8211
E-mail: set3746@apk.net

Trace Analytical Laboratories, Inc.
2241 Black Creek Road
Muskegon, MI 49444-2673
Phone: 231-773-5998
Fax: 231-773-6537
E-mail: traceanalytical@mad.scientist.com

Trimatrix Laboratory, Inc.
5560 Corporate Exchange Court, SE
Grand Rapids, MI 49512
Phone: 616-846-9528

United States Geological Survey**
8505 Research Way
Middleton, WI 53562
Contact: David Krabbenhoft
Phone: 608-821-3843
E-mail: dpkrabbe@usgs.gov
*Fully operational in early 2004
**Available to government entities only

Wisconsin State Lab of Hygiene
465 Henry Hall
Madison, WI 53706-1578
Contact: Alan Cleary
Phone: 608-224-6279