

DATE: June 17, 2008

TO: Natural Resources Board

FROM: Matthew Frank, Secretary

SUBJECT: Background Memo Concerning Adoption of AM-32-05 Revising the Mercury Air Emission Reduction Requirements for Coal-fired Electric Generating Units in Chapter NR 446

Introduction

Why Act Now?

- Wisconsin studies estimate that about 6 percent of women of childbearing age have elevated levels of mercury and that approximately 437,000 men and women in the state are exposed to higher than safe levels of mercury. Health risks associated with elevated levels of mercury include: developmental effects such as lower performance on language, attention and memory tests and adverse effects in vision and motor functions. Recent research has also identified mercury effects on the immune system and a potential role of mercury exposure in elevating the risks of heart attacks in adults.
- Statewide Fish Consumption Advisory – Nearly all of Wisconsin's lakes, rivers and streams are under a general fish consumption advisory for mercury that recommends that people, particularly pregnant women and young children, limit the number of some fish species they eat because of elevated mercury levels.
- Fishing Economics – Besides the health risks caused by elevated levels of mercury in the environment, Wisconsin also is concerned about the important economic consequences associated with a potential reduction of recreation and tourism activities. Fishing contributes \$2.3 billion to the Wisconsin economy, including \$90 million in sales, fuel and income taxes and 26,000 jobs.

Taking steps to remove mercury from our environment is too important to delay!

- The proposed rule is innovative, offering power plants two pathways to mercury reduction and when fully implemented, will meet Governor Doyle's 2006 directive to protect public health and the environment by reducing mercury emissions from utilities by 90% and cutting mercury pollution by 2,634 pounds each year.
- There is no reason to wait further for EPA to act. Wisconsin citizens have a right to expect their leaders to take action now to protect their health, the health of their children, and to support Wisconsin's recreation-based economy.
- The proposed mercury rule is more protective of human health than federal rules which were recently rejected by the courts sending EPA back to the drawing board...a process that could add years to any significant reductions in mercury pollution.

The proposed rule achieves the joint objectives of protecting human health, maintaining a healthy environment and assuring electrical reliability.

The proposed rule:

- Creates certainty for utility investments in pollution abatement equipment and technology;
- Assures future electrical reliability for business and ratepayers at reasonable costs.
- Helps the state shape and potentially meet future federal mercury requirements.

Power plants can choose to achieve:

- A **90%** reduction in mercury emissions by **2015**; or
- Pursue the “multi-pollutant” approach whereby significant reductions in sulfur dioxide and nitrogen oxides are achieved **by 2015**, and a graduated reduction in mercury emissions of **70%** by 2015, **80%** by 2018, and **90%** by 2021. The multipollutant approach provides:
 - Annual health benefits associated with the reductions of NO_x and SO₂ include 30 avoided deaths and a savings of more than \$200 million in related health care costs in Wisconsin;
 - Ecological benefits by reducing lake acidity and thereby decreasing mercury uptake in fish;
 - Lowers utility compliance costs from the existing state mercury regulation from 0.18 cents per megawatt-hour to 0.14 cents per megawatt-hour.
 - Significant reductions of sulfur dioxide and nitrogen oxides that may help meet future federal requirements for ozone, haze and particulate matter.
 - Flexibility and public health benefits comparable to the regulatory approaches of Illinois, Michigan and Minnesota and more protective of public health than a mercury-only rule.

Why is this rule being proposed?

In December 2000, in response to a Citizen Petition, the Natural Resources Board authorized the development of the existing state mercury rule in the absence of a federal regulation addressing mercury emissions from coal-fired power plants. Preparation of the current rule was completed in 2003 after a lengthy stakeholder process and was promulgated on October 1, 2004. Since that time, mercury control technology has advanced, commercial application of mercury control technology has commenced and federal regulations for coal-fired power plants are still not established. Subsequent to Wisconsin’s mercury rule, other states developed regulations that require more mercury emission reductions than our requirements.

In a 2007 Citizen Petition to the Natural Resources Board, revisions to the current state mercury rule were requested that achieve a 90% mercury reduction and make our rule consistent with requirements in effect or under development in our neighboring states, Illinois, Michigan and Minnesota. These proposed revisions update requirements to reflect developments that have occurred since the current state mercury rule was established.

March 2007 Proposed Revisions

In March 2007, the Board authorized public hearings on proposed revisions to the existing mercury rule, Chapter NR 446, Control of Mercury Emissions, Wis. Adm. Code, that responded to three related issues: the adoption of requirements in the federal Clean Air Mercury Rule (CAMR), an August 2006 directive from Governor Doyle to achieve a 90% mercury reduction from the state’s coal-fired power plants, and a January 2007 Citizen Petition requesting revisions that would achieve greater reductions sooner from coal-fired electric generating units than the federal CAMR.

The March 2007 proposed revisions had the following principal components:

1. Adoption of the federal New Source Performance Standards (NSPS), an element of the CAMR, for mercury emission controls at coal-fired electric utility steam generating units that are constructed or reconstructed after January 30, 2004.
2. Mercury emission caps for all coal-fired electrical generating units greater than 25 megawatts as the state's method of meeting the mercury emission budget established for Wisconsin in the federal CAMR. The revisions did not include participating in EPA's national trading program as an option for achieving the federal CAMR emission budget.
3. A commitment to adopt rules by June 30, 2010, that would require all coal-fired electric generating units greater than 25 megawatts to reduce their mercury emissions by 90% by January 1, 2020.

On February 8, 2008, the Washington D.C. Court of Appeals unanimously vacated the federal CAMR as well as United States Environmental Protection Agency's (EPA) removal of coal-fired electric generating units from the list of source categories regulated under section 112, the hazardous air pollutant section of the Clean Air Act. This decision became final March 14, 2008. The federal court's decision made the March 2007 proposed revisions relating to the federal CAMR, including the NSPS, no longer necessary.

March 2008 Proposed Revisions

To achieve Governor Doyle's directive, respond to the January 2007 Citizen Petition and address the vacatur of the federal CAMR, the Department prepared the March 2008 proposed revisions which include requirements to address both issues and omit the federal CAMR related provisions. A public hearing on these revisions and a preliminary finding that a mercury emission standard for coal-fired electric generating units is necessary to provide adequate protection of public health and welfare from the mercury risk in Wisconsin was held on April 7, 2008 and written comments were accepted until May 5, 2008.

Rule Development Timeline

March 2007 - Natural Resources Board public hearing authorization on revisions to Chapter NR 446

May 2007 - Public Hearings at five locations around the state

July 2007 - Natural Resources Board Mercury Seminar in Stevens Point

February 8, 2008 - Federal Clean Air Mercury Rule vacated in federal court

March 2008 - Public hearing announced on a revised rule and preliminary public health and welfare finding developed pursuant to s. 285.27(2)(b) Wis. Stats.

April 7, 2008 - Public hearing held in Madison

May 5, 2005 - Public comment period ends

Public Health and Welfare Finding

A public health and welfare finding was prepared pursuant to s. 285.27(2)(b), Wis. Stats. in support of the March 2008 proposed revisions to Chapter NR 446, Control of Mercury Emissions, Wis. Adm. Code. Under this statutory requirement written documentation in support of a finding is required that addresses the following:

1. Identify sources of mercury emissions and populations potentially at risk;
2. Assess whether exposures to mercury are above a level of concern;
3. Evaluate options to control risks from mercury emissions exposures;
4. Compare mercury emission standards proposed with those from neighboring states.

The public health and welfare finding concludes that a state mercury standard for coal-fired power plants is appropriate based on scientific research and technical analyses of mercury emissions sources, exposures, health effects, control options and comparisons of the proposed revisions to mercury standards in neighboring states. An information agenda item on the mercury public health and welfare finding will precede the request for adoption of the March 2008 proposed revisions. The finding, which includes the preliminary finding and the addendum responding to public hearing comments, is attached to the Green Sheet for the information agenda item.

Summary of the rule

Under the proposed revisions, the state's large coal-fired electric generating units, those with a nameplate capacity of 150 Megawatts (MW) and greater, must achieve a 90% mercury emission reduction through one of two compliance paths. Small coal-fired electric generating units, those with a nameplate capacity greater than 25 MW but less than 150 MW, must reduce their mercury emissions to a level defined as Best Available Control Technology (BACT).

2010 Major Utility 40% Mercury Reduction

Under existing provisions of Chapter NR 446, the state's major electric utilities including Dairyland Power Cooperative, We Energies, Wisconsin Power & Light, and Wisconsin Public Service Corporation, must reduce mercury emissions 40% by 2010 from a baseline established in 2007. This reduction requirement is retained in the proposed revisions. This requirement affects 36 electrical generating units operated by these major electric utilities.

The requirements in the proposed revisions will affect additional electric generating units and four additional state electric utilities including Madison Gas & Electric Company, Manitowoc Public Utilities, Mid-American Energy Company and Northern States Power Wisconsin would be affected.

Large Electric Generating Units

By January 1, 2015 existing large electric generating units must achieve a 90% mercury reduction or limit the concentration of mercury emissions to 0.0080 pounds of mercury per gigawatt-hour. Compliance must be demonstrated annually on a unit-by-unit basis. However, large units under common ownership or control can average to meet the mercury emission standard.

Large Electric Generating Unit Multipollutant Alternative

A multipollutant alternative for large electric generating units allows for a delay in attaining the 90% mercury emission reduction standard if the large electric generating unit reduces nitrogen oxides and sulfur dioxide emissions beyond those currently required by federal and state regulations. Owners and operators must designate which large units will follow the multipollutant option by December 31, 2010.

An additional six years to achieve a 90% mercury emission reduction standard is provided to large electric generating units choosing the multipollutant reduction approach. In order to receive the delayed attainment for mercury reductions, affected electric generating units must achieve a nitrogen oxides (NO_x) emission limit of 0.07 pounds of NO_x per million BTU and a sulfur dioxide (SO₂) emission limit of 0.10 pounds of SO₂ per million BTU by January 1, 2015. Compliance must be demonstrated annually on a unit-by-unit basis. However, large units under common ownership or control can average to meet the NO_x, SO₂, or mercury emission limit.

An interim mercury reduction goal is established to achieve a 70% mercury emission reduction or limiting the concentration of mercury emissions to 0.0190 pounds of mercury per gigawatt-hour by January 1, 2015. Beginning January 1, 2018, an 80% mercury reduction or limiting the concentration of mercury emissions to 0.0130 pounds of mercury per gigawatt-hour must be achieved. By January 1, 2021 a 90% mercury reduction or limiting the concentration of mercury emissions to 0.0080 pounds of mercury per gigawatt-hour is required. The percent reduction standard is measured from the mercury content in the coal combusted.

If no large electric generating units elected the multipollutant option, by 2015, total mercury emissions would be approximately 536 pounds per year. If all large electric generating units elected to follow the multipollutant option, mercury emissions would still be reduced to 536 pounds however, not until 2021. Substantial reductions in sulfur dioxide and nitrogen oxide emissions would, however, be achieved by 2015 under the multipollutant option. These reductions of pollutants other than mercury have significant health and welfare benefits to Wisconsin and address other critical air quality concerns including fine particles, haze, and ground level ozone.

Early Mercury Emission Reduction Credits

A large coal-fired electric generating unit may request certification of early mercury emission reductions. These early emission reduction credits may be used to meet only a portion of the annual allowable mercury emissions for the 70%, 80% and 90% emission limitations in the multipollutant compliance pathway.

Early emissions that qualify are:

1. Reductions beyond 40% of the baseline requirement in 2010-2014 for major electric utilities; and
2. Electric generating units that select the alternative multipollutant compliance pathway that achieve reductions beyond the 70% reduction requirement in the years 2015 to 2017 and the 80% reduction requirement in the years 2018 to 2020.

Small Electric Generating Units

By January 1, 2015 small coal-fired electric generating units must achieve a level of mercury emissions determined by the Department to be BACT. BACT includes economic and environmental considerations. Owners or operators would propose BACT for small units by June 30, 2011 and the Department must respond within six months of a complete proposal. Owners or operators also have the option to include small units in the large unit mercury or alternative multipollutant compliance pathway.

New Electric Generating Units

After the effective date of the rule, new or modified coal-fired electric generating units must meet the requirements in section 112 of the Clean Air Act. However, in no case shall the permitted mercury reduction for these units be less than 90% removal of mercury from coal combusted.

Compliance Flexibility

Owners and operators are provided several options to achieve compliance with the mercury and alternative multipollutant emission limitations proposed. Below are the compliance flexibilities that have been included in the proposed revisions:

1. Instead of demonstrating compliance on a unit-by-unit basis, emission averaging among all large electric generating units under an owner or operator's control is allowed. Under this compliance approach the overall reduction requirements are still achieved, however, some units would reduce more than the emission limitation requires while some units would reduce less. Emission averaging is limited to those units within a compliance pathway, either the mercury only or multipollutant alternative.
2. Large electric generating units can either demonstrate compliance with the mercury removal efficiency requirement (70%, 80% or 90%) or opt to meet an equivalent mercury stack emission concentration in pounds per gigawatt hour (e.g. 0.0080 lbs/gigawatt-hour for 90%). The alternative allows compliance to be demonstrated without an ongoing fuel sampling and analysis program, an approach that favors the use of mercury continuous emission monitors. Mercury continuous emission monitors are the Department's preferred compliance determination method.
3. For small electric generating units, owners and operators can choose to have these units follow a large electric generating unit compliance pathway in lieu of installing Best Available Control Technology.
4. A compliance extension, not to exceed two years from 2015, for large electric generating units to meet the mercury only or the multipollutant alternative may be granted if a demonstration that electric reliability could be disrupted is provided. The Department would consult with the Public Service Commission on any electric reliability compliance extension request.
5. Approved early mercury emission reduction credits can be used to meet a margin of the allowable mercury emission limitations for electric generating units in the multipollutant compliance pathway.

Evaluation Reports

Two evaluation reports for the Board would be required. By August 31, 2013 staff will provide a report on the achievability of mercury reduction requirements in the proposal based on a review of control technology developments and include recommendations for revisions or other actions that may be appropriate based on the evaluation. A second report is triggered by either the proposal of a federal regulation or enactment of federal law that includes mercury reduction requirements for coal-fired electric generating units. This is a comparative evaluation that may include recommendations for revisions or other actions staff deem appropriate.

How does the proposal affect existing policy?

The proposed revisions are consistent with existing DNR policy. In the absence of a federal standard promulgated under section 112 of the Clean Air Act, the Department may promulgate a standard if it finds that a standard is needed to provide adequate protection of public health and welfare. Department staff have made a preliminary finding that a standard is needed and revisions to the mercury emission requirements affecting coal-fired electric generating units in the current state mercury rule, Chapter NR 446, Wis. Adm. Code, are being proposed.

Hearing synopsis and public comment summary

A summary of public comments on the March 2007 proposed revisions to Chapter NR 446 are included in *Attachment A - Public Comment Summary - March 2007 Proposed Revisions to Chapter NR 446, Control of Mercury Emissions*. Five public hearings were held in May 2007 and numerous comments were received.

A public hearing was held on the March 2008 proposed revision in Madison on April 7, 2008. Written comments were accepted until May 5, 2008. There were eleven hearing appearances. The majority of those who commented at the public hearing urged the Department to require mercury emission reductions sooner. Several stakeholder meetings occurred after the end of the public comment period for the purpose of clarifying concerns and understanding recommended changes to the proposed revisions.

Changes made to AM-32-05

The March 2008 proposed revisions were modified to address public comments. A summary of public comments received and staff response to those comments is included in *Attachment B - Response to Public Comment - March 2008 Proposed Revisions to Chapter NR 446, Control of Mercury Emissions*. Attachment B provides rationale for the revisions made to the March 2008 proposal. Below is a summary of the changes made:

- A definition for Best Available Control Technology (BACT) has been added.
- A note has been added identifying the individual electric generating units required to establish a mercury baseline under the current state mercury rule. These are the units affected by the 2010 mercury emission limitation for major utilities requiring a 40% reduction from this mercury baseline.
- Lowest Achievable Emission Rate will not be required for new coal-fired electrical generating units. Instead the provisions of section 112 of the Clean Air Act for new and modified sources will determine mercury emission limitations for new units with the exception that in no case shall the emission limitation for a new or modified unit require less than a 90% mercury emission reduction.
- The procedure for certifying early emission reduction credits has been simplified.
- The electric reliability compliance extension has been expanded to allow electric generating units following either the mercury only compliance path or the alternative multipollutant compliance path an opportunity to seek additional time to meet mercury, sulfur dioxide or nitrogen oxides emission limitations.
- Owners or operators are required to designate the compliance approach for large electric generating units, either the mercury only or multipollutant alternative. This election of the compliance approach must be made by December 31, 2010. A preliminary BACT determination for small electric generating units is required from owners and operators by June 30, 2011. In the public hearing

proposal these requirements were due 24 months and 30 months, respectively, after the effective date of the revisions.

- The report evaluating the achievability of mercury reduction requirements under the multipollutant option has been expanded to include an evaluation of all proposed mercury reduction requirements from 2015 through 2021.
- A second evaluation report has been added. In this report, Department staff will report to the Board within 6 months of enactment of a federal law or promulgation of a federal regulation that contains mercury reduction requirements for sources affected by the proposed revisions. This report must provide a comparison of requirements and may include recommendations to the Board for rule revisions or other actions.
- The use of early mercury emission reduction credits is increased from 5% to 10% of annual allowable emissions.
- A variance from requirements due to technological and economic infeasibility for existing units has been added.
- Under the multipollutant compliance option for large electric generating units the SO₂ emission limitation is 0.10 lbs/mmBtu. A provision has been added that also allows compliance with this limitation can be achieved by demonstrating a 90% control efficiency of SO₂ emissions.
- The rule requires periodic control efficiency testing for demonstrating compliance with the 2010 to 2014 mercury reduction requirements. Additional EPA approved stack testing methods have been added as acceptable testing methods to meet this requirement.
- A methodology has been added that allows electric generating units vented to a common stack to demonstrate compliance that are affected by different emission limitations for the same air pollutant.
- An alternative to the requirement to measure fuel mercury content on a year-to-year basis has been added. This alternative allows the establishment of a fixed baseline for a 5-year period.

Information on environmental analysis

An environmental analysis of the impact of the proposed rule revisions is not needed because these changes are considered to be a Type III action under s. NR 150.03(3), Wis. Adm. Code. A Type III action is one that normally does not have the potential to cause significant environmental effects, normally does not significantly affect energy usage and normally does not involve unresolved conflicts in the use of available resources.

Final regulatory flexibility analysis

The requirements in the proposed revisions do not impose regulatory requirements on small businesses in Wisconsin. The electric generating units subject to the emission reduction requirements are not small businesses. However, any costs which the electric utility industry incurs to meet the requirements will likely be passed on to their customers, which will include small businesses.

The cost of the requirements proposed have been estimated by evaluating the type of control equipment installations that may be needed at individual electric generating units. The average cost across all of the affected electric generating units is expected to range from 0.06 to 0.14 cents per kilowatt hour. The costs of sorbent injection for small electric generating units and the mercury portion of multipollutant control costs for large electric generating units will be at the lower end of this range. Multipollutant approaches are preferred because environmental and public health benefits can be achieved at lower costs. The mercury portion of multipollutant control costs could be as low as 0.04 to 0.1 cents per kilowatt hour,

while achieving mercury removal efficiencies in the range of 80% to 95%. For an average household, using 8,900 kilowatt hours per year, this range of electricity costs is \$ 5 to \$ 12 annually.