This represents a draft clean copy of ch. NR 446 as it would read based on the proposed changes in Natural Resources Board Order AM-32-05, as provided for public hearing on Monday, April 7, 2008. Refer to the Board Order to see what parts of the chapter are repealed, renumbered, amended and created.

Chapter NR 446

CONTROL OF MERCURY EMISSIONS

Subchapter I — General Provisions

NR 446.01 Applicability; purpose. (1) APPLICABILITY. This chapter applies to all air contaminant sources which may emit mercury and to their owners and operators.

(2) PURPOSE. This chapter is adopted under ss. 285.11, 285.13,285.17 and 285.27, Stats., to establish emission limitations, stack sampling procedures and emission monitoring requirements for mercury emissions from air contaminant sources in order to protect air quality and reduce atmospheric mercury deposition.

Note: Subchapter IV of this chapter is based on the federal regulations contained in 40 CFR part 61, Subpart E, created October 14, 1975, as last revised October 17, 2000.

NR 446.02 Definitions. The definitions contained in ch. NR 400 apply to the terms used in this chapter. In addition, the following definitions apply to the terms used in this chapter:

(1) "Allowable emissions" means the annual mercury emissions of a stationary source, calculated using the maximum rated capacity of the source, and by accounting for enforceable limits which restrict the operating rate or hours of operation or both.

(1c) "Baseline mercury emissions" means the calculated level of annual mercury emissions from a major utility as determined under s. NR 446.07.

(1g) "Cell room" means a structure housing one or more mercury chlor−alkali cells.

(1n) "Certified emission reduction" means a reduction of mercury emissions that has been certified by the department and made enforceable through a construction permit, operation permit or other appropriate means.

(1r) "Commission" means the public service commission.

(2) "Condenser stack gases" mean the gaseous effluent evolved from the stack of processes utilizing heat to extract mercury metal from mercury ore.

(3) "Denuder" means a horizontal or vertical container which is part of a mercury chlor−alkali cell and in which water and alkali metal amalgam are converted to alkali metal hydroxide, mercury, and hydrogen gas in a short−circuited, electrolytic reaction.

(4) "End box" means one or more containers located on one or both ends of a mercury chlor−alkali electrolyzer which serves as a connection between the electrolyzer and denuder for rich and stripped amalgam.

(5) "End box ventilation system" means a ventilation system which collects mercury emissions from the end boxes, the mercury pump sumps, and their water collection systems.

(6) "Hydrogen gas stream" means a hydrogen stream formed in the chlor−alkali cell denuder.

(6e) "Major stationary source" means a stationary source whose mercury emissions are 10 pounds per year or greater.

(6m) "Major utility" means a Class A utility, as defined under s. 199.03 (4), Stats., that generates electricity or an electrical cooperative association organized under ch. 185, Stats., whose mercury emissions from all stationary sources under the common

ownership and control of the utility or the association are 100 pounds per year or greater.

(6s) "Mercury" has the meaning given in s. NR 445.02 (9).

(7) "Mercury chlor−alkali cell" means a device which is basically composed of an electrolyzer section and a denuder or decomposer section and utilizes mercury to produce chlorine gas, hydrogen gas, and alkali metal hydroxide.

(8) "Mercury chlor−alkali electrolyzer" means an electrolytic device which is part of a mercury chlor−alkali cell and utilizes a flowing mercury cathode to produce chlorine gas and alkali metal amalgam.

(9) "Mercury ore" means a mineral mined specifically for its mercury content.

(10) "Mercury ore processing facility" means a facility processing mercury ore to obtain mercury.

(10m) "Method X", where "X" is a number or a number followed by a letter, means the specified method contained in Appendix B of 40 CFR part 61, incorporated by reference in s. NR 484.04 (23).

(11) "Sludge" means sludge produced by a treatment plant that processes municipal or industrial wastewater.

(12) "Sludge dryer" means a device used to reduce the moisture content of sludge by heating to temperatures above 65ºC (ca. 150ºF) directly with combustion gases.

NR 446.03 Mercury emission limits. (1) MERCURY AMBIENT CONCENTRATION LIMIT. No person may cause, allow or permit emissions of mercury in such quantity and duration as to cause the ambient air concentration to exceed 1 $\mu g/m^3$, averaged over a 30−day period.

(2) MERCURY EMISSION LIMITS FOR NEW OR MODIFIED SOURCES. (a) No person may commence construction or modification of a stationary source that results in an increase in annual allowable emissions of mercury of 10 pounds or more from the new or modified source unless the person has obtained a permit under ch. NR 406. The department may not issue a permit under ch. NR 406 for the source unless the department finds that emissions of mercury will be controlled to a level which is best available control technology.

(b) New or modified stationary sources that are subject to an emission limit for mercury required under section 111 or 112 of the Act (42 USC 7411 and 7412 respectively) or s. NR 446.11 are exempt from the requirements of this section.

(c) Except as provided in par. (b), this section applies to all new or modified sources for which an air permit application was submitted or should have been submitted to the department under par. (a) on or after the first day of the calendar month following October 1, 2004.

NR 446.04 Procedures for determining annual mercury emissions. Except as provided in subchs. II, III and IV, beginning on January 1, 2005, the owner or operator of a major stationary source shall calculate annual mercury emissions using the procedures and methods in this section.

(1) STATIONARY SOURCE COMBUSTION UNIT. (a) The owner or operator of a combustion unit at the source which is not subject to subchs. II, III or IV shall calculate

annual mercury emissions using the procedures of this subsection for each emissions unit and shall provide all associated data to the department.

(b) The owner or operator shall determine the mass mercury content of each fuel by multiplying the mercury content of the fuel times the amount of the fuel consumed. The mercury content of the fuel shall be determined either through testing according to the procedures in ASTM D3684−01, incorporated by reference in s. NR 484.10 (47m), or an equivalent method approved by the department, or from published data which lists the mercury content of the specific fuel.

(c)1. Except as provided in subd. 2., the owner or operator shall calculate the removal efficiency of mercury by air pollution control equipment for each fuel used, except natural gas and fuel oil, based on source performance tests on the equipment conducted according to the following methods and procedures:

a. The source performance tests shall be conducted according to Method 101A in 40 CFR part 61, Appendix B, incorporated by reference in s. NR 484.04(23), or Method 29 in 40 CFR part 60, Appendix A, incorporated by reference in s. NR 484.04(20m).

b. A sample of the fuel burned during the test shall be analyzed for mercury content, using ASTM D3684-01, incorporated by reference in s. NR 484.10 (47m), or an equivalent method approved by the department. During each of the 3 runs of the performance test, a separate sample of the fuel being burned during the run shall be collected and analyzed.

c. During the source performance testing, the consumption of fuel shall be monitored and recorded.

2. Instead of conducting a source performance test under subd. 1., information derived from performance testing of other combustion units which are similar in terms of the type of combustion unit, particulate control equipment, fuel characteristics, and operating parameters may be used if the performance test was conducted according to the procedures in subd. 1.

(d) The owner or operator shall determine the annual mercury emissions by subtracting the mass mercury removed by air pollution control equipment from the mass mercury in the fuel.

(e) Nothing in this section shall prohibit the department from requiring other methods of determining annual mercury emissions.

(f) The owner or operator of a combustion source subject to this subsection may request that the department approve alternative methods for determining annual mercury emissions

(2) STATIONARY SOURCE PROCESS UNIT. The owner or operator of a process unit at the source which is not subject to subch. II, III or IV shall calculate and report annual mercury emissions from the process unit using the procedures and methods of this subsection and shall provide all associated data to the department. The calculations shall apply a mass balance approach, emission test data, or both, as follows:

(a) A separate mass balance shall be used to calculate the mercury contained in each applicable process stream by accounting for:

1. All process streams including: process raw materials, products and by−products; and pollution control equipment and control by−products.

2. The mercury concentration and throughput rate for each process stream.

3. The annual mass mercury content input and output of each process stream.

(b) Mercury emission test data and emission factors obtained during source performance testing for any applicable process stream may also be used.

(c) The owner or operator of the process units subject to this subsection may request that the department approve alternative methods for determining annual mercury emissions.

Subchapter II — Control of Mercury Emissions from Major Utilities

NR 466.05 Mercury emission limits for major utilities. Beginning January 1, 2010, no owner or operator of a major utility may cause, allow or permit mercury emissions that exceed 60% of the mercury emissions baseline determined by the department under s. NR 446.06.

NR 446.06 Baseline mercury emissions for major utilities. This section applies to the determination of baseline mercury emissions for major utilities.

(1) No later than October 1, 2005, the owner or operator of a major utility shall submit a report to the department that includes information to calculate the baseline mercury emissions of each combustion unit owned or operated by the major utility for calendar years 2002, 2003 and 2004, using the procedures in s. NR 446.07.

(2) After reviewing the report provided in sub. (1), the department shall determine the baseline mercury emissions for each combustion unit of the major utility. The baseline mercury emissions shall be the arithmetic average of the baseline emissions for 2002, 2003 and 2004, unless the department approves an alternative baseline requested by the major utility.

(3) In the report required under sub. (1), an owner or operator may request that the department determine an alternative baseline if the 3 years are not representative of the source's normal operations and maintenance schedule. This request shall include sufficient information to demonstrate that an alternative baseline is appropriate, a proposed alternative baseline, and information sufficient to document how the proposed alternative baseline was determined.

(4) No later than January 1, 2007, the department shall provide written notification to each owner or operator who submitted a report under sub. (1) of the department's determination of the baseline mercury emissions for each combustion unit of the major utility.

NR 446.07 Procedures for determining baseline mercury emissions for major utilities. The owner or operator of a major utility shall calculate baseline mercury emissions of the combustion units of the major utility using the procedures of this section for each emissions unit and provide all associated data to the department in the report required under s. NR 446.06 (1).

(1) No later than the first day of the 2nd month beginning after October 1, 2004, and continuing for a calendar 12 month period, a representative sample shall be collected weekly for each solid fossil fuel used in the emissions unit in that week. Each weekly sample of a fuel collected under this subsection shall be composited into a monthly sample that shall be analyzed for mercury content using ASTM D3684−01,

incorporated by reference in s. NR 484.10 (47m), or an equivalent method approved by the department.

(2) The mercury content of each non−solid fossil fuel shall be determined either through testing according to the procedures in ASTM D3684−01, incorporated by reference in s. NR 484.10 (47m), or an equivalent method approved by the department or from published data which lists the mercury content of the fuel.

(3) The major utility shall determine the monthly consumption of each fuel in million British thermal units (mmBtu), using methods and procedures specified in Appendices A, B, C and F of 40 CFR part 75, incorporated by reference in s. NR 484.04 (26m) (a) to (d). The major utility may apportion the fuel mmBtu to individual fuels for which the mercury content is determined under sub. (1) or (2), using consumption and delivery records for the fuels.

(4) The information gathered in subs. (1) and (2) shall be multiplied by the corresponding fuel consumption rates determined under sub. (3) to determine the total annual mercury contained in each fuel.

(5) The mercury content for each fuel, on a mmBtu-basis, shall be computed by dividing the results of sub. (4) by the amount of each fuel burned, in mmBtus, during the 12 month sampling period.

(6) The mercury emissions for 2002, 2003 and the 12 months identified in sub. (1) shall be calculated by multiplying the results of sub. (5) times the annual fuel consumption for each of those years.

(7) The baseline mercury emissions shall be the 3−year arithmetic average of the mercury emissions determined under subs. (4) and (6) for 2002, 2003 and the 12 months identified in sub. (1).

(8) The major utility shall record and report the baseline determination data and calculations for each combustion unit, including the type or types of fuel, the monthly consumption of each fuel in mmBtus, and the mercury concentration in each fuel.

(9) The owner or operator of a major utility may request that alternative procedures for determining baseline mercury emissions be approved by the department.

NR 446.08 Annual mercury emissions determination and reporting for major utilities. (1) The owner or operator of an emissions unit subject to the requirements of s. NR 446.05 shall determine and report to the department by March 1, annual mercury emissions for each emissions unit, beginning with calendar year 2010 emissions and ending with calendar year 2014 emissions, using the following formula:

$$\text{Annual Mercury Emissions} = \text{Fuel use} \times \text{Mercury Content of Fuel} \times \text{Reducion of Mercury Prior to Release to the Atmospere}$$

where:

(a) Fuel use is the amount of fuel combusted in the combustion unit, as measured by the procedures specified in Appendices A, B, C and F of 40 CFR part 75, incorporated by reference in s. NR 484.04 (26m) (a) to (d). The total amount of the fuel combusted in mmBtus may be apportioned to individual fuels, using consumption and delivery records for the fuels.

(b) Mercury content of the fuel is determined according to ASTM D3684−01, incorporated by reference in s. NR 484.10 (47m), or an equivalent method approved by the department, following the procedures in s. NR 446.07 (1), (2) and (3).

(c) Reduction of mercury is calculated through source performance tests which follow the procedures in this paragraph. A value of one is assumed for natural gas fired combustion units that are exempt from performance testing under sub. (6).

1. The source performance test shall be conducted according to EPA Method 101A in Appendix B of 40 CFR part 61, incorporated by reference in s. NR 484.04 (23), or EPA Method 29 in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 484.04 (20m).

2. A sample of the fuel burned during the test shall be analyzed for mercury content, using ASTM D3684−01, incorporated by reference in s. NR 484.10 (47m), or an equivalent method approved by the department. During each of the 3 runs of the performance test, a separate sample of the fuel being burned during the run shall be collected and analyzed.

3. During the source performance testing, the consumption of fuel shall be monitored and recorded.

4. The major utility shall submit to the department the information obtained in subds. 1. to 3. and the calculations for the percent removal efficiency of mercury.

(d) The department may require that more than one source performance test be conducted if a single test is determined not to be representative of conditions at the combustion unit.

(2) Nothing in this section shall prohibit the department from requiring major utilities to use other methods of determining annual mercury emissions.

(3) The owner or operator of a major utility may request that alternative methods for determining annual mercury emissions be approved by the department.

(4) All units subject to s. NR 446.05, with an electrical generating capacity equal to or greater than 200 MW, and all units that undergo process changes or change control equipment after January 1, 2006, shall have source performance tests conducted during calendar years 2010 and 2013.

(5) The owner or operator of a major utility shall use the results of the most recently conducted source performance test for calculating the reduction efficiency under sub. (1) (c).

(6) Combustion units subject to s. NR 446.06 that exclusively combust natural gas are not subject to the source performance testing requirements of this section.

Subchapter III – Control of Mercury Emissions From Coal-fired Electric Generating Units

NR 446.09 Applicability. (1) Except for those units that are excluded under sub. (2), this subchapter applies to the owner or operator of a coal-fired EGU, serving at any time, since the startup of the unit's combustion chamber, a generator with nameplate capacity of more than 25 MWe producing electricity for sale.

(2) A cogeneration unit which otherwise satisfies the applicability statement of this sub. (1) is exempt from this subchapter if the cogeneration unit, during the 12-month period starting on the date the unit first produces electricity and continues to qualify as a cogeneration unit, and which does not serve at any time, since the later of November 15, 1990 or the start-up of the cogeneration unit's combustion chamber, a generator with a nameplate capacity of more than 25 MWe supplying in any calendar year more than one-third of the cogeneration unit's potential electric output capacity or 219,000 MWh,

whichever is greater, to any utility power distribution system for sale.

(3) If a coal-fired EGU qualifies as a cogeneration unit during the 12-month period starting on the date the unit first produces electricity but subsequently no longer qualifies as a cogeneration unit, the coal-fired EGU shall become subject to this subchapter starting on the day on which the coal-fired EGU first no longer qualifies as a cogeneration unit.

NR 446.10 Definitions. The definitions contained in ch. NR 400 and in s. NR 446.02 apply to the terms used in this subchapter. In addition, the following definitions apply to the terms used in this subchapter:

(1) "Boiler" means an enclosed combustion device use to produce heat and to transfer heat to recirculating water, steam or other medium.

(2) "Coal-fired" means combusting any amount of coal or coal-derived fuel, alone or in combination with any amount of any other fuel.

(3) "Cogeneration" means an EGU that simultaneously produces both electrical or mechanical, and useful thermal energy from the same primary energy source.

(4) "Combustion turbine" means an enclosed device comprising a compressor, a combustor and a turbine and in which the flue gas resulting from the combustion of fuel in the combustor passes through the turbine, rotating the turbine. If the enclosed device is combined cycle, the combustion turbine includes any associated duct burner, heat recovery steam generator and steam turbine.

(5) "Electric generating unit" or "EGU" means a boiler or a combustion turbine serving a generator that produces electricity.

(6) "Gross electrical output" means electricity made available for use, including any electricity used in the power production process. A power production process includes any on-site processing or treatment of fuel combusted at the EGU and any on-site emission controls.

(7) "Large coal-fired EGU" means an electric generating unit serving a generator with nameplate capacity 150 megawatts and greater.

(8) "Process energy efficiency" means, with regard to cogeneration, the percentage of thermal energy used in the process excluding any energy contained in condensate return, makeup water, and system losses divided by the process internal energy input.

(9) "Process thermal energy input" means, with regard to cogeneration, the total amount of thermal energy made available to a process for use other than for generating electricity.

(10) "Small coal-fired EGU" means an electric generating unit serving a generator with a nameplate capacity greater than 25 megawatts but less than 150 megawatts.

(11) "Useful thermal energy" means , with regard to cogeneration, thermal energy that is any of the following:

(a) Made available to an industrial or commercial process, not a power production process, excluding any heat contained in condensate return or makeup water.

(b) Used in a heating application, such as space heating or hot water heating.

(c) Used in space cooling application, such as thermal energy used by an absorption chiller.

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NR 446.11 Mercury emission limits for new coal-fired electrical generating units. (1) After the effective date of this section . . . [LRB insert date], no person may commence construction of a new coal-fired EGU unless the department finds that emissions of mercury will be controlled to a level that is the lowest achievable emission rate.

(2) Notwithstanding sub. (1), a 90% mercury emission reduction as measured from the mercury content of fuel combusted is the minimum allowed mercury emission limitation.

NR 446.12 Mercury emission limits for small coal-fired electric generating units. (1) Beginning January 1, 2015, an owner or operator of a small coal-fired EGU shall limit mercury emissions to a level that is determined by the department to be the best available control technology.

(2) Notwithstanding sub. (1) an owner or operator may elect to have a small coal-fired EGU comply with the mercury emission limits in s. NR 446.13 or 446.14 in accordance with the provisions in s. NR 446.17(2)(b).

NR 446.13 Mercury emission limits for large coal-fired electric generating units. (1) Beginning January 1, 2015, an owner or operator of a large or a small coal-fired EGU designated by the department to meet the emission limitation in this subsection under s. NR 446.17(2)(b) shall achieve a minimum of 90% mercury emission reduction as measured from the mercury content of fuel combusted or limit mercury emissions annually to 0.0080 pounds per gigawatt-hour (lbs/GWh) of electricity produced.

(2) An owner or operator may achieve compliance with sub. (1) by either of the following methods:

(a) *Unit-by-unit compliance.* Demonstrating that the mercury emissions from each coal-fired EGU meet either of the mercury emission limits in sub. (1) using the measurement methods and calculation procedures in s. NR 446.18.

(b) *Unit averaging.* Demonstrating that the sum of the mercury emissions from all coal-fired EGUs subject to the mercury emission limits in sub. (1) does not exceed the sum of the allowable mercury emissions for the coal-fired EGUs using the measurement methods and calculation procedures in s. NR 446.18.

NR 446.14 Multipollutant reduction alternative for coal-fired electrical generating units. (1) An owner or operator of a large or small coal-fired EGU may elect to meet the emission limitations in this section instead of the emission limitations of s. NR 446.12 or 446.13 in accordance with the provisions of s. NR 446.17(2). The following annual emission limitations for NO_x, SO_2 and mercury apply to each unit for which the owner or operator makes an election under this section:

(a) For NO_x, beginning January 1, 2015, 0.07 pounds per mmBtu of heat input.

(b) For SO_2, beginning January 1, 2015, 0.10 pounds per mmBtu of heat input.

(c) For mercury emissions, all of the following:

1. Beginning January 1, 2015 and to December 31, 2017, a 70% mercury emission reduction as measured from the mercury content of fuel combusted or 0.0190 pounds per gigawatt-hour (lbs/GWh).

2. Beginning January 1, 2018 and to December 31, 2020, an 80% mercury emission reduction as measured from the mercury content of fuel combusted or 0.0130 pounds per gigawatt-hour (lbs/GWh).

3. Beginning January 1, 2021, a 90% mercury emission reduction as measured from the mercury content of fuel combusted or 0.0080 pounds per gigawatt-hour (lbs/GWh).

(2) An owner or operator may achieve compliance with sub. (1) by either of the following methods:

(a) *Unit-by-unit compliance.* Demonstrating that the mercury, NO_x and SO_2 emissions from each coal-fired EGU meet the applicable emission limitation in sub. (1) using the measurement methods and calculation procedures in s. NR 446.18.

(b) *Unit averaging.* Demonstrating that for each pollutant, the sum of the emissions from all coal-fired EGUs subject to the emission limits in sub. (1) do not exceed the sum of the allowable mercury, NO_x and SO_2 emissions for the coal-fired EGUs using the measurement methods and calculation procedures in s. NR 446.18

NR 446.15 Early mercury emission reduction credits. (1) An owner or operator of a coal-fired EGU that is subject to this subchapter may request that the department certify excess mercury emission reductions as early emission reduction credits.

(2) The department may only approve emission reductions that meet either of the following criteria as early emission reduction credits:

(a) Emission reductions achieved by major utilities in calendar years 2010 to 2014 in excess of the emission limitation in s. NR 446.05.

(b) Emission reductions achieved in calendar years 2015 to 2020 from coal-fired EGUs subject to s. NR 446.14 in excess of the emission limitation in s. NR 446.14(1)(c)1. or 2.

(3) Beginning March 1, 2011, and on or before March 1, 2021, owners and operators may request the department to certify excess mercury reductions from the previous calendar year as early emission reduction credits. The department shall provide written notice within 180 days of the receipt of a request approving or denying the early emission reduction credit request.

(4) The department shall certify the emission reductions, in terms of pounds of mercury emissions reduced, as early emission reduction credits if the owner or operator demonstrates to the department that the reductions are actual and permanent mercury emission reductions that are not required under any state or federal law, court order or air permit condition.

(5) Certified mercury emission reduction credits may be used by the owner or operator of a coal-fired EGU to meet the annual mercury emission limitations in s. NR 446.14(1)(c) subject to the provisions in sub. (6).

(6) For demonstrating compliance with the mercury emission limitations in s. NR 446.14(1)(c), an owner or operator shall only be allowed to surrender certified mercury emission reduction credits in an amount that does not exceed 5% of the annual allowable emission total, in pounds as calculated under s. NR 446.18(x).

(7) The department will maintain an ongoing record of the early mercury emission reduction credits certified and surrendered to achieve compliance with s. NR 446.14.

NR 446.16 Multipollutant compliance extension. (1) The owner or operator of a coal-fired EGU electing to comply with the provisions in s. NR 446.14 may request an extension to achieve compliance with the NO_x, SO_2 and mercury emission limitations in s. NR 446.14(1)(a), (b) and (c)1.

(2) The department may grant an extension under this section if, in consultation with the public service commission, the department determines that the information submitted by the owner or operator supports a conclusion that without the extension a major electrical supply disruption is likely to occur. An extension may not be granted beyond January 1, 2017.

(3) The owner or operator shall submit a written request for extension to the department at the time the emission limitation election in s. NR 446.17(2) is provided.

(4) The request shall provide sufficient information concerning the conditions on which the request is based to demonstrate to the department's satisfaction that an extension is warranted. In addition, the request shall include all of the following:

(a) The proposed control equipment installation schedule for all coal-fired EGUs the owner or operator has included in the notification to meet the requirements of this subchapter through the emission limitations in s. NR 446.14(1)(a), (b) and (c)1.

(b) The additional period of time being requested.

(c) The alternative annual emission limitations for mercury, NO_x and SO_2 that will be achieved during the period of the requested extension.

(d) The reasons why the owner or operator is unable to meet the January 1, 2015 compliance schedule and emission limitations in s. NR 446.14.

(5) Within 180 days after the receipt of a completed request, the department shall notify the applicant in writing of the reasons for denying, approving or conditionally approving any request for an extension.

NR 446.17 Annual compliance report, emission limitation election and BACT determination. (1) ANNUAL COMPLIANCE REPORT. Beginning March 1, 2015, and on or before March 1 of every year thereafter, the owner or operator of a coal-fired EGU subject to this subchapter shall prepare and submit a compliance report for the previous year. This report shall include all of the following:

(a) The actual mercury emissions and, if subject to NO_x and SO_2 emission limitations under this subchapter, the actual NO_x and SO_2 emissions from each coal-fired EGU for the previous year following the methodology in s. NR 446.18.

(b) The designated emission limitations under sub. (2) for each coal-fired EGU.

(c) The amount of early reduction emission credits certified under s. NR 446.15 and currently held by the owner or operator, in pounds, and the amount of certified early reduction emission credits being surrendered.

(d) A comparison of annual actual emissions minus any surrendered early emission reduction credits to the annual allowable emissions, in pounds, for each coal-fired EGU by the applicable emission limitation requirement established in sub. (2) using the methods and procedures in s. NR 446.18.

(2) EMISSION LIMITATION ELECTION. (a) No later than 24 months after the effective date of this subchapter…[LRB insert date] owners or operators of coal-fired EGUs affected by the requirements of this subchapter shall identify for each unit under their ownership or control the mercury emission limitations in this subchapter for those units including any elections made under s. NR 446.12(2) and s. NR 446.14(1). This

identification shall be made to the department in writing.

(b) Within 90 days after the receipt of the notice in sub. (1), the department shall notify the owner or operator in writing of the emission limitation designations for each coal-fired EGUs subject to this subchapter.

(c) Designations by the department under par. (b) establish permanent emission limitation requirements.

(3) BACT DETERMINATION FOR SMALL COAL-FIRED EGUs. (a) No later than 30 months after the effective date of this subchapter…[LRB insert date], owners or operators of small coal-fired EGUs subject to s. NR 446.12 shall provide the department with a preliminary BACT determination.

(b) Notwithstanding par. (a), a small coal-fired EGU designated by the department under sub. (2) to meet the emission limitations in s. NR 446.13 or 446.14 are not required to provide a preliminary BACT determination.

(c) The owner or operator shall submit the information required in par. (a) on the application form required for an operation permit, an amendment to an application, or renewal of the operation permit, as applicable.

(d) Within 180 days after the receipt of the information in par. (c), the department shall approve, conditionally approve or disapprove the owner's or operator's preliminary BACT determination.

NR 446.18 Emission determination methodology. (1) MONITORING REQUIREMENTS. Owners and operators of a coal-fired EGU affected by this subchapter shall monitor emissions and heat input and, as required for compliance, electricity generation and process thermal energy according to the following methods and specifications:

(a) For NO_x and SO_2, hourly mass emissions according to 40 CFR part 75 and 40 CFR part 75, Appendices A to I, incorporated by reference in ss. NR 484.03(7) and 484.04 (27) respectively.

(b) For mercury, hourly mass emissions using continuous emission monitoring. By December 31, 2013, the department shall promulgate rules that specify the requirements for continuous emission monitoring for purposes of this paragraph.

Note: On February 8, 2008, the U.S. District Court of Appeals for the D.C. Circuit vacated rules the department had intended to rely on related to continuous emission monitoring for mercury emissions. (See New Jersey, et. al. v. Environmental Protection Agency, D.C. Ct. App. No 05-1097, February 8, 2008.)

(c) For heat input flow rate and hourly heat input, according to 40 CFR part 75 and 40 CFR part 75, Appendices A to I, incorporated by reference in ss. NR 484.03(7) and 484.04(27) respectively.

(d) For gross electric output, hourly megawatt-hours using continuous monitoring.

(e) For process thermal energy input, hourly mmBtus using continuous monitoring.

(2) DETERMINING ANNUAL FUEL MERCURY CONTENT. Owners and operators of a coal-fired EGU affected by this subchapter shall determine the annual mass of mercury contained in combusted fuels according to the following procedures:

(a) Calculate the mass of mercury contained in each fuel for each month, according to Equation 1, as the mercury concentration in fuel combusted each month as

determined following the procedures in s. NR 446.07 (1),(2) and (3), multiplied by the amount of fuel, in mmBtu, combusted each month as determined following the procedures in s. NR 446.07(4).

$$\text{Fuel Hg}_{fm} = \text{HI}_{fm} \times \text{Hg C}_{fm} \qquad \text{Equation 1}$$

where:
Fuel Hg_{fm} is the mass of mercury contained in fuel f, in month m
HI_{fm} is the heat input of the combusted fuel f, in month m
Hg C_{fm} is the mercury concentration for fuel f, in month m

(b) Calculate the annual mass of mercury, according to Equation 2, as the sum of mercury contained in all fuels combusted for all months during the compliance year.

$$\text{Fuel Hg}_{\text{annual}} = \sum_{m=1}^{12}\left(\sum_{i=1}^{f}\text{Fuel HG}_{i}\right)_{m} \qquad \text{Equation 2}$$

where:
Fuel Hg_{annual} is the mass amount of mercury contained in all fuels combusted during the compliance year
Fuel Hg_i is the mercury mass content for fuel i, combusted in month m, during the compliance year
f is number of fuels combusted during the compliance month

3) DETERMINING ANNUAL GROSS OUTPUT. Owners and operators of a coal-fired EGU affected by this subchapter shall determine the annual gross output in gigawatt-hours according to the following procedures:
(a) Calculate the annual gross electric output in gigawatt-hours, according to Equation 3, as the sum of gross electric output measured in megawatt-hours for each hour the EGU is operating.

$$E_{GWh} = \frac{\sum_{i=1}^{n}\text{MWh}_{i}}{1{,}000} \qquad \text{Equation 3}$$

where:
E_{GWh} is the total annual gross electric output in GWh
MWh_i is the gross electric output in MWh for each hour i the EGU operated during the compliance year
1,000 is the factor to convert MWh to GWh
n is the number of hours the EGU operated during the compliance year

(b) Calculate the annual amount of useful thermal energy in mmBtu, according to Equation 4, as the sum of the process thermal energy input for each hour the EGU is operated multiplied by the process energy efficiency.

$$UTE_{annual} = \sum_{i=1}^{n}\left(PTEI_i \times \frac{PEE}{100}\right) \qquad \text{Equation 4}$$

where:

UTE_{annual} is the annual amount of thermal energy, in mmBtu, utilized in the cogeneration process

$PTEI_i$ is the amount of thermal energy input, in mmBtu, made available to the cogeneration process for each hour i the EGU operated during the compliance year

PEE is the process energy efficiency, expressed as a percent, measured for the EGU. A value of 50% may be assumed.

n is the number of hours the unit operated during the year of compliance

(c) Calculate the annual gross output in mmBtu, according to Equation 5, as the sum of the annual gross electric output and the annual applied thermal energy converted to electric output.

$$GO_{GWh} = E_{GWh} + \frac{UTE_{annual}}{3{,}413} \qquad \text{Equation 5}$$

where:

GO_{GWh} is the total annual gross output in GWh

E_{GWH} is the total annual gross electric output in GWh

UTE_{annual} is the total annual useful thermal energy in mmBtu determined in par. (a)

3,413 is the factor to convert thermal energy in mmBtu to GWh determined in par. (b)

(4) DETERMINING ANNUAL ALLOWABLE EMISSIONS. Owners and operators of a coal-fired EGU affected by this subchapter shall determine annual allowable emissions according to the following procedures:

(a) When achieving compliance on a unit-by-unit basis, use one of the following equations as applicable:

1. For a percent reduction mercury emission limitation.

$$Hg_{allowable} = Fuel\ Hg_{annual} \times (1 - Hg\ CE) \qquad \text{Equation 6}$$

where:

$Hg_{allowable}$ is the mass of mercury emissions allowed for the compliance year

Fuel Hg_{annual} is the mass of mercury in fuel combusted during the compliance year as determined in sub. (2)(b).

Hg CE is the applicable requirement for mercury control removal divided by 100.

2. For a mercury output emission limitation.

$$Hg_{allowable} = GO_{GWh} \times EL_{output} \qquad \text{Equation 7}$$

where:

$Hg_{allowable}$ is the mass of mercury emissions allowed for the compliance year.

GO_{GWh} is the annual gross output during the compliance year as determined in sub. (3)(c)

EL_{output} is the applicable mercury output based emission limitation in pounds per GWh

3. For a NO_x or SO_x emission limitation.

$$P_{allowable} = HI_{annual} \times EL_p \qquad \text{Equation 8}$$

where:

$P_{allowable}$ is the mass of NO_x or SO_x emissions allowed for the compliance year

HI is the annual heat input of fuel combusted during the compliance year

EL_p is the applicable emission limitation of s. NR 446.14(1) for NO_x or SO_x

(b) When achieving compliance using unit averaging as allowed under s. NR 446.13(2)(b) or s. NR 446.14(2)(b), according to Equation 9:

$$\text{Unit Averaging } P_{allowable} = \sum_{u=1}^{n} P_u \qquad \text{Equation 9}$$

where:

Unit Averaging $P_{allowable}$ is the mass of mercury, NO_x, or SO_x emissions allowed for each pollutant for all EGUs participating in emissions averaging during the compliance year

P_u is the mass of mercury, NO_x or SO_x emissions allowed for each EGU for the compliance year as determined under par. (a).

n is the number of EGUs participating in emissions averaging

(5) DETERMINING ANNUAL ACTUAL EMISSIONS. Owners and operators of a coal-fired EGU affected by this subchapter shall determine annual mass of actual emissions for each pollutant as the sum of monitored emissions according to Equation 8.

$$P_{actual} = \sum_{i=1}^{n} P_{monitored} \qquad \text{Equation 10}$$

where:

P_{actual} Actual Emissions is the mass of mercury, NO_x or SO_x emitted during the compliance year

$P_{monitored}$ is the mass of mercury, NO_x or SO_x emissions monitored and determined for each hour i the EGU is operated during the compliance year

n is the number of hours the EGU is operating during the compliance year

NR 446.19 Evaluation. (1) The department staff shall report to the natural

resources board by August 31, 2013. This report shall include:

(a) An evaluation of the scientific and technology developments in relation to the control or reduction of mercury emissions.

(b) An evaluation of whether the mercury requirements of s. NR 446.14 are achievable, given the scientific and technological developments.

(c) Recommendations for revisions to this subchapter or other actions including additional compliance flexibility to achieve the mercury emission reduction requirement in s. NR 446.14 (1) (c) 3., given the scientific and technological developments.

Subchapter IV — Mercury Emission Standards for Other Sources

NR 446.20 Mercury emission limits. No person may cause, allow or permit emissions of mercury:

(1) In quantities greater than 2.3 kg (5.1 lbs) per 24−hour period from mercury cell chlor−alkali plants, or mercury ore processing facilities.

(2) In quantities greater than 3.2 kg (7.1 lbs) of mercury per 24−hour period from sludge incineration plants, sludge drying plants, or a combination of these that process wastewater treatment plant sludges.

NR 446.21 Stack sampling. (1) MERCURY ORE PROCESSING FACILITIES. (a) Unless a waiver of emission testing is requested and obtained from the department, each owner or operator of a facility processing mercury ore on which construction or modification commenced after February 1, 1984 shall test emissions from the source in accordance with Method 101 within 90 days after startup.

(b) The department shall be notified at least 30 days prior to a stack or performance test to afford it the opportunity to have a representative present to witness the testing procedures. The notice shall include a test plan in accordance with s. NR 439.07.

(c) Samples shall be taken over such a period as is necessary to accurately determine the maximum emissions which will occur in a 24−hour period. No changes in the operation may be made which would potentially increase emissions above that determined by the most recent source test until the new emission level has been estimated by calculation and the results reported to the department.

(d) All samples shall be analyzed, and mercury emissions shall be determined within 30 days after the source test. Each determination shall be reported to the department by registered letter dispatched before the close of the next business day following the determination.

(e) Records of emission test results and other data needed to determine total emissions shall be retained at the source and made available for inspection by a department representative for a minimum of 2 years.

(2) MERCURY CHLOR−ALKALI PLANTS—HYDROGEN AND END BOX VENTILATION GAS STREAMS. (a) Unless a waiver of emission testing is requested and obtained from the department, each owner or operator of a mercury chlor−alkali cell on which construction or modification commenced after February 1, 1984 shall test emissions from hydrogen streams in accordance with Method 102 and from end−box gas streams in accordance with Method 101 within 90 days after startup.

(b) The department shall be notified at least 30 days in advance of stack or performance tests to afford it the opportunity to have a representative present to witness the testing procedures. The notice shall include a test plan in accordance with s. NR 439.07.

(c) Samples shall be taken over such a period as is necessary to accurately determine the maximum emissions which will occur in a 24−hour period. No changes in the operation may be made which would potentially increase emissions above that determined by the most recent source test until the new emission level has been estimated by calculation and the results reported to the department.

(d) All samples shall be analyzed, and mercury emissions shall be determined within 30 days after the source test. All determinations shall be reported to the department by registered letter dispatched before the close of the next business day following the determination.

(e) Records of emissions test results and other data needed to determine total emissions shall be retained at the source and made available for inspection by a department representative for a minimum of 2 years.

(3) MERCURY CHLOR−ALKALI PLANTS—CELL ROOM VENTILATION SYSTEM. (a) Stationary sources using mercury chlor−alkali cells may test cell room emissions in accordance with par. (b), or demonstrate compliance with par. (d) and assume ventilation emissions of 1.3 kg (2.9 lbs) per day of mercury.

(b) Unless a waiver of emission testing is requested and obtained from the department, each owner or operator of a new or modified chlor−alkali plant shall pass all cell room air in forced gas streams through stacks suitable for testing and shall test emissions from the cell room in accordance with Method 101 within 90 days after startup.

(c) The department shall be notified at least 30 days in advance of stack or performance tests to afford it the opportunity to have a representative present to witness the testing procedures. The notice shall provide a test plan in accordance with s. NR 439.07.

(d) An owner or operator may carry out U.S. environmental protection agency approved design, maintenance and housekeeping practices.

Note: A list of approved practices is provided in appendix A of "Review of National Emission Standards for Mercury," EPA−450/3−84−014, December 1984, incorporated by reference in s. NR 484.05 (9).

(4) SLUDGE INCINERATION AND DRYING PLANTS. (a) Unless a waiver of emission testing is requested and obtained from the department, each owner or operator of sludge incineration plants and drying plants on which construction or modification commenced after February 1, 1984 shall test emissions from the source within 90 days of startup. The tests shall be conducted in accordance with Method 101A, using the procedures in par. (f).

(b) The department shall be notified at least 30 days in advance of stack or performance tests to afford it the opportunity to have a representative present to witness the testing procedures. The notice shall include a test plan in accordance with s. NR 439.07.

(c) Samples shall be taken over such a period as is necessary to determine accurately the maximum emissions which will occur in a 24−hour period. No changes

may be made in the operation which would potentially increase emissions above the level determined by the most recent stack tests until the new emission level has been estimated by calculation and the results reported to the department.

(d) All samples shall be analyzed, and mercury emissions shall be determined within 30 days after the stack test. All determinations shall be reported to the department by registered letter dispatched before the close of the next business day following the determination.

(e) Records of emission test results and other data needed to determine total emissions shall be retained at the source and shall be made available for inspection by a department representative for a minimum of 2 years.

(f) If an owner or operator uses Method 105, the following procedures shall be adhered to:

1. The sludge shall be sampled after dewatering and before incineration or drying, at a location that provides a representative sample of the sludge that is charged to the incinerator or dryer. Eight consecutive grab samples shall be obtained at intervals of between 45 and 60 minutes and thoroughly mixed into one sample. Each of the 8 grab samples shall have a volume of at least 200 milliliters but not more than 400 milliliters. A total of 3 composite samples shall be obtained within an operating period of 24 hours. When the 24−hour operating period is not continuous, the total sampling period may not exceed 72 hours after the first grab sample is obtained. Samples may not be exposed to any condition that may result in mercury contamination or loss.

2. The maximum 24−hour period sludge incineration or drying rate shall be determined by use of a flow rate measurement device that can measure the mass rate of sludge charged to the incinerator or dryer with an accuracy of plus or minus 5% over its operating range. Other methods of measuring sludge mass charging rates may be used if they have received prior approval by the department.

3. The handling, preparation and analysis of sludge samples shall be accomplished in accordance with Method 105.

4. The mercury emissions shall be determined by use of the following equation:

$$E_{Hg} = \frac{MQF_{sm(avg)}}{1000}$$

where:

EHg is the mercury emissions, g/day

M is the mercury concentration of sludge on a dry solids basis, µg/g

Q is the sludge charging rate, kg/day

Fsm(avg) is the average weight fraction of solids in the collected sludge after mixing

1000 is the conversion factor, kg µg/g^2

5. No changes in the operation of a plant may be made after a sludge test has been conducted which would potentially increase emissions above the level determined by the most recent sludge test, until the new emissions level has been estimated by calculation and the results reported to the department.

6. All sludge samples shall be analyzed for mercury content within 30 days after the sludge sample is collected. Each determination shall be reported to the department

by registered letter dispatched before the close of the next business day following the determination.

7. Records of sludge sampling, charging rate determination and other data needed to determine mercury content of wastewater treatment plant sludges shall be retained at the source and made available for inspection by a department representative for a minimum of 2 years.

NR 446.22 Monitoring of emissions and operations. (1) All wastewater treatment plant sludge incineration and drying plants for which mercury emissions exceed 1.6 kg (3.5 lbs) per 24-hour period, demonstrated either by stack sampling or sludge sampling according to s. NR 446.21(4), shall monitor mercury emissions at intervals of at least once per year in accordance with Method 105 and the procedures specified in s. NR 446.21(4)(f). The results of monitoring shall be reported to the department by registered letter dispatched before the close of the next business day following the monitoring. The results shall be retained at the source and shall be made available for inspection by a department representative for a minimum of 2 years.

(2) The owner or operator of each mercury cell chlor−alkali plant—hydrogen and end−box ventilation gas streams shall:

(a) Perform a mercury emission test that demonstrates compliance with the emission limits in s. NR 446.20(1) on the hydrogen stream by Method 102 and on the end−box stream by Method 101 for the purpose of establishing limits for parameters to be monitored, within one year after June 1, 1994 or within one year of startup for a plant with initial startup after February 1, 1984.

(b) Monitor and record manually or automatically at least once every 15 minutes during the tests specified in par. (a) all of the following control device parameters, except as provided in par. (c):

1. The exit gas temperature from uncontrolled streams.

2. The outlet temperature of the gas stream for the final cooling system when no control devices other than coolers and demisters are used.

3. The outlet temperature of the gas stream from the final cooling system when the cooling system is followed by a molecular sieve or carbon adsorber.

4. Outlet concentration of available chlorine, pH, liquid flow rate and inlet gas temperature of chlorinated brine scrubbers and hypochlorite scrubbers.

5. The liquid flow rate and exit gas temperature for water scrubber.

6. The inlet gas temperature of carbon adsorption systems.

7. The temperature during the heating phase of the regeneration cycle for carbon adsorbers or molecular sieves.

(c) Average the parameters recorded in par. (b) over a minimum 6 hour test period. The highest temperature reading that is measured in par. (b) 7. is to be identified as the reference temperature for use in par. (f) 2.

(d) Monitor and record manually or automatically immediately after the completion of the emission tests specified in par. (a) the following:

1. The parameters specified in par. (b) 1. to 6. at least once per hour.

2. The temperature specified in par. (b) 7. during each heating phase of the regeneration cycle.

(e) Operate, maintain and calibrate monitoring devices according to the manufacturer's instructions. Monitoring devices used in accordance with pars. (b) and

(d) shall be certified by their manufacturer to be accurate to within 10%. Records of the certifications and calibrations shall be retained at the chlor−alkali plant and made available for inspection by the department as follows: certification, for as long as the device is used for this purpose; and calibration, for a minimum of 2 years.

(f) Notify the department within 10 days when:

1. The hourly value of a parameter monitored in accordance with par. (d) 1. exceeds, or, in the case of liquid flow rate and available chlorine, falls below, the value of that same parameter determined in par. (b) for 24 consecutive hours, and

2. The maximum hourly value of the temperature measured in accordance with par. (d) 2. is below the reference temperature recorded according to par. (c) for 3 consecutive regeneration cycles.

(g) Submit semiannual reports to the department indicating the time and date on which the hourly value of each parameter monitored according to par. (d) 1. and 2. fell outside the value of that same parameter determined under par. (c) and corrective action taken, and the time and date of the corrective action. Parameter excursions shall be considered unacceptable operation and maintenance of the emission control system. In addition, while compliance with the emission limits is determined primarily by conducting a performance test according to the procedures in s. NR 446.21 (2), reports of parameter excursions may be used as evidence in judging the duration of a violation that is determined by a performance test.

(h) Submit semiannual reports required in par. (g) to the department on September 15 and March 15 of each year. The first semiannual report is to be submitted following the first full 6 month reporting period. The semiannual reports due on September 15 and March 15 shall include all excursions monitored during the 6 calendar months previous to the report date.

(3) The owner or operator of a facility subject to sub. (2) may develop and submit for the department's approval a plant−specific monitoring plan as an alternative to the monitoring, recordkeeping and reporting requirements of sub. (2) (a) to (g). Approval of an alternative plan shall ensure compliance with the emission limits of s. NR 446.20(1), and proper operation and maintenance of emissions control systems. Any site−specific monitoring plan shall, at a minimum, include all of the following:

(a) Identification of the critical parameter or parameters for the hydrogen stream and for the end−box ventilation stream that are to be monitored and an explanation of why the critical parameters selected are the best indicators of proper control system performance and of mercury emission rates.

(b) Identification of the maximum or minimum value of each parameter that is not to be exceeded. The levels shall be directly correlated to the results of a performance test, conducted no more than 180 days prior to submittal of the plan, when the facility was in compliance with the emission limits of s. NR 446.20(1).

(c) Designation of the frequency for recording the parameter measurements, with justification if the frequency is less than hourly. A longer recording frequency shall be justified on the basis of the amount of time that could elapse during periods of process or control system upsets before the emission limits would be exceeded, and consideration is to be given to the time that would be necessary to repair the failure.

(d) Designation of the immediate actions to be taken in the event of an excursion beyond the value of the parameter established in par. (b).

(e) Provisions for reporting, semiannually, parameter excursions and the corrective actions taken, and provisions for reporting within 10 days any significant excursion.

(f) Identification of the accuracy of the monitoring devices or of the readings obtained.

(g) Recordkeeping requirements for certifications and calibrations.

Note: The owner or operator of a mercury cell chlor−alkali plant, cell room ventilation system determining cell room emissions, shall maintain records of any leak or spill of mercury. The records shall indicate the amount, location, time and date when the leak or spill occurred, identify the cause of the leak or spill, state the immediate steps taken to minimize mercury emissions and steps taken to prevent future occurrences and provide the time and date on which corrective steps were taken. The results of monitoring shall be recorded, retained at the source and made available for inspection by the administrator for a minimum of 2 years.