

Chapter NR 446

CONTROL OF MERCURY EMISSIONS

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Note: Corrections made under s. 13.93 c2md cbd 7., Stats., Register, January, 1997, No. 493.

Subchapter I — General Provisions

NR 446.01 Applicability; purpose. c1d APPLICABILITY. This chapter applies to all air contaminant sources which may emit mercury and to their owners and operators.

c2d 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.

History: Cr. Register, September, 1986, No. 369, eff. 10-1-86; am. c1d, Register, May, 1992, No. 437, eff. 6-1-92; CR 01-081: am. c2d Register September 2004 No. 585, eff. 10-1-04.

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:

c1d XAllowable emissionsY 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.

c1cd XBaseline mercury emissionsY means the calculated level of annual mercury emissions from a major utility as determined under s. NR 446.07.

c1ed XBest available control technologyY or XBACTY means an emission limit for mercury based on the maximum degree of reduction practically achievable as specified by the department on an individual case-by-case basis taking into account energy, economic and environmental impacts and other costs related to the source.

c1gd XCell roomY means a structure housing one or more mercury chlor-alkali cells.

c1nd XCertified emission reductionY 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.

c1rd XCommissionY means the public service commission.

c2d XCondenser stack gasesY mean the gaseous effluent evolved from the stack of processes utilizing heat to extract mercury metal from mercury ore.

c3d XDenuderY 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.

c4d XEnd boxY 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.

c5d XEnd box ventilation systemY means a ventilation system which collects mercury emissions from the end boxes, the mercury pump sumps, and their water collection systems.

c6d XHydrogen gas streamY means a hydrogen stream formed in the chlor-alkali cell denuder.

c6ed XMajor stationary sourceY means a stationary source whose mercury emissions are 10 pounds per year or greater.

c6md XMajor utilityY means a Class A utility, as defined under s. 199.03 c4d, 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.

c6sd XMercuryY has the meaning given in s. NR 445.02 c9d.

c7d XMercury chlor-alkali cellY 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.

c8d XMercury chlor-alkali electrolyzerY 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.

c9d XMercury oreY means a mineral mined specifically for its mercury content.

c10d XMercury ore processing facilityY means a facility processing mercury ore to obtain mercury.

c10md XMethod XY, where XXY 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 c23d.

c11d XSludgeY means sludge produced by a treatment plant that processes municipal or industrial wastewater.

c12d XSludge dryerY means a device used to reduce the moisture content of sludge by heating to temperatures above 65°C cca. 150°Fd directly with combustion gases.

History: Renum. from NR 154.01, Register, September, 1986, No. 369, eff. 10-1-86; am. cintro.d and c2d, cr. c10md, Register, May, 1994, No. 461, eff. 6-1-94; am. c10md, Register, December, 1995, No. 480, eff. 1-1-96; CR 02-097: am. cintro.d Register June 2004 No. 582, eff. 7-1-04; CR 01-081: renum. c1d to be c1gd, cr. c1d, c1c, c1nd, c1rd, c1wd, c6ed, c6md, c6sd, c8md and c10sd Register September 2004 No. 585, eff. 10-1-04; CR 07-036: cr. c1ed, r. c1wd, am. c1ed Register November 2008 No. 635, eff. 12-1-08.

NR 446.03 Mercury emission limits. c1d 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 µg{m³, averaged over a 30-day period.

c2d cad 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.

cbd New or modified stationary sources that are subject to an emission limit for mercury required under section 111 or 112 of the Act c42 USC 7411 and 7412 respectivelyd are exempt from the requirements of this section.

ccd Except as provided in par. cbd, 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. cad on or after the first day of the calendar month following October 1, 2004.

History: CR 01-081: renum. cintro.d and c1d from s. NR 446.03 and am. Register September 2004 No. 585, eff. 10-1-04; CR 07-036: cr. titled, sub. c1d and c2d renum. from NR 446.025 and NR 446.05, am. c2d cbd and ccd Register November 2008 No. 635, eff. 12-1-08.

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.

c1d STATIONARY SOURCE COMBUSTION UNIT. cad The owner or operator of a combustion unit at the source which is not subject to subchs. II, III and 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.

cbd 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 c47md, or an equivalent method approved by the department, or from published data which lists the mercury content of the specific fuel.

ccd 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 Appendix B of 40 CFR part 61, incorporated by reference in s. NR 484.04 c23d; Method 29 in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 484.04 c20md; Method 30A or 30B in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 484.04 c20sd and c20td respectively; or ASTM D6784-02, incorporated by reference in s. NR 484.10 c55xd.

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 c47md, 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.

cdd 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.

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

cfd 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

c2d 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:

cad 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.

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

ccd 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.

History: CR 01-081: cr. Register September 2004 No. 585, eff. 10-1-04; CR 07-036: renum. from NR 446.027, am. cintro.d, c1d cad, ccd and c2d cintro.d Register November 2008 No. 635, eff. 12-1-08.

Subchapter II — Control of Mercury Emissions from Major Utilities

NR 446.05 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](#).

History: CR 07-036: cr. Register November 2008 No. 635, eff. 12-1-08.

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

c1d 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](#).

c2d After reviewing the report provided in sub. [c1d](#), 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.

c3d In the report required under sub. [c1d](#), 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.

c4d No later than January 1, 2007, the department shall provide written notification to each owner or operator who submitted a report under sub. [c1d](#) of the department's determination of the baseline mercury emissions for each combustion unit of the major utility.

Note: Combustion units for which the owner or operator is required to establish baseline mercury emissions are Alma Units 4 & 5, Genoa Unit 1, J.P. Madgett Unit 1, Pleasant Prairie Units 1 & 2, Port Washington Units 1, 2, 3 & 4, South Oak Creek Units 5, 6, 7 & 8, Valley Units 1, 2, 3 & 4, Columbia Units 1 & 2, Edgewater Units 3, 4 & 5, Nelson Dewey Units 1 & 2, Rock River Units 1 & 2, Pulliam Units 3, 4, 5, 6, 7 & 8 and Weston Units 1, 2 & 3.

History: CR 01-081: cr. September 2004 No. 585, eff. 10-1-04; CR 07-036: renum. from NR 446.03, am. [c1d](#) Register November 2008 No. 635, eff. 12-1-08.

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 c1d](#).

c1d 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 c47md](#), or an equivalent method approved by the department.

c2d 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](#)

c47md, or an equivalent method approved by the department or from published data which lists the mercury content of the fuel.

c3d The major utility shall determine the monthly consumption of each fuel in million British thermal units cmmBtu, 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 c26md cad to cdd](#). The major utility may apportion the fuel mmBtu to individual fuels for which the mercury content is determined under sub. [c1d](#) or [c2d](#), using consumption and delivery records for the fuels.

c4d The information gathered in subs. [c1d](#) and [c2d](#) shall be multiplied by the corresponding fuel consumption rates determined under sub. [c3d](#) to determine the total annual mercury contained in each fuel.

c5d The mercury content for each fuel, on a mmBtu-basis, shall be computed by dividing the results of sub. [c4d](#) by the amount of each fuel burned, in mmBtus, during the 12 month sampling period.

c6d The mercury emissions for 2002, 2003 and the 12 months identified in sub. [c1d](#) shall be calculated by multiplying the results of sub. [c5d](#) times the annual fuel consumption for each of those years.

c7d The baseline mercury emissions shall be the 3-year arithmetic average of the mercury emissions determined under subs. [c4d](#) and [c6d](#) for 2002, 2003 and the 12 months identified in sub. [c1d](#).

c8d 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.

c9d The owner or operator of a major utility may request that alternative procedures for determining baseline mercury emissions be approved by the department.

History: CR 01-081: cr. September 2004 No. 585, eff. 10-1-04; CR 07-036: renum. from NR 446.04, am. [cintro.d](#) Register November 2008 No. 635, eff. 12-1-08.

NR 446.08 Annual mercury emissions determination and reporting for major utilities. **c1d** 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:

$$\text{Annual Mercury Emissions} = \text{Fuel Use} \times \text{Mercury Content of Fuel} \times \text{Reduction of Mercury Prior to its Release to the Atmosphere}$$

where:

cad 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 c26md cad to cdd](#). The total amount of the fuel combusted in mmBtus may be apportioned to individual fuels, using consumption and delivery records for the fuels.

cbd Mercury content of the fuel is determined according to ASTM D3684-01, incorporated by reference in s. [NR 484.10 c47md](#), or an equivalent method approved by the department, following the procedures in s. [NR 446.07 c1d, c2d and c3d](#).

ccd 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. [c6d](#).

1. The source performance test shall be conducted according to Method 101A in Appendix B of [40 CFR part 61](#), incorporated by reference in s. [NR 484.04 c23d](#); Method 29 in Appendix A of [40 CFR part 60](#), incorporated by reference in s. [NR 484.04 c20md](#); Method 30A or 30B in Appendix A of [40 CFR part 60](#), incorporated by reference in s. [NR 484.04 c20sd](#) and [c20td](#) respectively; or ASTM D6784-02, incorporated by reference in s. [NR 484.10 c55xd](#).

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 c47md](#), 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 subs. 1. to 3. and the calculations for the percent removal efficiency of mercury.

cdd 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.

c2d Nothing in this section shall prohibit the department from requiring major utilities to use other methods of determining annual mercury emissions.

c3d The owner or operator of a major utility may request that alternative methods for determining annual mercury emissions be approved by the department.

c4d 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.

c5d 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. [c1d ccd](#).

c6d 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.

History: [CR 01-081](#): cr. September 2004 No. 585, eff. 10-1-04; [CR 07-036](#): renum. from [NR 446.09](#), am. titled, [c1d](#) intro.d, [cbd](#), [ccd](#) 1., [cdd](#) and [c4d](#) [Register November 2008 No. 635](#), eff. 12-1-08.

Subchapter III — Control of Mercury Emissions from Coal-Fired Electric Generating Units

NR 446.09 Applicability. **c1d** Except for those units that are excluded under sub. [c2d](#), 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.

c2d A cogeneration unit which otherwise satisfies the applicability statement of sub. [c1d](#) 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.

c3d If a coal-fired EGU qualifies as a cogeneration unit during the 12-month period starting on the date the unit first produces electricity and meets the exemption requirements of sub. [c2d](#) for at least one calendar year, but subsequently no longer meets the exemption requirements, the coal-fired EGU shall become subject to this subchapter starting January 1 of the following calendar year.

History: [CR 07-036](#): cr. [Register November 2008 No. 635](#), eff. 12-1-08.

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:

c1d XBoilerY means an enclosed combustion device used to produce heat and to transfer heat to recirculating water, steam or other medium.

c2d XCoal-firedY means combusting any amount of coal or coal-derived fuel, alone or in combination with any amount of any other fuel.

c3d XCogenerationY means an EGU that simultaneously produces both electrical or mechanical, and useful thermal energy from the same primary energy source.

c4d XCombustion turbineY 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.

c5d XElectric generating unitY or XEGUY means a boiler or a combustion turbine serving a generator that produces electricity.

c6d XGross electrical outputY 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.

c7d XLarge coal-fired EGUY means an electric generating unit serving a generator with nameplate capacity 150 megawatts and greater.

c8d XProcess energy efficiencyY 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.

c9d XProcess thermal energy inputY means, with regard to cogeneration, the total amount of thermal energy made available to a process for use other than for generating electricity.

c10d XSmall coal-fired EGUY means an electric generating unit serving a generator with a nameplate capacity greater than 25 megawatts but less than 150 megawatts.

c11d XUseful thermal energyY means, with regard to cogeneration, thermal energy that is any of the following:

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

cbd Used in a heating application, such as space heating or hot water heating.

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

History: [CR 07-036](#): cr. [Register November 2008 No. 635](#), eff. 12-1-08.

NR 446.11 Mercury emission limits for new or modified coal-fired electric generating units. Notwith-

standing the provisions of s. NR 446.03, after December 1, 2008, no person may commence construction, or commence a modification with respect to mercury, of a coal-fired EGU unless the department finds that a 90% mercury emission reduction as measured from the mercury content of fuel combusted will be achieved.

History: CR 07-036: cr. Register November 2008 No. 635, eff. 12-1-08.

NR 446.12 Mercury emission limits for small coal-fired electric generating units. c1d Beginning April 16, 2016, 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 best available control technology.

c2d Notwithstanding sub. c1d, 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 c2d cbd.

History: CR 07-036: cr. Register November 2008 No. 635, eff. 12-1-08; CR 13-089: am. c1d Register July 2014 No. 703, eff. 8-1-14.

NR 446.13 Mercury emission limits for large coal-fired electric generating units. c1d Beginning April 16, 2016, 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 c2d cbd 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 clbs{GWhd of electricity produced.

c2d An owner or operator may achieve compliance with sub. c1d by either of the following methods:

cad *Unit-by-unit compliance.* Demonstrating that the mercury emissions from each coal-fired EGU meet either of the mercury emission limits in sub. c1d using the measurement methods and calculation procedures in s. NR 446.18.

cbd *Unit averaging.* Demonstrating that the sum of the mercury emissions from all coal-fired EGUs subject to the mercury emission limits in sub. c1d does not exceed the sum of the annual allowable mercury emissions for the coal-fired EGUs using the measurement methods and calculation procedures in s. NR 446.18.

History: CR 07-036: cr. Register November 2008 No. 635, eff. 12-1-08; CR 13-089: am. c1d Register July 2014 No. 703, eff. 8-1-14.

NR 446.14 Multipollutant reduction alternative for coal-fired electrical generating units. c1d 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 c2d. The following annual emission limitations for NO_x, SO₂ and mercury apply to each unit for which the owner or operator makes an election under this section:

cad For NO_x, beginning April 16, 2016, 0.07 pounds per mmBtu of heat input.

cbd For SO₂, beginning April 16, 2016, 0.10 pounds per mmBtu of heat input.

ccd For mercury emissions, all of the following:

1. Beginning April 16, 2016 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 clbs{GWhd.

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 clbs{GWhd.

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 clbs{GWhd.

c2d An owner or operator may achieve compliance with sub. c1d by either of the following methods:

cad *Unit-by-unit compliance.* Demonstrating that the mercury, NO_x and SO₂ emissions from each coal-fired EGU meet the applicable emission limitation in sub. c1d using the measurement methods and calculation procedures in s. NR 446.18.

cbd *Unit averaging.* Demonstrating that for each pollutant, the sum of the emissions from all coal-fired EGUs subject to the emission limits in sub. c1d do not exceed the sum of the annual allowable mercury, NO_x or SO₂ emissions for the coal-fired EGUs using the measurement methods and calculation procedures in s. NR 446.18.

History: CR 07-036: cr. Register November 2008 No. 635, eff. 12-1-08; CR 13-089: am. c1d cad, cbd, ccd 1. Register July 2014 No. 703, eff. 8-1-14.

NR 446.15 Early mercury emission reduction credits. c1d 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.

c2d The department may only certify emission reductions that meet either of the following criteria as early emission reduction credits:

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

cbd 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 c1d ccd 1. or 2.

c3d Beginning March 1, 2011, and on or before March 1, 2021, owners and operators may request in the annual compliance report required in s. NR 446.17 c1d, that the department certify excess mercury reductions from the previous calendar year as early emission reduction credits. The department shall provide written notice within 60 days of the receipt of a request approving or denying the early emission reduction credit request.

c4d 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 mercury emission reductions that are not required under any state or federal law, court order or air permit condition.

c5d 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 c1d ccd subject to the provisions in sub. c6d.

c6d For demonstrating compliance with the mercury emission limitations in s. NR 446.14 c1d ccd, an owner or operator shall only be allowed to surrender certified mercury emission reduction credits in an amount that does not exceed 10% of the annual allowable emission total, in pounds.

c7d 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.

History: CR 07-036: cr. Register November 2008 No. 635, eff. 12-1-08.

NR 446.16 Electric reliability compliance extension. c1d The owner or operator of a coal-fired EGU subject to s. NR 446.13, or electing to comply with s. NR 446.13 or 446.14, may request an extension to achieve compliance with the applicable mercury, NO_x or SO₂ emission limitations.

c2d 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.

c3d 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 c2d is provided.

c4d 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:

cad The proposed control equipment installation schedule for all coal-fired EGUs the owner or operator has included in the request to meet the requirements of this subchapter.

cbd The additional period of time being requested.

ccd The alternative annual emission limitations for mercury, NO_x or SO₂ that will be achieved during the period of the requested extension.

cdd The reasons why the owner or operator is unable to meet the January 1, 2015 compliance schedule and emission limitations in s. NR 446.13 or 446.14.

c5d 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.

History: CR 07-036: cr. Register November 2008 No. 635, eff. 12-1-08.

NR 446.165 Large coal-fired electric generating unit variance. c1d The owner or operator of a large coal-fired EGU may request a variance from the emission reduction requirements of s. NR 446.13 or 446.14 by submitting a written request to the department and the commission. The request shall provide sufficient information concerning the conditions or special circumstances on which the variance request is based to demonstrate to the department[s] satisfaction that a variance from the applicable requirements is necessary. In addition, the request shall include the following:

cad Where an alternative compliance schedule is sought, the owner or operator shall submit a proposed schedule which demonstrates reasonable further progress and contains a date for final compliance as soon as practicable.

cbd Where an alternative reduction requirement is sought, the owner or operator shall submit a proposed reduction requirement.

ccd Requests for variances shall contain relevant information on the costs and technological feasibility of meeting the reduction requirements as required by the department.

c2d Requests for a variance shall be received 12 months in advance of an emission reduction requirement in s. NR 446.13 or 446.14 or established under s. NR 446.16.

c3d The department may grant a variance that sets an alternative reduction requirement or schedule, or both.

c4d The department may grant a variance if the owner or operator demonstrates to the department[s] satisfaction that the reduction requirements are technologically or economically infeasible.

c5d The department may grant a variance that sets an alternative schedule if the owner or operator demonstrates to the department[s] satisfaction that the delay is needed to complete installation and place into operation control technology to achieve compliance with a reduction requirement.

c6d Within 90 days of the receipt of a completed request, the department shall publish a public notice on each variance request and the department[s] preliminary determination to grant or deny the request, to provide the opportunity for public comments including, where requested, a public hearing on the variance request. Following the public comment period, the department shall notify the variance applicant in writing of the reasons for denying, granting or for granting in a modified form any request for a variance.

c7d The department may, after notice and opportunity for hearing, revoke or modify any variance when any term or condition of the variance has been violated.

History: CR 07-036: cr. Register November 2008 No. 635, eff. 12-1-08.

NR 446.17 Annual compliance report, emission limitation election and BACT determination. c1d ANNUAL COMPLIANCE REPORT. By July 1, 2017, the owner or operator of a coal-fired EGU subject to this subchapter shall prepare and submit a compliance report for the initial period of April 16, 2016 to April 15, 2017. On or before March 1, 2018, and on or before March 1 of every calendar 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 calendar year. The report shall include all of the following:

cad The actual mercury emissions and, if subject to NO_x and SO₂ emission limitations under this subchapter, the actual NO_x and SO₂ emissions from each coal-fired EGU for the previous year following the methodology in s. NR 446.18.

cbd The designated emission limitations under sub. c2d for each coal-fired EGU.

ccd 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.

cdd 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. c2d using the methods and procedures in s. NR 446.18.

Note: The compliance periods and compliance report due dates are specified in order to allow for 12 month emission averaging periods in complying with large EGU emission limitations, and in complying with small EGU emission limitation if appropriate. The initial compliance report due by July 1, 2017 will demonstrate compliance for the period of April 16, 2016 to April 15, 2017. The second compliance report will be due on March 1, 2018 and will demonstrate compliance for the period of January 1, 2017 to December 31, 2017. All subsequent reports will be due on March 1 of each year and will demonstrate compliance for the previous calendar year.

c2d EMISSION LIMITATION ELECTION. cad No later than December 31, 2010, 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 ss. NR 446.12 c2d and 446.14 c1d. This identification shall be made to the department in writing.

cbd Within 90 days after the receipt of the report in sub. c1d, the department shall notify the owner or operator in writing of the emission limitation designations for each coal-fired EGUs subject to this subchapter.

ccd Designations by the department under par. cbd shall establish emission limitation requirements under this subchapter.

c3d BACT DETERMINATION FOR SMALL COAL-FIRED ELECTRIC GENERATING UNITS. cad No later than June 30, 2011, owners or operators of small coal-fired EGUs subject to s. NR 446.12 shall provide the department with a preliminary BACT determination.

cbd Notwithstanding par. cad, a small coal-fired EGU designated by the department under sub. c2d to meet the emission limitations in s. NR 446.13 or 446.14 are not required to provide a preliminary BACT determination.

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

cdd Within 180 days after the receipt of the information in par. ccd, the department shall approve, conditionally approve or disapprove the owner[s] or operator[s] preliminary BACT determination.

History: CR 07-036: cr. Register November 2008 No. 635, eff. 12-1-08; CR 13-089: am. c1d cintro.d Register July 2014 No. 703, eff. 8-1-14.

NR 446.18 Emission determination and compliance demonstration. c1d MONITORING REQUIREMENTS. Owners and operators of a coal-fired EGU affected by this subchapter shall monitor emissions, heat input, electricity generation and process thermal energy, as required to demonstrate compliance, according to the following methods and specifications:

cad For NO_x and SO₂, 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 c7d and 484.04 c27d respectively.

cbd 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. cSee *New Jersey, et. al. v. Environmental Protection Agency*, D.C. Ct. App. No 05-1097, February 8, 2008.d

ccd 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 c7d and 484.04 c27d respectively.

cdd For gross electric output, hourly megawatt-hours using continuous monitoring.

ced For process thermal energy input, hourly mmBtus delivered to the process using continuous monitoring.

c2d 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 1.

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

where:

P_{actual} is the mass of mercury, NO_x or SO₂ emitted during the compliance year

$P_{\text{monitored}}$ is the mass of mercury, NO_x or SO₂ 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

c3d 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 all combusted fuels, as required to demonstrate compliance, according to the following procedures:

cad Calculate the mass of mercury contained in each fuel for each month, according to Equation 2, as the mercury concentra-

tion in fuel combusted each month as determined following the procedures in s. NR 446.07 c1d, c2d and c3d according to solid and non-solid types of fuel, multiplied by the amount of fuel, in mmBtu, combusted each month as determined following the procedures in s. NR 446.07 c4d.

$$\text{Fuel Hg}_{\text{fm}} = \text{HI}_{\text{fm}} \times \text{Hg C}_{\text{fm}} \quad \text{Equation 2}$$

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

cbd Calculate the annual mass of mercury, according to Equation 3, as the sum of mercury contained in all fuels combusted for all months during the compliance year.

$$\text{Fuel Hg}_{\text{annual}} = \sum_{m=1}^{12} \left(\sum_{i=1}^f \text{Fuel Hg}_i \right)_m \quad \text{Equation 3}$$

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 determined in par. cad

f is number of fuels combusted during the compliance month

c4d DETERMINING ANNUAL GROSS OUTPUT. Owners and operators of a coal-fired EGU affected by this subchapter shall determine the annual gross energy output in gigawatt-hours, as required to demonstrate compliance, according to the following procedures:

cad Calculate the annual gross electric output in gigawatt-hours, according to Equation 4, as the sum of gross electric output measured in megawatt-hours for each hour the EGU is operating.

$$E_{\text{GWh}} = \frac{\sum_{i=1}^n \text{MWh}_i}{1,000} \quad \text{Equation 4}$$

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

cbd Calculate the annual amount of useful thermal energy in mmBtu, according to Equation 5, as the sum of the process thermal energy input for each hour the EGU is operated multiplied by the process energy efficiency.

$$\text{UTE}_{\text{annual}} = \sum_{i=1}^n \left(\text{PTEI}_i \times \frac{\text{PEE}}{100} \right) \quad \text{Equation 5}$$

where:

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

PTE_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

ccd Calculate the annual gross energy output in mmBtu, according to Equation 6, as the sum of the annual gross electric output and the annual applied thermal energy converted to electric output.

$$GEO_{GWh} = E_{GWh} + \frac{UTE_{annual}}{3,413} \tag{Equation 6}$$

where:

GEO_{GWh} is the total annual gross energy output in GWh

E_{GWh} is the total annual gross electric output in GWh determined in par. cad

UTE_{annual} is the total annual useful thermal energy in mmBtu determined in par. cbd

3,413 is the factor to convert thermal energy in mmBtu to GWh

c5d DETERMINING ANNUAL ALLOWABLE EMISSIONS. Except as provided in s. NR 446.185, owners and operators of a coal-fired EGU affected by this subchapter shall determine annual allowable emissions, as required to demonstrate compliance, according to the following procedures:

cad 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, Equation 7.

$$Hg_{allowable} = Fuel Hg_{annual} \times (1 - Hg CE) \tag{Equation 7}$$

Equation 7

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. c3d cbd.

Hg CE is the applicable requirement for percent mercury emission reduction divided by 100.

2. For a mercury output emission limitation, Equation 8.

$$Hg_{allowable} = GEO_{GWh} \times EL_{output} \tag{Equation 8}$$

where:

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

GEO_{GWh} is the annual gross energy output during the compliance year as determined in sub. c4d ccd

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

3. For an NO_x or SO₂ emission limitation, Equation 9.

$$P_{allowable} = \sum_{i=1}^h HI_i \times EL_p \tag{Equation 9}$$

where:

P_{allowable} is the mass of NO_x or SO₂ emissions allowed for the compliance year

HI_i is the amount of fuel, in mmBtu combusted each hour i, during the compliance year

h is the number of hours fuel is combusted during the compliance year

EL_p is the applicable emission limitation of s. NR 446.14 c1d for NO_x or SO₂

cbd When achieving compliance using unit averaging as allowed under s. NR 446.13 c2d cbd or 446.14 c2d cbd, according to Equation 10:

$$\text{Unit Averaging } P_{allowable} = \sum_{u=1}^n P_u \tag{Equation 10}$$

where:

Unit Averaging P_{allowable} is the mass of mercury, NO_x, or SO₂ emissions allowed for each pollutant determined in par. cad for each EGU participating in emissions averaging during the compliance year

P_u is the lowest annual allowable mass of mercury, NO_x or SO₂ emissions allowed for the compliance year for each EGU as determined under par. cad or applicable under any other enforceable state or federal requirement for each EGU participating in emissions averaging during the compliance year

n is the number of EGUs participating in emissions averaging

History: CR 07-036: cr. Register November 2008 No. 635, eff. 12-1-08.

NR 446.185 Compliance alternatives. c1d ALTERNATIVE ANNUAL ALLOWABLE MERCURY EMISSIONS. cad Owners and operators of a coal-fired EGU affected by this subchapter may use baseline mercury emissions approved by the department as an alternative to procedures in s. NR 446.18 c5d cad in determining annual allowable mercury emissions.

cbd Baseline mercury emissions shall be determined and used for calculating annual allowable mercury emissions for 5-year periods beginning with the period of 2016 to 2020. Baseline mercury emissions shall be determined every 5 years and used to calculate annual allowable mercury emissions for the subsequent 5-year period.

ccd Baseline mercury emissions for each 5-year period shall be determined using fuel mercury content data measured for the calendar year which is 2 years prior to the first year of the applicable 5-year period. The year designated for measuring fuel mercury content is the baseline determination year.

Note: Baseline emissions are measured for 2013 for determining the annual allowable emissions for compliance years 2015 to 2019, measured for 2018 for determining allowable emissions for compliance years 2020 through 2024, etc.

cdd No later than May 1 of the calendar year after the baseline determination year, the owner or operator of a coal-fired EGU shall submit a report to the department that includes information necessary to determine the baseline mercury emissions for that 5-year period.

ced In the report required under par. cdd, the owners or operators of a coal-fired EGU may request alternative data be used for determining baseline emissions if the data for the specified year is not representative of the EGU[s] normal operations or maintenance schedule.

cfd Baseline mercury emissions for each EGU shall be determined according to the following procedures:

1. Measure and determine the fuel mercury content according to requirements of s. NR 446.18 c3d for all fuels combusted in the EGU for the baseline determination year.

2. Calculate the baseline mercury concentration, on a mmBtu-basis, for the baseline determination year according to Equation 11.

$$\text{BMC} = \frac{\text{Fuel Hg}_{\text{annual}}}{\sum_{i=1}^h \text{HI}_i} \quad \text{Equation 11}$$

where:

BMC is the average baseline mercury concentration of fuel, in pounds per mmBtu, contained in the fuels combusted in the EGU during the baseline determination year

Fuel Hg_{annual} is the total mass of mercury contained in the fuel determined in subd. 1.

HI_i is the total amount of fuel, in mmBtu, consumed each hour i, during the baseline determination year

h is the total number of hours fuel is consumed during the baseline determination year

3. Calculate the baseline mercury emissions according to Equation 12 as the baseline mercury concentration times the 3-year average of annual fuel consumption, in mmBtu, for the baseline determination year and 2 years prior to the baseline determination year.

$$\text{BME} = \text{BMC} \times \frac{\sum_{y=1}^3 \left(\sum_{i=1}^h \text{HI}_i \right)_y}{3} \quad \text{Equation 12}$$

where:

BME is the baseline mercury emissions for the EGU in pounds

BMC is the baseline mercury concentration for the EGU determined in subd. 2., in pounds per mmBtu.

HI_i is the amount of fuel, in mmBtu combusted in the EGU for each hour i during each year y

h is the total number of hours fuel is combusted in the EGU during each year

cgd When determining annual allowable mercury emissions for achieving compliance on a unit-by-unit basis, use one of the following equations as applicable:

1. For a percent reduction mercury emission limitation, Equation 13.

$$\text{Hg}_{\text{allowable}} = \text{BME} \times (1 - \text{Hg CE}) \quad \text{Equation 13}$$

where:

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

BME is the baseline emissions for the EGU as determined in par. cfd 3.

Hg CE is the applicable requirement for percent mercury emission reduction divided by 100.

2. For a mercury output emission limitation, Equation 14.

$$\text{Hg}_{\text{allowable}} = \text{GEO}_{\text{GWh}} \times \text{BMC} \times (1 - \text{Hg CE}) \times \left(\frac{\sum_{i=1}^h \text{HI}_i}{\text{E}_{\text{GWh}}} \right)$$

Equation 14

where:

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

GEO_{GWh} is the annual gross energy output of the EGU, in GWh, as determined in s. NR 446.18 c4d for the compliance year

BMC is the baseline mercury concentration determined in par. cfd 2. for the EGU in pounds per mmBtu

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

HI_i is the amount of fuel, in mmBtu combusted each hour i, in the baseline determination year

h is the total number of hours fuel is combusted during the calendar year designated for measuring baseline emissions data under par. ccd

E_{GWh} is the annual gross electric output, in GWh, for the baseline determination year calculated according to s. NR 446.18 c4d cad

c2d ALTERNATIVE SO₂ COMPLIANCE DETERMINATION. cad The owner or operator of a coal-fired EGU may demonstrate compliance with the SO₂ emission limitation in s. NR 446.14 c1d by demonstrating a minimum SO₂ control efficiency equal to or greater than 90% removal of sulfur from fuels combusted in the EGU each year, excluding startup and shutdown, using a method approved by the department.

cbd If electing to demonstrate compliance according to par. cad, the owners or operators of a coal-fired EGU shall submit an SO₂ compliance demonstration procedure for department approval no later than October 1, 2013. The compliance procedure shall include test methods to determine sulfur removal from fuel and operating and parametric monitoring procedures to ensure continuous operation of control equipment consistent with maintaining the required control efficiency.

c3d ALTERNATIVE METHODS AND PROCEDURES. The owner or operator of a coal-fired EGU may use methods and procedures in determining annual allowable emissions as approved by the department to account for any of the following:

cad The contribution to mercury emissions by non-fuel materials inherent to pollution control processes. The contribution to the annual allowable emissions may not exceed the amount calculated when substituting annual mercury content of non-fuel materials for annual fuel mercury content in Equation 7 in s. NR 446.18 c5d cad 1.

cbd When monitoring or implementing control equipment for a stack serving multiple EGUs.

History: CR 07-036: cr. Register November 2008 No. 635, eff. 12-1-08; correction in c3d made under s. 13.92 c4d cbd 1., Stats., Register November 2008 No. 635; CR 13-089: am. c1d cbd Register July 2014 No. 703, eff. 8-1-14.

NR 446.19 Evaluation reports. c1d The department shall report to the natural resources board by August 31, 2013. This report shall include:

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

cbd An evaluation of whether the mercury requirements in this subchapter are achievable, given the scientific and technological developments.

ccd 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 c1d ccd 3., given the scientific and technological developments.

c2d In addition to the report required under sub. c1d, the department shall report to the natural resources board within 6

months of the date of promulgation of a federal regulation under section 111 or 112 of the Act [c42 USC 7411](#) or [7412d](#) or the enactment of a federal law that has mercury reduction requirements for the mercury emission sources affected by this subchapter. The report shall include a comparison of the federal requirements and the requirements of this subchapter along with recommendations for revisions to this subchapter or other actions.

c3d The natural resources board shall review these reports and, if they include recommendations for rule revisions or other actions, determine whether the department should proceed with actions based on the recommendations.

History: CR 07-036: cr. Register November 2008 No. 635, eff. 12-1-08.

Subchapter IV — Mercury Emission Standards for Other Sources

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

c1d In quantities greater than 2.3 kg c5.1 lbsd per 24-hour period from mercury cell chlor-alkali plants, or mercury ore processing facilities.

c2d In quantities greater than 3.2 kg c7.1 lbsd per 24-hour period from sludge incineration plants, sludge drying plants, or a combination of these that process wastewater treatment plant sludges.

History: Renum. from NR 154.19 c3d cad, Register, September, 1986, No. 369, eff. 10-1-86; am. cintro.d, Register, May, 1992, No. 437, eff. 6-1-92; am. c2d, Register, May, 1994, No. 461, eff. 6-1-94; CR 01-081: c1d and c2d renum. from NR 446.03 c2d and c3d Register September 2004 No. 585, eff. 10-1-04; CR 07-036: renum. from NR 446.14, am. c1d and c2d Register November 2008 No. 635, eff. 12-1-08.

NR 446.21 Stack sampling. c1d MERCURY ORE PROCESSING FACILITIES. cad 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.

cbd 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](#).

ccd 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.

cdd 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.

ced 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.

c2d MERCURY CHLOR-ALKALI PLANTS—HYDROGEN AND END BOX VENTILATION GAS STREAMS. cad 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.

cbd 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](#).

ccd 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.

cdd 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.

ced 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.

c3d MERCURY CHLOR-ALKALI PLANTS—CELL ROOM VENTILATION SYSTEM. cad Stationary sources using mercury chlor-alkali cells may test cell room emissions in accordance with par. [cbd](#), or demonstrate compliance with par. [cdd](#) and assume ventilation emissions of 1.3 kg c2.9 lbsd per day of mercury.

cbd 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.

ccd 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](#).

cdd 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 XReview of National Emission Standards for Mercury, Y EPA-450/3-84-014, December 1984, incorporated by reference in s. [NR 484.05](#) c9d.

c4d SLUDGE INCINERATION AND DRYING PLANTS. cad 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. [cfd](#).

cbd 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](#).

ccd 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.

cdd 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.

ced 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.

cf 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:

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

where:

E_{Hg} is the mercury emissions, g{day

M is the mercury concentration of sludge on a dry solids basis, $\mu\text{g}\{\text{g}$

Q is the sludge charging rate, $\text{kg}\{\text{day}$

$F_{\text{sm}(\text{avg})}$ is the average weight fraction of solids in the collected sludge after mixing

1000 is the conversion factor, $\text{kg}\ \mu\text{g}\{\text{g}^2$

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.

History: Renum. from NR 154.19 c3d cbd, and am., Register, September, 1986, No. 369, eff. 10-1-86; am. c1d cbd, c2d cbd, c3d ccd and c4d cbd, Register, May, 1992, No. 437, eff. 6-1-92; am. c1d cad, c2d cad, c3d cbd and cdd and c4d cad, cfd cintro.d, 3. and 4., Register, May, 1994, No. 461, eff. 6-1-94; CR 01-081: renum.

from NR 446.04 Register September 2004 No. 585, eff. 10-1-04; CR 07-036: renum. from NR 446.15, am. c3d cad Register November 2008 No. 635, eff. 12-1-08.

NR 446.22 Monitoring of emissions and operations. c1d

All wastewater treatment plant sludge incineration and drying plants for which mercury emissions exceed 1.6 kg c3.5 lbsd per 24-hour period, demonstrated either by stack sampling or sludge sampling according to s. NR 446.21 c4d, 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 c4d cfd. 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.

c2d The owner or operator of each mercury cell chlor-alkali plant—hydrogen and end-box ventilation gas streams shall:

cad Perform a mercury emission test that demonstrates compliance with the emission limits in s. NR 446.20 c1d 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.

cbd Monitor and record manually or automatically at least once every 15 minutes during the tests specified in par. cad all of the following control device parameters, except as provided in par. ccd:

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.

ccd Average the parameters recorded in par. cbd over a minimum 6 hour test period. The highest temperature reading that is measured in par. cbd 7. is to be identified as the reference temperature for use in par. cfd 2.

cdd Monitor and record manually or automatically immediately after the completion of the emission tests specified in par. cad the following:

1. The parameters specified in par. cbd 1. to 6. at least once per hour.
2. The temperature specified in par. cbd 7. during each heating phase of the regeneration cycle.

ced Operate, maintain and calibrate monitoring devices according to the manufacturer[s] instructions. Monitoring devices used in accordance with pars. cbd and cdd 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.

cfb Notify the department within 10 days when:

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

2. The maximum hourly value of the temperature measured in accordance with par. [cdd 2.](#) is below the reference temperature recorded according to par. [ccd](#) for 3 consecutive regeneration cycles.

cgd Submit semiannual reports to the department indicating the time and date on which the hourly value of each parameter monitored according to par. [cdd 1.](#) and [2.](#) fell outside the value of that same parameter determined under par. [ccd](#) 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 c2d](#), reports of parameter excursions may be used as evidence in judging the duration of a violation that is determined by a performance test.

chd Submit semiannual reports required in par. [cgd](#) 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.

c3d The owner or operator of a facility subject to sub. [c2d](#) 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. [c2d cad](#) to [cgd](#). Approval of an alternative plan shall ensure compliance with the emission limits of s. [NR 446.20 c1d](#), and proper operation and maintenance of emissions control systems. Any site-specific monitoring plan shall, at a minimum, include all of the following:

cad 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.

cbd 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 c1d](#).

ccd 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.

cdd Designation of the immediate actions to be taken in the event of an excursion beyond the value of the parameter established in par. [cbd](#).

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

cfb Identification of the accuracy of the monitoring devices or of the readings obtained.

cgd 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.

History: Renum. from NR 154.19 c3d ccd, and am., [Register, September, 1986, No. 369](#), eff. 10-1-86; renum. 446.05 to be c1d, cr. c2d and c3d, [Register, May, 1994, No. 461](#), eff. 6-1-94; am. c2d cad, c3d cintro.d and cbd, [Register, November, 1999, No. 527](#), eff. 12-1-99; [CR 01-081](#): renum. from NR 446.05 [Register September 2004 No. 585](#), eff. 10-1-04; [CR 07-036](#): renum. from NR 446.16, am. c1d, c2d cad, cgd, c3d cintro.d and cbd [Register November 2008 No. 635](#), eff. 12-1-08.