7011.0561 CONTROL OF MERCURY FROM ELECTRIC GENERATING UNITS.

Subpart 1. **Applicability.** The owners or operators of a coal-fired electric generating unit that have demonstrated actual mercury emissions of five pounds per year or more must comply with this part, except as provided under subpart 3.

Subp. 2. **Definitions.** The terms used in this part have the meanings given them in this subpart.

A. "Boiler operating day" means a 24-hour period between 12:00 midnight and the following midnight during which any fuel is combusted at any time in the steam-generating unit. It is not necessary for fuel to be combusted during the entire 24-hour period.

B. "Coal-fired electric generating unit" or "coal-fired EGU" means an electric generating unit that burns coal either exclusively or with any fuels in any amount.

C. "Electric generating unit" or "EGU" means a fossil-fuel combustion unit greater than 25 megawatt (MW) electric that serves a generator that produces electricity for sale. A fossil-fuel fired unit that cogenerates steam and electricity and supplies more than one-third of its potential electric output capacity to any utility power distribution system for sale is considered an electric generating unit.

D. "Grace period" means a specified number of hours after the deadline of a required quality assurance test has passed, within which the test may be performed without the loss of data.

E. "Operating hour" means a clock hour in which an EGU combusts any fuel for part of or for the entire hour.

F. "Quality-assured operating quarter" means a calendar quarter in which there are at least 168 operating hours.

Subp. 3. **Exemption.** Beginning one year after September 29, 2014, the owners or operators of a coal-fired EGU are not subject to this part if the coal-fired EGU does not:

A. emit five pounds of mercury per year or more as demonstrated in subpart 9;

B. combust coal for more than ten percent of the average annual heat input during any three consecutive calendar years; or

C. combust coal for more than 15 percent of the annual heat input during any calendar year.

Subp. 4. **Performance standards for mercury emissions.** Unless the commissioner establishes an alternative mercury emissions reduction under Minnesota Statutes, section 216B.687, subdivision 3, the owners or operators of coal-fired electric generating units

that do not qualify for the exemption under subpart 3 must control mercury emissions as described in this subpart.

A. By January 1, 2018, owners or operators of a coal-fired EGU with a nameplate electricity generation capacity greater than 100 MW must:

(1) control mercury such that at least 90 percent of the mercury present in the fuel is captured and not emitted; or

(2) demonstrate that the unit emits no more than 0.8 pounds of mercury per trillion British thermal units (Tbtu) of heat input.

B. By January 1, 2025, owners or operators of a coal-fired EGU that is not a supplemental unit as defined in Minnesota Statutes, sections 216B.682 to 216B.688, and with a nameplate capacity less than or equal to 100 MW must:

(1) control mercury such that at least 70 percent of the mercury present in the fuel is captured and not emitted; or

(2) demonstrate that the unit emits no more than 2.3 pounds of mercury per Tbtu of heat input.

C. By January 1, 2018, owners or operators of a coal-fired EGU that is a supplemental unit as defined in Minnesota Statutes, sections 216B.682 to 216B.688, must:

(1) control mercury such that at least 70 percent of the mercury present in the fuel is captured and not emitted; or

(2) demonstrate that the unit emits no more than 2.3 pounds of mercury per Tbtu heat input.

Subp. 5. **Monitoring mercury emissions.** The owners or operators of a coal-fired EGU must monitor mercury emissions as described in this subpart.

A. Coal-fired EGUs with a generating capacity equal to or greater than 250 MW (net) must continuously monitor mercury at a representative sampling location following the outlet of the last air pollution control device. A continuous monitor is either a continuous emissions monitoring system (CEMS) for mercury or a sorbent trap monitoring system capable of monitoring mercury as described in this part.

(1) If the system is a CEMS for mercury, the owners or operators must prepare a monitoring plan according to subpart 6. If the system is a sorbent trap system, the owner or operator must prepare a monitoring plan according to subpart 7. The plan must be submitted within 180 days of September 29, 2014, or as established by a permit, whichever is later.

(2) If applicable federal regulations establish requirements for installation and operation of continuous monitoring of the coal-fired EGU, the monitoring plan must

describe the compliance procedures for the monitors according to the federal regulation, in addition to the requirements of this part.

B. If a coal-fired EGU with a generating capacity less than 250 MW does not use a CEMS or a sorbent trap monitoring system to monitor mercury, the owner or operator must conduct performance testing for mercury according to this item at least once every 12 months and must complete the test no more than 13 months after the previous test. The initial test must be conducted by the applicable compliance deadline in subpart 4. Owners or operators may conduct performance stack tests for mercury no less frequently than once every three years, but no longer than 37 months after the previous performance test, if: (i) the performance tests for at least the immediately preceding three consecutive years show mercury reduction is greater than or equal to 85 percent; or (ii) mercury emissions are at or below 1.2 pounds of mercury per Tbtu of heat input; and, in both cases, if there are no changes in the operation of the EGU or air pollution control equipment that could increase emissions. The owner or operator must resume annual performance stack tests if the test results show mercury reduction is less than 85 percent or mercury emissions are above 1.2 pounds of mercury per Tbtu of heat input. Subitems (1) to (3) apply to performance testing conducted under this item.

(1) Performance testing must be conducted using Code of Federal Regulations, title 40, part 60, Appendix A-8, Method 30B. The initial performance test must be conducted for 30 boiler operating days under all process operating conditions. Sorbent traps must be used no longer than ten boiler operating days. Subsequent performance tests may be ten boiler operating days long.

(2) Compliance is determined by calculating the average mercury concentration from all sorbent trap results.

(3) Performance testing must be conducted according to parts 7017.2001 to 7017.2060 unless modified by this subpart.

Subp. 6. **Monitoring provisions; CEMS for mercury.** This subpart applies to the measurement of mercury from a coal-fired EGU using a continuous emissions monitoring system (CEMS) for mercury. "CEMS for mercury" means the total equipment required to measure the total vapor phase mercury concentration, consisting of three major subsystems: sample acquisition, transport, and conditioning; mercury converter and analyzer; and a data acquisition and handling system.

A. The monitoring plan for the CEMS for mercury must include:

(1) a description of the CEMS span value and justification for the span value's selection;

(2) methods, procedures, equations, and performance specifications, both main and alternate, to be used to conduct a certification test of the CEMS for mercury. The

certification must include a seven-day calibration error test, a linearity check, a three-level system integrity check, a cycle time test, and a relative accuracy test audit as described in Code of Federal Regulations, title 40, part 60, Appendices for Test Methods;

(3) methods, procedures, equations, and performance specifications to be used for ongoing daily calibration error tests, system integrity checks, linearity checks, or three-level system integrity checks, and a relative accuracy test audit. Relative accuracy must be calculated as described in Code of Federal Regulations, title 40, part 60, Appendix B: Performance Specification 2, section 12, or Performance Specification 6;

(4) a description of calculations used to convert mercury concentration values to the appropriate units of the emission standard; and

(5) procedures to provide substituted data in the event that monitors are not collecting mercury emissions data and data is missing from the monitoring record.

B. The CEMS must operate in compliance with parts 7017.0100, 7017.1002, 7017.1030, 7017.1080 to 7017.1130, 7017.1150, and 7017.1180.

C. Owners or operators must conduct routine quality assurance and control tests on a frequency as follows:

(1) a calibration error test must be conducted daily using either mid- or high-level gas. The calibrations are not required when the EGU is not in operation;

(2) single-level system integrity checks must be conducted weekly, meaning once every seven consecutive operating days for systems with mercury converters. This test is not required if daily calibrations are done with a National Institute of Standards and Technology-traceable source of oxidized mercury;

(3) linearity checks or three-level system integrity checks must be conducted quarterly in each quality-assured operating quarter and no less than once every four calendar quarters;

(4) a relative accuracy test audit is required annually, meaning once every four quality-assured operating quarters. This deadline may be extended for non-quality-assured operating quarters up to a maximum of eight quarters from the quarter of the previous test; and

(5) a 720 operating-hour grace period is allowed for relative accuracy test audits.

D. Calibration gas mercury concentrations used to conduct quality assurance tests on a CEMS must have the following concentrations:

(1) zero-level with a mercury concentration below the detectable limit of the analyzer;

(2) low-level with a mercury concentration of 20 to 30 percent of the span value of the analyzer;

(3) mid-level with a mercury concentration of 50 to 60 percent of the span value of the analyzer;

(4) high-level with a mercury concentration of 80 to 100 percent of the span value of the analyzer; and

(5) alternative concentrations may be used if approved by the commissioner. The data collected with the alternative concentration must be improved, given the applicable limit to qualify for approval.

E. Measurement or adjustment of the CEMS mercury data for bias is not required.

F. The owners or operators must certify, operate, maintain, and quality-assure the CEMS used to convert measured hourly mercury concentrations to applicable emission standards according to the applicable provisions of Code of Federal Regulations, title 40, part 75.

G. The owners or operators must reduce the hourly averages data from the CEMS for mercury according to Code of Federal Regulations, title 40, section 60.13(h)(2).

H. The owners or operators must convert hourly emissions concentrations to 30 boiler operating day rolling average (lb/Tbtu) according to appropriate emission rate equations of Code of Federal Regulations, title 40, part 60, Appendix A-7, Method 19.

I. Using fuel sampling data generated by the procedures in subpart 8, the owners or operators must demonstrate that the output from item G is no greater than ten percent of the input from fuel or demonstrate that emissions in item H are no greater than those specified in subpart 4.

J. The first 30 days of the monitoring period are used to determine compliance with the mercury emissions concentration limit.

Subp. 7. **Monitoring provisions; sorbent trap monitoring system.**

A. Owners or operators of a coal-fired EGU using a sorbent trap monitoring system must follow the monitoring provisions under this subpart for the measurement of mercury. "Sorbent trap monitoring system" means the equipment necessary to monitor mercury emissions continuously by using paired sorbent traps containing iodated charcoal or other sorbent medium. The system consists of sample acquisition, transport, conditioning, sorbent traps, and an automated data acquisition and handling system. The system samples the stack gas at a constant proportional rate relative to the stack gas volumetric flow rate. The sampling is a batch process. The average mercury concentration in the stack gas for the sampling period is determined, in units of micrograms per dry standard cubic meter (μg/dscm), based on the sample volume measured by the gas flow

meter and the mass of mercury collected in the sorbent traps. The use of a sorbent trap monitoring system also requires the installation and certification of a stack gas flow monitor to maintain the ratio of stack gas flow rate to sample flow rate.

B. The monitoring plan for the sorbent trap monitoring system must include:

(1) methods, procedures, equations, and performance specifications, both main and alternate, to be used to conduct a certification test of the sorbent trap monitoring system;

(2) methods, procedures, equations, and performance specifications, both main and alternate, to be used for ongoing relative accuracy test audits;

(3) the rationale for the minimum acceptable data collection period for the size of the sorbent trap selected;

(4) procedures used to monitor system integrity and data quality;

(5) a description of calculations used to convert mercury concentration values to the appropriate units of the emission standard;

(6) procedures for inscribing or permanently marking a unique identification number on each sorbent trap for tracking purposes. A record system must be developed to track the identification of the monitoring system along with dates and hours for each collection period; and

(7) procedures for providing substituted data in the event that monitors are not available to measure mercury emissions and data is missing from the monitoring record.

C. The continuous monitor must be operated in compliance with parts 7017.0100, 7017.1002, 7017.1030, 7017.1080 to 7017.1130, 7017.1150, and 7017.1180.

D. Monitoring systems that are used to measure stack gas volumetric flow rate, diluent gas concentration, or stack gas moisture content, either for routine operation of a sorbent trap monitoring system or to convert mercury concentration data to units of the applicable emission limit, must be certified according to the applicable provisions of Code of Federal Regulations, title 40, part 75.

E. The owners or operators must determine the mercury concentration for each data collection period and assign this concentration value to each operating hour in the data collection period.

F. The owners or operators must convert hourly emissions concentrations to 30 boiler operating day rolling average (lb/Tbtu) according to appropriate emission rate equations of Code of Federal Regulations, title 40, part 60, Appendix A-7, Method 19.

G. Using fuel sampling data generated by the procedures in subpart 8, the owners or operators must demonstrate that the output from item F meets the limits specified in subpart 4.

H. The first 30 days of the monitoring period is the first period used to determine compliance with the mercury emissions concentration limit.

Subp. 8. **Procedures for determining mercury content of fuel.** The owner or operator shall prepare a fuel sampling and analysis plan and submit it to the commissioner 30 days prior to collecting the initial fuel sample. When the mercury content of fuel is needed to determine total mercury emission reductions, owners or operators of a coal-fired EGU must use the fuel sampling and measuring fuel content procedures in items A to E. The mercury content of fuel used for start-up, unit shutdown, or transient flame stability does not need to be measured. The owners or operators must:

A. collect samples of each fuel using ASTM D2234/D2234M;

B. prepare a composited sample for each fuel type using ASTM D2013/D2013M;

C. determine the heat content of the fuel using ASTM D5865;

D. determine the moisture content of the fuel using ASTM D3173; and

E. measure mercury in the fuel sample using ASTM D6722-11, or SW-846-7471 for solid samples, and report in terms of lb/ton of fuel burned.

Subp. 9. **Demonstrating applicability of mercury control requirements.** The owners or operators of a coal-fired EGU without a continuous monitor for mercury must conduct a 28 to 30 operating day performance test to determine the mercury mass emissions according to this subpart. The initial test must be completed within one year of September 29, 2014. The owner or operator must:

A. conduct performance tests according to parts 7017.2001 to 7017.2060. When preparing the test plan required in part 7017.2030, the owner or operator must identify parametric data for air pollution control devices in place during the performance test that will be recorded;

B. use Code of Federal Regulations, title 40, part 60, Appendix A-8, Method 30B, or a substantially similar alternative method approved by the commissioner;

C. locate the Method 30B sampling probe tip at a point within the ten percent centroidal area of the duct at a location selected according to Method 1 in Code of Federal Regulations, title 40, part 60, Appendix A-1, and conduct at least three nominally equal length test runs over the 28- to 30-day test period. Test runs may not be longer than ten days;

D. collect diluents gas data over the corresponding time period using Code of Federal Regulations, title 40, part 60, Appendix A-2, Method 3A, or a diluent gas monitor certified according to Code of Federal Regulations, title 40, part 75;

E. for calculation of pounds per year of mercury, collect:

(1) stack gas flow rate using Method 2, 2F, or 2G in Code of Federal Regulations, title 40, part 60, Appendix A-1 or A-2, or a flow rate monitor that has been certified according to Code of Federal Regulations, title 40, part 75; and

(2) moisture data using Method 4 in Code of Federal Regulations, title 40, part 60, Appendix A-3, or a moisture monitor certified according to Code of Federal Regulations, title 40, part 75;

F. calculate the average mercury concentration, in micrograms per cubic meter ($\mu g/m^3$), for the 28- to 30-day performance test, as the arithmetic average of all sorbent trap results. The owner or operator must calculate the average CO_2 or O_2 concentration for the test period. The owner or operator must use the average mercury concentration and diluents gas values to express the performance test results in units of pounds of mercury per trillion British thermal units (lb/Tbtu) and actual pounds of mercury emitted per year, using the expected fuel heat input over a one-year period. Alternatively, the owner or operator must calculate pounds of mercury emitted per year using the average mercury concentration, average stack gas flow rate, average stack gas moisture, and maximum operating hours per year;

G. record parametric data for air pollution control devices in place during the performance test. If the calculation in item F demonstrates that the EGU emits less than five pounds per year of mercury, the owner or operator must operate air pollution control equipment at the rates exhibited during the performance test; and

H. repeat the performance test once every five years to demonstrate that the mercury emissions from the EGU remain below five pounds per year.

Subp. 10. **Incorporations by reference.** For purposes of this part, the methods listed in items A and B are incorporated by reference, as amended. These documents are subject to frequent change.

A. The Annual Book of American Society for Testing and Materials International (ASTM) methods D2234/D2234M (Standard Practice for Collection of a Gross Sample of Coal), D2013/D2013M (Standard Practice for Preparing Coal Samples for Analysis), D5865 (Standard Test Method for Gross Calorific Value of Coal and Coke), D3173 (Standard Test Method for Moisture in the Analysis Sample of Coal and Coke), and D6722 (Standard Test Method for Total Mercury in Coal and Coal Combustion Residues by Direct Combustion Analysis). These methods are published in the Annual Book of ASTM

Standards; Volume 05.06 Gaseous Fuels; Coal and Coke, 2012 edition. These documents are available through the Minitex interlibrary loan system.

B. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA SW-846, Third Edition, November 1986, issued by the United States Environmental Protection Agency (EPA). Method 7471 Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique) is available electronically from the Environmental Protection Agency and through the Minitex interlibrary loan system.

Statutory Authority: *MS s 116.07*

History: *39 SR 386*

Published Electronically: *February 3, 2015*