

1st Draft language for portions of WAC 173-407:

Send comments by December 4, 2007 to:

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WAC 173-407-050 Calculating total carbon dioxide emissions to be mitigated under part I.

(3) **Step 3 - Determine and apply the cogeneration credit (if any).** Where the cogeneration unit or facility qualifies for cogeneration credit, the cogeneration credit is the annual CO₂ emission rate (in metric tons per year) and is calculated as shown below or similar method:

$$CO_{2credit} = \frac{H_s}{2204.6} (K_a) \div \del{.35} n$$

- Where = The annual CO₂ credit for cogeneration credit in metric tons/year.
- H_s = Annual heat energy supplied by the cogeneration plant to the "steam host" per the contract or other binding obligation/agreement between the parties in MMBtu/yr as substantiated by an engineering analysis.
- K_a = The time weighted average CO₂ emission rate constant for the cogeneration plant in lb CO₂/MMBtu supplied. The time weighted average is calculated similarly to the above method described in subsection (1) of this section.
- n ≡ Efficiency of new replacement boiler. Assume n = 0.85 unless applicant provides information supporting a different value.

$$\text{Cogeneration Credit} = \text{CO}_{2\text{credit}} \times 30$$

WAC 173-407-060 Carbon dioxide mitigation plan requirements and options under part I.

(5) **What are the requirements for the applicant controlled mitigation projects option?** RCW 80.70.040 identifies the requirements for applicant controlled mitigation projects. Subsections (1) through (5) specify the criteria. ~~Subsection (6) specifies that if federal requirements are adopted for carbon dioxide mitigation for fossil-fueled thermal electric generation facilities, ecology or the local air authority may deem the federal requirements equivalent and replace RCW 80.70.040 with the federal requirements.~~ The direct investment cost of the applicant controlled mitigation project including funds used for selection monitoring and evaluation of mitigation projects must equal but is not required to exceed the cost of making a lump sum payment to a third party per WAC 173-407-060(3).

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WAC 173-407-110 Definitions to Part II. The following definitions are applicable for the purposes of Part II of this chapter.

"Baseload electric generation" means electric generation from a power plant that is designed and intended to provide electricity at an annualized plant capacity factor of at least sixty percent. For a cogeneration facility, the 60% annual capacity factor applies to the electrical production only. Last sentence added from cogeneration discussion on what the 60 % CF applies to.

“Bottoming-cycle cogeneration facility” means a cogeneration facility in which the energy input to the system is first applied to a useful thermal energy application or process, and at least some of the reject heat emerging from the application or process is then used for power production;

"Cogeneration facility" means a power plant in which the heat or steam is also used for industrial or commercial heating or cooling purposes and that meets federal energy regulatory commission standards for qualifying facilities under the public utility regulatory policies act of 1978 (16 U.S.C. Sec. 824a-3), as amended. From RCW 80.80.010

“Cogeneration facility” means equipment used to produce electric energy and forms of useful thermal energy (such as heat or steam), used for industrial, commercial,

heating, or cooling purposes, through the sequential use of energy. From 18CFR 292.202

"Combined-cycle natural gas thermal electric generation facility" means a power plant that employs a combination of one or more gas turbines and steam turbines in which electricity is produced in the steam turbine from otherwise lost waste heat exiting from one or more of the gas turbines.

"Distributed generation" means electric generation connected to the distribution level of the transmission and distribution grid, which is usually located at or near the intended place of use.

"Electric utility" means an electrical company or a consumer-owned utility.

"Electrical company" means a company owned by investors that meets the definition of RCW 80.04.010.

"Fossil fuel" means natural gas, petroleum, coal, or any form of solid, liquid, or gaseous fuel derived from such material to produce heat for the generation of electricity. From RCW 80.70 and 173-407-020(10).

"Greenhouse gases" includes carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

"Long-term financial commitment" means:

- (a) Either a new ownership interest in baseload electric generation or an upgrade to a baseload electric generation facility; or
- (b) A new or renewed contract for baseload electric generation with a term of five or more years for the provision of retail power or wholesale power to end-use customers in this state.

"MWh" = megawatt-hour electricity

"MWh_{eq}" = megawatt-hr equivalent electrical energy of useful thermal energy output. 1 MWh_{eq} = 3,413 million Btu of thermal energy.

"Permanent sequestration" means retention of greenhouse gases using a sequestration method approved by the department that creates a high degree of certainty that at least 99% of the greenhouse gases will remain sequestered for at least 1,000 years.

"Plant capacity factor" means the ratio of the electricity produced during a given time period, measured in kilowatt-hours, to the electricity the unit could have produced if it had been operated at its rated capacity during that period, expressed in kilowatt-hours.

"Power plant" means a facility for the generation of electricity that is permitted as a single plant by the energy facility site evaluation council or a local jurisdiction.

"Renewable resources" means electricity generation facilities fueled by:

- (a) Water;
- (b) Wind;
- (c) Solar energy;
- (d) Geothermal energy;
- (e) Landfill gas;
- (f) Biomass energy utilizing animal waste, solid organic fuels from wood, forest, or field residues or dedicated energy crops that do not include wood pieces that have been treated with chemical preservatives such as creosote, pentachlorophenol, or copper-chrome-arsenic;
- (g) Byproducts of pulping or wood manufacturing processes, including but not limited to bark, wood chips, sawdust, and lignin in spent pulping liquors;
- (h) Ocean thermal, wave, or tidal power; or
- (i) Gas from sewage treatment facilities.

Sequential use" of energy means:

- (a) For a topping-cycle cogeneration facility, the use of reject heat from a power production process in sufficient amounts in a thermal application or process to conform to the requirements of the operating standard; or
- (b) For a bottoming-cycle cogeneration facility, the use of reject heat from a thermal application or process, at least some of which is then used for power production.

"Supplementary firing" means an energy input to the cogeneration facility used only in the thermal process of a topping-cycle cogeneration facility, or only in the electric generating process of a bottoming-cycle cogeneration facility.

"Unspecified sources" means electricity purchased from one or more unidentified power plants.

"Topping-cycle cogeneration facility" means a cogeneration facility in which the energy input to the facility is first used to produce useful power output, and at least some of the reject heat from the power production process is then used to provide useful thermal energy.

"Total energy output" of a topping cycle cogeneration facility is the sum of the useful power output and useful thermal energy output.

"Total energy input" means the total energy of all forms supplied from external sources.

“Total Greenhouse gas emissions” is the mass of carbon dioxide emitted plus the mass of nitrous oxide emitted plus the mass of methane emitted. Total Greenhouse gas emissions include CO₂ produced by a sulfur dioxide control system such as a wet limestone scrubber system.

“Useful power output” of a cogeneration facility means the electric or mechanical energy made available for use, exclusive of any such energy used in the power production process.

“Useful thermal energy output” of a topping-cycle cogeneration facility means the thermal energy:

- (a) that is made available to an industrial or commercial process (net of any heat contained in condensate return and/or makeup water);
- (b) that is used in a heating application (e.g., space heating, domestic hot water heating);
or
- (c) that is used in a space cooling application (i.e., thermal energy used by an absorption chiller).

"Upgrade" means any modification made for the primary purpose of increasing the electric generation capacity of a baseload electric generation facility. "Upgrade" does not include routine or necessary maintenance, installation of emission control equipment, installation, replacement, or modification of equipment that improves the heat rate of the facility, or installation, replacement, or modification of equipment for the primary purpose of maintaining reliable generation output capability that does not increase the heat input or fuel usage as specified in existing generation air quality permits as of July 22, 2007, but may result in incidental increases in generation capacity.

“Waste gas” is refinery gas, pulp mill waste gasifier gas, pulp mill noncondensable gasses, and other gasses with a heat content of less than 600 – 800 Btu/cu. ft. at standard conditions. Waste gas does not include gaseous renewable energy sources. *This is a suggestion based on committee discussion. Need to research what Btu content would be a low content gas, though probably the rate at which an organic gas stream would not be autothermal would be the logical Btu content.*

WAC 173-407-120 Greenhouse gases emissions performance standard applicability for part II.

- (1) This rule is applicable to:
 - (a) All baseload electric generation facilities which are all electric generation units and collections of units at a single site which:
 - (i) Utilize a nonrenewable resource for all or part of its fuel requirements
 - (ii) Are designed and intended to operate as baseload generation facilities, or
 - (iii) Are subject to long term contracts to provide baseload electric generation.

(b) All baseload electric cogeneration facilities which are all electric cogeneration units and collections of units at a single site which:

- (i) Utilize a nonrenewable resource for all or part of its fuel requirements
- (ii) Are designed and intended to operate as baseload generation facilities, or
- (iii) Are subject to long term contracts to provide baseload electric generation.

(2) This rule is not applicable to any facility which utilizes a renewable energy source for all of its fuel input.

(3) A baseload electric generation or cogeneration facility in existence on July 1, 2007 that has not been subject to a long term financial commitment is presumed to meet the performance standard until it has become subject to a new long term financial commitment.

(4) A baseload electric generation or cogeneration facility that is new or an existing baseload electric generation or cogeneration facility that is subject to a new long term financial commitment is required to meet the performance standard in effect at the time:

- (a) The new facility is permitted,
- (b) The existing facility is upgraded, or
- (c) The existing facility is subject to a new long term financial commitment

(5) A new baseload electric generation or cogeneration facility becomes an existing baseload electric generation or cogeneration facility the day it first delivers electricity to the electrical transmission or distribution grid.

WAC 173-407-140 Calculating greenhouse gases emissions and determining compliance for baseload electric generation under part II.

(1) All baseload electrical generation facilities which are not baseload cogeneration facilities are subject to compliance in accordance with the following process.

(2) Compliance determinations shall be made using the data identified below.

(a) Fuels to be accounted for in determining compliance

- (i) All fossil fuels as defined in 173-407-110.
- (ii) No fuel which is a renewable resource, as defined in RCW 19.280.020, is included as a fuel contributing to total greenhouse gas emissions.
- (iii) Fuel usage is to be monitored, and reported as directed by WAC 173-407-170

(b) Electrical output will be the net electrical output measured in MWh as directed by WAC 173-407-170

(c) Total greenhouse gas emissions

(3) Annually the baseload electric generation facility will calculate the lb of total greenhouse gas emissions emitted per MWh of electricity produced during the calendar year by dividing the total greenhouse gas emissions by the total MWh produced in the year.

WAC 173-407-150 Calculating greenhouse gases emissions and determining compliance for baseload cogeneration units under part II.

(1) The use of this section for determining compliance with the GHG performance standard is limited to only those facilities which have certified to FERC under the provisions of 18 CFR 292 Subpart B as a qualifying cogeneration facility.

(2) Compliance determination

(a) Fuels to accounted for in determining compliance

(i) All fossil fuels as defined in 173-407-110(/).

(ii) No fuel which is a renewable resource, as defined in RCW 19.280.020, is included as a fuel contributing to GHG emissions.

(b) All useful thermal energy used for non-electrical generation uses will be converted to units of megawatts energy equivalent (MWeq) using the conversion factor of 3,413 million Btu/megawatt (MMBtu/MW).

(3) Bottoming Cycle cogeneration facilities. The formula to determine compliance of a bottoming cycle cogeneration facility with the performance standard will be jointly developed by Ecology and the facility. The formula plus all necessary monitoring, recordkeeping and reporting requirements required to use the formula will be included in an air quality permit issued to the facility. The formula will be specific to the installed equipment and operating conditions of the facility.

(4) Topping cycle cogeneration facilities. Compliance of a topping cycle facility with the performance standard will be as follows:

(a) Determine annual net electricity produced in MWh. Net electrical energy produced may be reduced based on the ratio of the total energy input from renewable energy sources and total energy input from fossil and renewable energy sources combined.

(b) Determine the annual electrical energy equivalent of the useful thermal energy output in MWh_{eq} . Useful thermal energy produced may be reduced based on the ratio of the total energy input from renewable energy sources and total energy input from fossil and renewable energy sources combined.

(c) Determine the annual total greenhouse gas emissions produced in pounds.

(d) Calculate the pounds of total greenhouse gas emissions/MWh by dividing the annual total greenhouse gas emissions by the sum of the MWh and MWh_{eq} produced in the year.

WAC 173-407-170 Emissions and electrical production Monitoring, recordkeeping and reporting requirements under part II.

(1) Monitoring and recordkeeping requirements. The following parameters shall be monitored and reported as explained below:

(a) Net electrical output: Net electrical output is as measured at the point of connection with the local electrical distribution network or to a transmission line, as appropriate. This is the same point of measurement as is used for payment for electrical sales and uses the same meters. Measurement will be on an hourly or daily basis and recorded in a form suitable for use in calculating

compliance with the GHG emission standard.

(b) Useful thermal energy output: Determine quantity of energy supplied to non-electrical production uses through monitoring of both the energy supplied and returned by the thermal energy user or uses. This can be done through

(i) Measurement of the supply and return streams of the:

- (A) Mass of steam or other thermal fluid,
- (B) Pressure of the steam or thermal fluid, and
- (C) Temperature of the steam or thermal fluid.

(ii) Through use of thermodynamic calculations as approved by Ecology.

(iii) Measurement will be on an hourly or daily basis and recorded in a form suitable for use in calculating compliance with the GHG emission standard.

(c) Total Greenhouse gas emissions

(i) The total greenhouse gas emissions are the sum of the CO₂ emissions from the main plant exhaust stack and any bypass stacks or flares. For power plants including a gasifier with CO₂ separation, process and fugitive CO₂ emissions from the CO₂ separation and compression process are included.

(ii) Carbon dioxide (CO₂)

- (A) For baseload electric generation and cogeneration facilities producing 25 MW or more of electricity, CO₂ emissions will be monitored by a continuous emission monitoring system meeting the requirements of 40 CFR Part 75.10, 75.13 and Appendix F.
- (B) For baseload electric generation and cogeneration facilities producing less than 25 MW of electricity, the owner may either utilize a continuous emission monitoring system meeting the requirements of 40 CFR Part 75.10, 75.13 and Appendix F, or through fuel carbon content monitoring and methods meeting the requirements of 40 CFR Part 75.10, 75.13 and Appendix G
- (C) When the monitoring data from a continuous emission monitoring system does not meet the completeness requirements of 40 CFR 75, the baseload generation facility operator will substitute data according to the process in 40 CFR Part 75.
- (D) Continuous emission monitors for CO₂ will be installed at a location meeting the requirements of 40 CFR Part 75, Appendix A. The CO₂ and flow monitoring equipment must meet the quality control and quality assurance requirements of 40 CFR Part 75, Appendix B.

(iii) Nitrous Oxide (N₂O)

(A) For new and upgraded baseload power plants equal to or greater in output than 25 MWh net.

- (1) For the first year of operation, N₂O emissions are estimated by use of emission factors as published by the Environmental Protection Agency, the federal Dept. of Energy's Energy Information Agency, or other authoritative

source as approved by Ecology for use by the facility.

(2) For succeeding years, N₂O emissions will be estimated through use of plant specific emission factors derived through use of emissions testing using Ecology or EPA approved methods. The emission factor shall be derived through testing at varying loads and through at least 4 separate test periods spaced evenly through the first year of commercial operation.

(B) For new and upgraded baseload power plants below 25 MW net. The annual N₂O emissions will be estimated by use of emission factors as published by the Environmental Protection Agency, the federal Dept. of Energy's Energy Information Agency, or other authoritative source as approved by Ecology for use by the facility.

(iv) Methane (CH₄)

(A) For new and upgraded baseload power plants equal to or greater in output than 25 MWh net.

(1) For the first year of operation, CH₄ emissions are estimated by use of emission factors as published by the Environmental Protection Agency, the federal Dept. of Energy's Energy Information Agency, or other authoritative source as approved by Ecology for use by the facility.

(2) For succeeding years, CH₄ emissions will be estimated through use of plant specific emission factors derived through use of emissions testing using Ecology or EPA approved methods. The emission factor shall be derived through testing at varying loads and through at least 4 separate test periods spaced evenly through the first year of commercial operation.

(B) For new and upgraded baseload power plants below 25 MW net. The annual CH₄ emissions will be estimated by use of emission factors as published by the Environmental Protection Agency, the federal Dept. of Energy's Energy Information Agency, or other authoritative source as approved by Ecology for use by the facility.

(d) Fuel usage information

(i) Fossil fuel usage will be monitored by continuous fuel volume or weight measurement as appropriate for the fuel used. Measurement will be on an hourly or daily basis and recorded in a form suitable for use in calculating GHG emissions.

(ii) Renewable energy fuel usage will be monitored by continuous fuel volume or weight measurement as appropriate for the fuel used. Measurement will be on an hourly or daily basis and recorded in a form suitable for use in calculating GHG emissions.

(2) Reporting requirements. The parameters monitored above shall be reported to Ecology or the permitting authority annually.

(a) Facilities subject to the reporting requirements of 40 CFR part 75. Annual emissions of CO₂, N₂O and CH₄ will be reported to Ecology and the air quality permitting authority with jurisdiction over the facility by January 31 of each calendar year. The report may be an Excel™ or CSV format copy of the report submitted to EPA with the emissions for N₂O and CH₄ appended to the report

(b) For facilities not subject to the reporting requirements of 40 CFR Part 75. Annual emissions of CO₂, N₂O and CH₄ will be reported to Ecology and the air quality permitting authority with jurisdiction over the facility by January 31 of each calendar year. Need to check the Acid Rain rules when this report is actually required to be submitted to confirm if Jan. 31 is correct.

(c) Format of the report is given in Appendix A of this regulation. Gives us a chance to define the report format without cluttering up the rule text with a big table in the middle.