

## Model Regulations for the Output of Specified Air Emissions from Smaller-Scale Electric Generation Resources

**Title AA:** Emissions Standards for Smaller-Scale Electric Generation Facilities

**I. Purpose.** The purpose of this rule is to:

- (A) Regulate the emissions of certain air pollutants from smaller-scale electric generating units in this jurisdiction; and
- (B) Reduce the regulatory and administrative requirements for siting units that are affected by this rule.

**II. Definitions.**

- (A) **Agency:** The local or state governmental department, division, or agency that has jurisdiction over air pollution emissions of electric generating units.
- (B) **Combined Heat and Power:** A generator that sequentially produces both electric power and thermal energy from a single source. Herein referred to as CHP.
- (C) **Design System Efficiency:** For CHP, the sum of the full load design thermal output and electric output divided by the heat input.
- (D) **Dual-Fuel Generator:** A generator that has the capacity to be fired by either natural gas (including landfill methane, digester gas, or similarly produced gases) or a liquid fuel (e.g., diesel or #2 oil), but not by both fuels simultaneously.
- (E) **Emergency:** An electric power outage due to a failure of the electrical grid, on-site disaster, local equipment failure, or public service emergencies such as flood, fire, or natural disaster.
- (F) **Emergency Generators:** Generators used only during emergencies or for maintenance purposes, provided that the maximum annual operating hours, including maintenance, shall not exceed 300 hours per calendar year. Emergency generators shall not be operated in conjunction with any voluntary demand-reduction program or any other interruptible power supply arrangement with a utility, other market participant, or system operator.
- (G) **Generator:** Any equipment that converts primary fuel (including fossil fuels and renewable fuels) into electricity or electricity and thermal energy.
- (H) **Installation:** A generator is installed when it begins generating electricity.
- (I) **ISO:** International Organization for Standardization.
- (J) **Landfill Gas:** Gas generated by the decomposition of organic waste deposited in a landfill (including municipal solid waste landfills) or derived from the evolution of organic compounds in the waste.
- (K) **Mobile Diesel Fuel:** Diesel fuel that meets current US Environmental Protection Agency sulfur limits for fuel used by on-highway diesel engines (40 CFR 86).
- (L) **Non-Emergency Generator:** Any generator that is not defined herein as an emergency generator.
- (M) **Other Gaseous Fuels:** Gaseous fuels other than natural gas, including but not limited to landfill gas, waste gas, and anaerobic digester gas.
- (N) **Owner:** The owner of, or person responsible for, a generator subject to the requirements of this rule.

- (O) **Power to Heat Ratio:** For a CHP unit, the design electrical output divided by the design recovered thermal output in consistent units.
- (P) **Supplier:** A person or firm that manufactures, assembles, or otherwise supplies generators subject to the requirements of this rule.
- (Q) **USEPA:** The United States Environmental Protection Agency.
- (R) **Waste Gas:** Manufacturing or mining byproduct gases that are not used and are otherwise flared or incinerated. A manufacturing or mining byproduct is a material that is not one of the primary products of a particular manufacturing or mining operation, is a secondary and incidental product of the particular operation, and would not be solely and separately manufactured or mined by the particular manufacturing or mining operation. The term does not include an intermediate manufacturing or mining product which results from one of the steps in a manufacturing or mining process and is typically processed through the next step of the process within a short time.

**III. Effective Date.** This rule is effective on [date].

**IV. Applicability.**

- (A) This rule applies to all non-mobile generators that are installed on or after the effective date and that are not subject to Prevention of Significant Deterioration (40 CFR 52.21) or Review of New Sources and Modifications (40 CFR 51.160).
- (B) **Exemptions.** Generators whose engines are subject to the 40 CFR 89, 90, 91, and 92, (the US EPA's Non-Road Engine Program) will be exempt from compliance with the requirements of this rule.

**V. Emissions.** A generator's emissions of nitrogen oxides (NO<sub>x</sub>), particulate matter (PM), carbon monoxide (CO), and carbon dioxide (CO<sub>2</sub>) under full load design conditions or at the load conditions specified by the applicable testing methods shall not exceed the standards set out in the following subparagraphs. Standards are expressed in pounds per megawatt-hour (lbs/MWh) of electricity output. A generator shall meet the applicable standard in effect on the date that the unit is manufactured or on the date one year prior to the installation date of the unit, whichever is later.

- (A) **Emergency generators.** A generator may run up to a maximum of 300 hours per year for maintenance, testing, and emergencies. Within that limit of 300 hours per year, a generator may run up to a maximum of 50 hours per year for maintenance and testing. Emergency generators must meet the emissions standards set by the USEPA for non-road engines (40 CFR 89) at the time of installation. Any engine that is certified under the USEPA non-road standards is automatically certified under this rule to operate as an emergency generator. In addition, CO<sub>2</sub> emissions standards for emergency generators are as follows:

	<b>Carbon Dioxide</b>
Phase One (installed on or after 1/1/04)	1,900 lbs/MWh
Phase Two (installed on or after 1/1/08)	1,900 lbs/MWh
Phase Three (installed on or after 1/1/12)	1,650 lbs/MWh

(B) **Non-Emergency Generators.** Emissions standards for non-emergency generators are as follows:

	<b>Nitrogen Oxides:</b> Ozone Attainment Areas	<b>Nitrogen Oxides:</b> Ozone Non-Attainment Areas
Phase One (installed on or after 1/1/04)	4.0 lbs/MWh	0.6 lbs/MWh
Phase Two (installed on or after 1/1/08)	1.5 lbs/MWh	0.3 lbs/MWh
Phase Three (installed on or after 1/1/12)	0.15 lbs/MWh	0.15 lbs/MWh

	<b>Particulate Matter:</b> liquid fuel reciprocating engines	<b>Particulate Matter:</b> liquid-fuel only non-reciprocating engines	<b>Carbon Monoxide</b>	<b>Carbon Dioxide</b>
Phase One (installed on or after 1/1/04)	0.7 lbs/MWh	To be determined	10 lbs/MWh	1,900 lbs/MWh
Phase Two (installed on or after 1/1/08)	0.07 lbs/MWh	To be determined	2 lbs/MWh	1,900 lbs/MWh
Phase Three (installed on or after 1/1/12)	0.03 lbs/MWh	To be determined	1 lb/MWh	1,650 lbs/MWh

(C) **Technology Review.**

- (1) By December 31, 2010, the Agency shall complete a review of the state of, and expected changes in, technology and emissions rates. This review shall be used by the Agency in considering whether the Phase Three standards (beginning 1/1/12) should be amended.
- (2) Beginning in 2017 and every five years thereafter, the Agency shall review the state of technology and emissions rates and determine whether the emissions set out herein should be amended.

(D) **Dual-Fuel Generators.** Dual-fuel generators must meet all applicable requirements of this rule when operated on gaseous fuels. Such generators may operate no more than thirty (30) days per year on liquid fuel. The liquid fuel must meet current USEPA sulfur limits for fuel used by on-highway diesel engines.

**VI. Emissions Certification, Compliance, and Enforcement.**

(A) **Emissions Certification.** A supplier may seek to certify that its generators meet the provisions of this rule.

- (1) **Certification Process.** Emissions of nitrogen oxides, particulate matter, carbon monoxide, and carbon dioxide from the generator shall be certified in pounds of emissions per megawatt hour (lb/MWh) at full load design (ISO) conditions or at the load conditions specified by the applicable testing methods. If the design of a certified generator is modified, the generator will need to be re-certified. Certification means that a generator meets the required emissions standards and can be installed as supplied. With respect to nitrogen oxides, carbon monoxide,

and carbon dioxide, test results from USEPA Reference Methods, California Air Resources Board methods, or equivalent testing may be used to verify this certification. When testing the output of particulate matter from liquid-fuel reciprocating engines, ISO Method 8178 shall be used. Test results shall be provided upon request to the Agency. Any engine that has been certified to meet the currently applicable USEPA non-road emissions standards and the CO<sub>2</sub> standards set out in Section V(A) shall be deemed to be certified for use in emergency generators. A statement attesting to certification must be displayed on the nameplate of the unit or on a label attached to the unit with the following text:

This engine has met the standards defined by [state/USEPA] regulation and is certified as meeting applicable emission levels when it is maintained and operated in accordance with the supplier's instructions.

- (2) **Responsibility of Supplier.** Certification will apply to a specific make and model of generator. For a make and model of a generator to be certified, the supplier must certify that the generator is capable of meeting the requirements of this rule for the lesser of 15,000 hours of operation or three years. During the initial 15,000-hour operating period, the Agency may enforce compliance with these standards.
- (B) An owner of a generator that is not certified under the terms of Section VI.A. will need to demonstrate compliance with this rule through on-site testing using procedures set out in [other applicable state regulations].
- (C) **Duty to Comply.** An owner shall comply with the requirements of this rule or with the terms and conditions of any permit issued pursuant to this rule. Neither certification nor compliance with this rule relieves owners from compliance with all other applicable state and federal regulations (e.g., a general permit or a new source review permit).
- (D) **Enforceability.** This rule and any permit issued pursuant to it are enforceable by the Agency as provided by law.

**VII. Credit for Concurrent Emissions Reductions.**

- (A) **Flared Fuels.** If a generator uses fuel that would otherwise be flared (i.e., not used for generation or other energy related purpose), the emissions that were or would have been produced through the flaring can be deducted from the actual emissions of the generator, for the purposes of calculating compliance with the requirements of this rule. If the actual emissions from flaring can be documented, they may be used as the basis for calculating the credit, subject to the approval of the Agency. If the actual emissions from flaring cannot be documented, then the following default values shall be used:

Emissions	Waste, Landfill, Digester Gases
Nitrogen Oxides	0.1 lbs/MMBtu
Particulate Matter	N/A
Carbon Monoxide	0.7 lb/MMBtu

- (B) **Combined Heat and Power.**
  - (1) CHP installations must meet the following requirements to be eligible for emissions credits related to thermal output:
    - (a) At least 20% of the fuel's total recovered energy must be thermal and at least 13% must

be electric. This corresponds to an allowed power-to-heat ratio range of between 4.0 and 0.15.

(b) The design system efficiency must be at least 55 percent.

(2) A CHP system that meets these requirements can receive a compliance credit against its actual emissions based on the emissions that would have been created by a conventional separate system used to generate the same thermal output. The credit will be subtracted from the actual generator emissions for purposes of calculating compliance with the limits in section V.B. The credit will be calculated according to the following assumptions and procedures:

(a) The emission rates for the displaced thermal system (e.g., boiler) will be:

- i. For CHP installed in new facilities, the emissions limits applicable to new natural gas-fired boilers in [state code reference for boiler standards or Standards of Performance for New Sources (40 CFR 60, Subparts Da, Db, Dc), whichever is more stringent] in lbs/MMBtu.
- ii. For CHP facilities that replace existing thermal systems for which historic emission rates can be documented, the historic emission rates in lbs/MMBtu but not more than:

Emissions	Maximum Rate
Nitrogen Oxides	0.3 lbs/MMBtu
Particulate Matter	N/A
Carbon Monoxide	0.08 lbs/MMBtu

(b) The emissions rate of the thermal system in lbs/MMBtu will be converted to an output-based rate by dividing by the thermal system efficiency. For new systems the efficiency of the avoided thermal system will be assumed to be 80% for boilers or the design efficiency of other process heat systems. If the design efficiency of the other process heat system cannot be documented, an efficiency of 80% will be assumed. For retrofit systems, the historic efficiency of the displaced thermal system can be used if that efficiency can be documented and if the displaced thermal system is either enforceably shut down and replaced by the CHP system, or if its operation is measurably and enforceably reduced by the operation of the CHP system.

(c) The emissions per MMBtu of thermal energy output will be converted to emissions per MWh of thermal energy by multiplying by 3.412 MMBtu/MWh<sub>thermal</sub>.

(d) The emissions credits in lbs/MWh<sub>thermal</sub>, as calculated in (c), will be converted to emissions in lbs/MWh<sub>emissions</sub> by dividing by the CHP system power-to-heat ratio.

(e) The credit, as calculated in (d), will be subtracted from the actual emission rate of the CHP unit to produce the emission rate used for compliance purposes.

(f) The mathematical calculations set out in subsections (a) through (d) above are expressed in the following formula:

$$\text{Credit lbs/MWh}_{\text{emissions}} = [(\text{boiler limit lbs/MMBtu})/(\text{boiler efficiency})] * [3.412/(\text{power to heat ratio})]$$

(C) **End-Use Efficiency and Non-Emitting Resources.** When end-use energy efficiency and conservation measures or electricity generation that does not produce any of the emissions regulated herein are installed and operated contemporaneously at the facility where the generator is installed and operated, then the electricity savings credited to the efficiency and conservation measures or supplied by the non-emitting electricity source shall be added to the electricity sup-

plied by the generator for the purposes of calculating compliance with the requirements of this rule, subject to the approval of the Agency and in accordance with guidelines established by the Agency for determining such savings.

#### **VIII. Fuel Requirements.**

- (A) **Mobile Diesel Fuel.** Generators powered by diesel internal combustion engines shall use only on-road mobile diesel fuel.
- (B) **Natural Gas and Other Gaseous Fuels.** Gaseous fuels combusted in these generators shall contain no more than ten grains total sulfur per 100 dry standard cubic feet.
- (C) **Monitoring.** If the generator is powered by an engine supplied with fuel from more than one tank or if multiple sources (engines and other devices that use the fuel) are supplied fuel by one fuel tank, a non-resettable fuel metering device shall be used to continuously monitor the fuel consumption by the generator's engine. Generators whose total capacity is 200 kW or less will be exempt from this requirement.

#### **IX. Record Keeping and Reporting.**

- (A) **Record-Keeping Requirements.** At the premises where the generator is installed, or at such other place as the Agency approves in writing, the owner shall maintain the records as described in subsections (1) through (4) following. Non-emergency generators with electric generating capacity of less than 200 kW shall be exempt from these requirements. Emergency generators shall be exempt from subsections (1) and (2):
  - (1) Monthly and annual amounts of fuel(s) consumed. For the purposes of this subparagraph, annual fuel consumption shall be calculated each calendar month by adding (for each fuel) the current calendar month's fuel consumption to those of the previous eleven months;
  - (2) Monthly and annual operating hours. For the purpose of this subparagraph, annual operating hours shall be calculated each calendar month by adding the current calendar month's operating hours to those of the previous eleven months;
  - (3) With respect to each shipment of liquid fuel (other than liquefied petroleum gas), to be used in each engine authorized hereunder, a shipping receipt and certification from the fuel supplier of the type of fuel delivered, the percentage of sulfur in such fuel (by weight dry basis), and the method used by the fuel supplier to determine the sulfur content of such fuel; and
  - (4) Date, duration, and type of emergency during which an emergency generator is operated. Owner must certify that non-maintenance run hours occurred only during emergencies. Maintenance hours must be separately accounted for. Owner shall record operations when they occur.
- (D) **Availability of Records.** Unless the Agency provides otherwise in writing, the owner shall maintain each record required by this subsection for a minimum of five years after the date such record is made. An owner shall promptly provide any such record, or copy thereof, to the Agency upon request.
- (E) **Duty to Report.**
  - (1) **Additional Information.** If the Agency requests any information pertinent to the authorized activity or to compliance with a general permit issued pursuant to this rule, the owner shall provide such information within thirty days of such request.