

## SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT

### **RULE 4701 - INTERNAL COMBUSTION ENGINES**

*(Adopted May 21, 1992; Amended December 17, 1992; Amended October 20, 1994; Amended March 16, 1995; Amended December 19, 1996; Amended November 12, 1998; Amended December 19, 2002)*

#### 1.0 Purpose

The purpose of this rule is to limit the emissions of nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), and volatile organic compounds (VOC) from internal combustion engines.

#### 2.0 Applicability

Except as provided in Section 4.0, the provisions of this rule apply to any internal combustion engine, rated greater than 50 bhp, that requires a Permit to Operate (PTO).

#### 3.0 Definitions

- 3.1 Beam-balanced pumping engine: A cyclic loaded engine powering an oil well pump, with the pump counterweight on the back end of the walking beam. The counterweight is moved mechanically without a cylinder supplying air pressure.
- 3.2 CO: Carbon monoxide.
- 3.3 Crank-balanced pumping engine: A cyclic loaded engine powering an oil well pump, with the pump counterweight attached to a gearbox which is attached to the walking beam with a pitman arm. The counterweight is moved mechanically, in a circular motion, without a cylinder supplying air pressure.
- 3.4 Cyclic Loaded Engine: An engine that, under normal operating conditions, varies in shaft load by 40% or more of rated brake horsepower during recurrent periods of 30 seconds or less or is used to power an oil well reciprocating pump unit.
- 3.5 Diesel Engine: Any compression-ignited internal combustion engine.
- 3.6 De-rated Engine: An internal combustion engine which has been physically limited and restricted by permit condition to an operational level of 50 horsepower or less.
- 3.7 Dual-Fuel Engine: Any internal combustion engine which is designed to burn a liquid and gaseous fuel mixture during a single operating cycle.
- 3.8 Gaseous Fuel: Any fuel which is a gas at standard conditions including but not limited to natural gas, methane, ethane, propane, butane and liquefied petroleum gas (LPG).

- 3.9 Internal Combustion Engine: Any spark- or compression-ignited reciprocating engine.
- 3.10 Lean-Burn Engine: Any spark ignited internal combustion engine that is operated with an exhaust stream oxygen concentration of four (4) percent by volume, or greater prior to any exhaust stream control device.
- 3.11 Location: Any single site at a building, structure, facility, or installation.
- 3.12 Low-use engine: Any internal combustion engine that is limited by District permit to operate no more than 1,000 hours in any one calendar year, and is equipped with a non-resettable, totalizing hour-meter. Total time shall include all operational use and operation for maintenance and testing purposes.
- 3.13 Major NO<sub>x</sub> Source: Any major source as defined in Rule 2201 (New and Modified Stationary Source Review Rule), with a potential to emit 50 tons or more per year of NO<sub>x</sub>.
- 3.14 Military Tactical Equipment: Any transportable engine operated by the United States armed forces or National Guard which is designed specifically for military use in an off-road, dense terrain; hostile environment; or aboard military combat vessels.
- 3.15 NO<sub>x</sub>: Oxides of nitrogen, calculated as equivalent nitrogen dioxide (NO<sub>2</sub>).
- 3.16 Public Water District: Any government agency whose primary function is the supply and/or distribution of water; the collection and disposal of storm water runoff; or the collection, treatment, and disposal of wastewater.
- 3.17 Rated Brake Horsepower: The continuous brake horsepower rating specified for the engine by the manufacturer or listed on the nameplate of the unit, unless otherwise physically limited and specified by a condition on the engine's Permit to Operate (PTO).
- 3.18 Rich-Burn Engine: Any spark ignited internal combustion engine that is operated with an exhaust stream oxygen concentration of less than four (4) percent by volume prior to any exhaust stream control device.
- 3.19 Standby Engine: Any internal combustion engine used exclusively for non-utility electric power generation or any other emergency engine, approved by the APCO, and limited by permit condition to operate no more than 200 hours per calendar year for non-emergency purposes and not used in conjunction with any voluntary utility demand reduction program.
- 3.20 Transportable engine: Any engine designed to be and capable of being carried or moved from one location to another, and that is operated at one location for no more than 12 consecutive months. Indications of transportability include, but are not limited to, wheels, skids, carrying handles, dolly, trailer, or platform.

- 3.20.1 Any transportable engine that replaces a transportable engine at a location will be included in calculating the consecutive time if it performs the same function as the engine being replaced. In that case, the cumulative time of both engines, including the time between the removal of the original unit and installation of the replacement unit, would be counted towards the consecutive time period.
- 3.20.2 A replacement engine is not transportable if it performs the same function as the replaced engine and remains at the location for more than 12 consecutive months.
- 3.20.3 An engine is not transportable if it remains or will remain at a location for less than 12 consecutive months where such a period represents the length of normal annual source operations of the stationary source.
- 3.20.4 An engine is not transportable if it is removed from one location for a period and then returned to the same location in an attempt to circumvent the residence time requirement.
- 3.20.5 The period during which an engine is maintained at a storage facility shall be excluded from the time used to determine the resident time requirement.
- 3.21 VOC: Volatile organic compounds, as defined in Rule 1020 (Definitions).
- 3.22 Waste Derived Gaseous Fuel: Any gaseous fuel that was generated from the biodegradation of solid or liquid waste including, but not limited to, sewage sludge digester gas, and landfill gas.
- 3.23 Westside: For the purposes of this rule, this phrase refers to any facility which is physically located west of Interstate Highway 5 in Fresno, Kern, or Kings County and any facility designated as west of Interstate Highway 5 in the photochemical modeling submitted for the State Implementation Plan.

#### 4.0 Exemptions

- 4.1 The provisions of this rule do not apply to engines in agricultural operations in the growing of crops or raising of fowl or animals.
- 4.2 Except for the administrative requirements of Sections 6.1 and 6.5, the provisions of this rule shall not apply to:
  - 4.2.1 Standby engines.
  - 4.2.2 Engines used exclusively for fire fighting services and flood control.

- 4.2.3 Laboratory engines used in research and testing or for the advancement of engine performance.
- 4.2.4 Any engine registered as a portable emissions unit under Rule 2280 (Portable Equipment Registration) or the Statewide Portable Equipment Registration Program pursuant to Sections 2450-2465, Article 5, Title 13, California Code of Regulations.
- 4.2.5 Engines using other fuels during natural gas curtailment that are normally fired with natural gas fuel. This exemption is limited to periods of natural gas curtailment or maintenance testing on the ancillary fuel and is limited to 336 cumulative hours of operation on the ancillary fuel per calendar year. These engines are not exempt from compliance when fired on natural gas.
- 4.2.6 Military Tactical Equipment.
- 4.2.7 Transportable engines.
- 4.3 Except for the administrative requirements of Sections 6.1 and 6.5, the provisions of this rule shall not apply to a low-use engine not subject to the Reasonably Available Control Technology (RACT) requirements of Section 5.2.
- 4.4 The requirements of this rule shall not apply to any de-rated engine, provided the de-rating occurred before December 31, 1995.
- 4.5 The requirements of Section 5.1.3 shall not apply to any engine which is or will be de-rated before the applicable compliance date.

5.0 Requirements

- 5.1 The owner of an internal combustion engine shall not operate it under load in such a manner that results in emissions exceeding the applicable emission limit table, according to the compliance schedules listed in Section 7.0:

5.1.1 Table 1 Engine Emission Levels (corrected to 15% oxygen)

Engine Type	NOx	CO
1. Rich-Burn	9.5 g/bhp-hr or 640 ppmv	2000 ppmv
2. Lean-Burn	10.1 g/bhp-hr or 740 ppmv	2000 ppmv
3. Diesel	9.6 g/bhp-hr or 700 ppmv	2000 ppmv

5.1.2 Table 2 Engine Emission Levels (corrected to 15% oxygen)

Engine Type	NOx	CO
1. Rich Burn		
a. Beam-balanced or crank-balanced pumping engine	300 ppmv	2000 ppmv
b. Other rich burn	90 ppmv or 80% reduction	2000 ppmv

2. Lean-Burn	150 ppmv or 70% reduction	2000 ppmv
3. Diesel	600 ppmv or 20% reduction	2000 ppmv

5.1.3 Table 3 Engine Emission Levels (corrected to 15% oxygen)

Engine Type	NOx	CO	VOC
1. Waste Derived Gaseous Fuel.	125 ppmv or 80% reduction	2000 ppmv	750 ppmv
2. Engines owned by public water districts			
a. Rich-Burn	90 ppmv or 80% reduction	2000 ppmv	
b. Lean-Burn	150 ppmv or 70% reduction	2000 ppmv	
c. Diesel or dual-fuel	600 ppmv or 20% reduction	2000 ppmv	
3. Engines not listed in categories 1 and 2, above			
a. Rich Burn			
i. Beam-balanced or crank-balanced pumping engine	300 ppmv	2000 ppmv	
ii. Other rich burn	50 ppmv or 90% reduction	2000 ppmv	250 ppmv
b. Lean Burn	75 ppmv or 85% reduction	2000 ppmv	750 ppmv
c. Diesel or dual-fuel	80 ppmv or 90% reduction	2000 ppmv	750 ppmv

5.1.4 NO<sub>x</sub>, CO, and VOC emissions measured for compliance with this Section shall be averaged in accordance with the applicable test method in Section 6.4. Emissions from engines with continuous emission monitoring systems (CEMS) shall be averaged in accordance with the requirements of 40 CFR Part 60.13. Any averaged CEMS value exceeding an applicable emission limit shall constitute a violation of this rule.

5.1.5 Percent emission reductions, if used to comply with Section 5.1, shall be calculated as follows:

5.1.5.1 For engines with external control devices, percent reduction shall be calculated using emission samples taken at the inlet and outlet of the control device.

5.1.5.2 For engines without external control devices and for engines with an external control device in combination with a second emission control device or technique, percent reduction shall be based on source test results for the uncontrolled engine and the engine after the control device or technique has been employed. When representative source sampling prior to the application of an emissions control technology or technique is not available, the APCO may approve the use of manufacturer's uncontrolled emissions information or source sampling from a similar, uncontrolled engine.

5.1.6 Owners choosing to comply with a grams/bhp-hr emission limit shall also demonstrate the rated horsepower at the source tested power level using the test method specified in Section 6.4.

5.2 Low-use engines:

5.2.1 The owner of the following low-use engines shall not operate such engines under load in a manner that results in emissions exceeding the applicable limits of Section 5.1.1 and 5.1.2, according to the compliance schedules listed in Section 7.3.1 and 7.3.2:

5.2.1.1 Natural gas fired, low-use engines in the Central and Western Kern County Fields.

5.2.1.2 Low use engines operated at a major NO<sub>x</sub> source outside the Westside area.

5.2.2 Compliance with Section 5.1.3 is not required for low-use engines.

5.3 In lieu of compliance with the emission limits of Sections 5.1 and 5.2, an owner of any internal combustion engine may elect to permanently remove it from service. NO<sub>x</sub> emission reductions achieved by removal of an engine in lieu of compliance with the emission requirements of Sections 5.1.1 or 5.1.2 shall not be available for emission reduction credit (ERC) and electric motors replacing such engines shall not be included in an Alternate Emission Control Plan (AECPP).

5.4 Monitoring Equipment

The owner of any engine subject to the provisions of this rule shall:

5.4.1 For engines with external control devices, either install and maintain continuous emissions monitoring equipment for NO<sub>x</sub>, CO, and oxygen, as identified in Rule 1080 (Stack Monitoring), or install and maintain APCO-approved alternate monitoring consisting of one or more of the following:

- 5.4.1.1 periodic NO<sub>x</sub> and CO emission concentrations,
- 5.4.1.2 engine exhaust oxygen concentration,
- 5.4.1.3 air-to-fuel ratio,
- 5.4.1.4 flow rate of reducing agents added to engine exhaust,
- 5.4.1.5 catalyst inlet and exhaust temperature,
- 5.4.1.6 catalyst inlet and exhaust oxygen concentration,
- 5.4.1.7 other operational characteristics.

5.4.2 For engines without external control devices, monitor operational characteristics recommended by the engine manufacturer or emission control system supplier, and approved by the APCO.

## 6.0 Administrative Requirements

### 6.1 Emission Control Plan

The owner of any engine subject to the provisions of this rule shall submit to the APCO an emissions control plan of all actions to be taken to satisfy the emission requirements of Section 5.1 and the compliance schedule of Section 7.0.

6.1.1 Such plan shall contain a list with the following for each permitted engine:

- 6.1.1.1 Permit to Operate number
- 6.1.1.2 engine manufacturer
- 6.1.1.3 model designation
- 6.1.1.4 rated brake horsepower
- 6.1.1.5 type of fuel and type of ignition
- 6.1.1.6 combustion type: rich-burn or lean-burn

6.1.2 Such plan shall identify the type of emission control device or technique to be applied to each engine and a construction/removal schedule, or shall provide support documentation sufficient to demonstrate that the engine is in compliance with the emission requirements of this rule.

6.1.3 The plan shall include support documentation for any exempt engine, pursuant to Section 6.5, and a letter of intent for any engine being permanently removed from service, pursuant to Section 7.5.

### 6.2 Recordkeeping

The owner of any engine subject to the provisions of this rule shall maintain an engine operating log that includes compliance source test results, monitoring data, or other information deemed necessary by the APCO to demonstrate compliance with this rule. This information shall be retained for a period of at least two years and be made available to the APCO upon request.

### 6.3 Compliance Testing

6.3.1 The owner of any engine subject to the emission limits in Section 5.0, shall demonstrate compliance with applicable limits by the date specified in Section 7.3 and at least once every 24 months thereafter, in accordance with the test methods in Section 6.4.

6.3.2 In lieu of compliance with Section 6.3.1, compliance with the applicable limits shall be demonstrated by submittal of annual emission test results from an engine or engines that represents a group of engines, provided:

- 6.3.2.1 Engines subject to the emission limits of Section 5.1.2 and 5.1.3 are initially source tested for compliance with those limits; and
  - 6.3.2.2 Emissions of all engines in the group are similar; and
  - 6.3.2.3 All engines are similar in terms of rated brake horsepower, engine make and series, operational conditions, fuel used, and control method; and
  - 6.3.2.4 The group of engines is owned or operated by a single owner and is located at a single stationary source or at two contiguous stationary sources; and
  - 6.3.2.5 The selection of the representative engines is approved by the APCO prior to testing; and
  - 6.3.2.6 The number of engines tested shall be at least 10% of the total number of engines in the group; and
  - 6.3.2.7 All engines in the group shall have received the same maintenance and tune-up procedures as the representative engine(s); and
  - 6.3.2.8 An engine operating log shall be maintained for each engine in the group. The log shall include, on a monthly basis, the total hours of operation, the type and quantity of fuel used, maintenance or modifications performed, and other information necessary to show compliance with this rule. This information shall be retained for at least five years and shall be made available to the APCO upon request; and
  - 6.3.2.9 Should any of the representative engines exceed the required emission limits, each of the engines in the group shall demonstrate compliance by emissions testing. Failure to complete emissions testing within 90 days of the failed test shall result in the untested engines being considered in violation of this rule.
- 6.3.3 Once Section 6.3.2.9 has been satisfied, subsequent testing shall be performed pursuant to Sections 6.3.1 or 6.3.2.

#### 6.4 Test Methods

Compliance with the requirements of Section 5.0 shall be determined in accordance with the following test procedures:

- 6.4.1 Oxides of nitrogen- EPA Method 7E, or ARB Method 100.
- 6.4.2 Carbon monoxide - EPA Method 10, or ARB Method 100.



- 6.4.3 Stack gas oxygen - EPA Method 3 or 3A, or ARB Method 100.
- 6.4.4 Volatile organic compounds - EPA Method 25 or EPA Method 18, referenced as methane.
- 6.4.5 Operating horsepower determination - any method approved by the APCO and EPA.

6.5 Exempt engines

Any owner claiming an exemption under Sections 4.2 or 4.3 shall maintain annual operating records and/or support documentation necessary to claim exemption. This information shall be retained for at least two years and submitted to the APCO upon request.

7.0 Compliance Schedules

- 7.1 By December 19, 1997 owners of engines subject to Section 5.1.3 shall submit to the APCO an emission control plan pursuant to Section 6.1.
- 7.2 Owners of engines subject to Section 5.1.3 shall submit a complete application for an ATC for each engine to be modified by December 19, 1997 or at least 24 months before compliance with section 5.1.3 is required as indicated in Section 7.3, whichever is later.
- 7.3 Owners shall not operate any engine unless the owner demonstrates and maintains the engine in compliance with the applicable emissions limit by the indicated dates:

7.3.1 Emission Limit Compliance Schedule for non-cyclic loaded natural gas fired engines in the Central and Western Kern County Fields:

Engine Location	Section 5.1.1 (Table 1) Compliance	Section 5.1.2 (Table 2) Compliance	Section 5.1.3 (Table 3) Compliance
1. Central Kern County Fields	Not Required	12/31/95	5/31/99
2. Western Kern County Fields	Not Required	12/31/95	5/31/01

7.3.2 Emission Limit Compliance Schedule for the following engines, but excluding engines identified in Section 7.3.1:

- 7.3.2.1 liquid-fueled and LPG engines operating on those fuels on October 20, 1994 in Central and Western Kern County Fields at a major NOx source;

7.3.2.2 cyclic loaded, natural gas fired engines in the Central and Western Kern County Fields;

7.3.2.3 other engines operated at a major NOx source not located in the Westside area.

Engine Location or Type	Section 5.1.1 (Table 1) Compliance	Section 5.1.2 (Table 2) Compliance	Section 5.1.3 (Table 3) Compliance
1. Public Water District Engines	Not Required	Not Required	5/31/99
2. Rich-burn, beam-balanced or crank-balanced, pumping engines shall comply with either			
a. Early RACT Compliance	5/31/95	Not Required	12/31/97
b. Delayed RACT Compliance	Not Required	5/31/97	Not Required
3. Engines in Western Kern County Fields, not identified in category 2, shall comply with either			
a. Early RACT Compliance	5/31/95	Not Required	5/31/01
b. Delayed RACT Compliance	Not Required	5/31/97	5/31/01
4. Engines not identified in categories 1, 2, or 3 shall comply with either			
a. Early RACT Compliance	5/31/95	Not Required	5/31/99
b. Delayed RACT Compliance	Not Required	5/31/97	5/31/99

7.3.3 Emission Limit Compliance Schedule for all other engines not specified in Sections 7.3.1 or 7.3.2:

Engine Location or Type	Section 5.1.1 (Table 1) Compliance	Section 5.1.2 (Table 2) Compliance	Section 5.1.3 (Table 3) Compliance
1. Rich-burn, beam-balanced or crank-balanced pumping engines shall comply with either			
a. Early Compliance	Not Required	Not Required	12/31/97
b. Delayed Non-Westside Compliance	Not Required	5/31/99	Not Required
c. Delayed Westside Compliance	Not Required	5/31/01	Not Required
2. Engines not identified in category 1 shall comply with either:			
a. Non-Westside Compliance	Not Required	Not Required	5/31/99
b. Westside Compliance	Not Required	Not Required	5/31/01

- 7.4 Any owner of an engine which becomes subject to the emission limits of this rule through loss of exemption, shall:
  - 7.4.1 Within 30 days from loss of exemption, submit a complete application for an Authority to Construct for all modifications to meet the requirements of this rule; and
  - 7.4.2 Within 12 months from loss of exemption, demonstrate full compliance with the requirements of this rule.
- 7.5 Any owner who elects to permanently remove an engine from service as allowed in Section 5.3, shall comply with the following:
  - 7.5.1 Operators removing an engine from service in lieu of compliance with the emission requirements of Sections 5.1.1 or 5.1.2 shall
    - 7.5.1.1 Submit a letter stating the intent to permanently remove the engine from service no later than May 31, 1997; and
    - 7.5.1.2 Permanently remove the engine from service and officially surrender the permit to operate by May 31, 1999.
  - 7.5.2 Operators removing an engine from service in lieu of compliance with the emission requirements of Section 5.1.3 shall
    - 7.5.2.1 Submit a letter with the emission control plan stating the intent to permanently remove the engine from service; and
    - 7.5.2.2 Permanently remove the engine from service and officially surrender the permit to operate by the applicable compliance date in Section 7.3.

## 8.0 Alternative Emission Control

- 8.1 An owner may comply with the requirements of Sections 5.1.3 and 7.0 by achieving an aggregated NO<sub>x</sub> emission level that is no higher than the emission level which would result if individual units were in compliance with this rule, provided that:
  - 8.1.1 Actual aggregate NO<sub>x</sub> emissions, calculated according to Section 8.3, during any 14-calendar-day period, are no greater than those obtained by controlling the internal combustion engines to comply individually with the limits in Section 5.1.3; and

- 8.1.2 All engines involved are under the operational control of a single owner and are located at a single stationary source or at two contiguous stationary sources; and
- 8.1.3 The owner submits an Alternative Emission Control Plan (AECPP) that is enforceable on a daily basis by the District and receives written approval of the plan from the APCO prior to implementation; and
- 8.1.4 The AECPP schedule for achieving reduced NOx emission levels shall be at least as expeditious as the schedule if applicable units were to comply individually with the emission limits in Section 5.1.3 and the compliance schedule in Section 7.0.

8.2 The Alternative Emission Control Plan shall:

- 8.2.1 Contain, in addition to requirements of Section 6.1, all data, records, and other information necessary to determine eligibility of the engines for alternative emission control, including, but not limited to:
  - 8.2.1.1 list of engines subject to the AECPP; and
  - 8.2.1.2 estimated emission levels, calculated according to Section 8.3.
- 8.2.2 Present the methodology for estimation of equivalency of emissions under the proposed AECPP as compared to the emissions required by the applicable rule.
- 8.2.3 Detail the method of recording and verifying daily compliance with the AECPP.
- 8.2.4 Demonstrate to the satisfaction of the APCO that the difference between the emission limits of this rule and any lower actual emissions will not be used to increase emissions from the same or another source.
- 8.2.5 Demonstrate that the engines subject to the specified rule emission limitations are in compliance with or on an approved schedule for compliance with all applicable District rules.

8.3 AECPP calculations shall be performed according to the following procedures:

- 8.3.1 The aggregate emission limit ( $AE_{Limit}$ ) is the sum of the emissions, over a rolling, 14-calendar-day period, calculated with the limits of Section 5.1.3 and the actual fuel usage during that period. This limit shall be calculated as:

$$AE_{Limit} = \sum_i (L_i)(F_i)(k_i)$$

where:

$L_i$  is the emission factor limit from Section 5.1.3 for each engine.

$F_i$  is the actual total fuel used by the unit during the 14-day-period.

$k_i$  is a constant used to convert an engine's fuel use and emission factor limit to the amount of NOx emitted.  $k_i$  is dependent on the engine and the pollutant emitted. Calculation of  $k_i$  shall be accomplished using 40 CFR Part 60, Appendix A, Method 19, or an equivalent, District-approved method.

$i$  identifies each engine in the AECP.

8.3.2 The actual aggregate emissions ( $AE_{Actual}$ ) is the sum of the actual emissions, over a rolling, 14-calendar-day period, from all units in the AECP, which were actually operated during that period. This factor shall be calculated as:

$$AE_{Actual} = \sum_i (EF_i)(F_i)(k_i)$$

where:

$EF_i$  is the emission factor of the unit from the most recent source test conducted pursuant to Section 6.3 and approved by the APCO.

$F_i$  is the actual total fuel used by the unit during the 14-day period.

$k_i$  is a constant used to convert an engine's fuel use and emission factor limit to the amount of NOx emitted.  $k_i$  is dependent on the engine and the pollutant emitted. Calculation of  $k_i$  shall be accomplished using 40 CFR Part 60, Appendix A, Method 19, or an equivalent, District-approved method.

$i$  identifies each engine in the AECP.

8.3.3 Except as provided in Section 8.4, only engines which are subject to the emission limits of Section 5.1.3 and were operated during the 14-day period shall be included in the calculations.

## 8.4 Electrification

- 8.4.1 An owner who replaces an engine with an electric motor may, subject to APCO approval, include the Avoided Emissions ( $AE_{Motor}$ ) in the calculation of the  $AE_{Actual}$ , provided that:
- 8.4.1.1 The engine has been shutdown and replaced after December 19, 1996; and
  - 8.4.1.2 The  $AE_{Motor}$ , as calculated pursuant to Section 8.4.2, shall not exceed the daily and annual maximum Avoided Emission ( $AE_{Max}$ ) amounts calculated pursuant to Section 8.4.3; and
  - 8.4.1.3 The electrical power supplied to each motor is individually metered; and
  - 8.4.1.4 The emission reductions from such engines shall not be eligible for ERC issuance; and
  - 8.4.1.5 Any engine for which an ERC has been/will be issued is not eligible for inclusion in an AECP.

8.4.2  $AE_{Motor}$  is the actual equivalent emissions which would have been produced by the replaced engine operating with the limits in Section 5.1.3 and powering the same equipment. The  $AE_{Motor}$  shall be calculated as follows:

$$AE_{Motor} = \sum_i (L_i)(E_i)(c_i)(k_i)$$

where:

- $L_i$  is the ppmv emission factor limit, from Section 5.1.3 for each replaced engine.
- $E_i$  is the actual total electrical power consumed by the motor during the 14-day aggregating period.
- $c_i$  is a factor used to convert a motor's electrical power consumption to an equivalent amount of fuel consumption.  $c_i$  is dependent on the efficiencies of the motor and engine and the fuel involved. Calculation of  $c_i$  shall be accomplished as shown in Section 8.4.2.1.
- $k_i$  is a constant used to convert an engine's fuel use and emission factor limit to the amount of NOx emitted.  $k_i$  is dependent on the engine replaced and the pollutant emitted. Calculation of  $k_i$  shall be accomplished using 40 CFR Part 60, Appendix A, Method 19, or an equivalent, District-approved method.
- $i$  identifies each engine or motor in the AECP.

8.4.2.1 Calculation of  $c_i$  shall be accomplished as follows

$$c_i = \frac{(ee)(eff_{motor(i)})}{eff_{engine(i)}}$$

where:

ee is the conversion factor from electrical power to an equivalent amount of fuel. For example, assuming a gaseous fuel with a heat content of 1,050 Btu/scf, this value is  
ee = 3,410 Btu/kwh x 1.0 scf/1,050 Btu  
= 3.25 scf/kwh

eff<sub>engine</sub> is the efficiency of the engine. A value of 30% shall be assumed unless a more specific value is approved by the APCO.

eff<sub>motor</sub> is the efficiency of the motor. A value of 60% shall be assumed unless a more specific value is approved by the APCO.

i identifies each engine or motor in the AECP.

8.4.3  $AE_{Max}$  is the maximum allowable amount of avoided emissions which can be used for a motor in an AECP. It equates to the historical expected emission from the replaced engine operating in compliance with the limits in Section 5.1.3 and powering the same equipment. The  $AE_{Max}$  shall be calculated for each replaced engine as follows:

$$AE_{Max} = (L)(F_b)(k)$$

where:

L is the BARCT emission factor limit from Section 5.1.3 for the replaced engine.

F<sub>b</sub> is the baseline operational fuel level defined by Section 8.4.4 for the specific engine which has been replaced.

k is a constant used to convert an engine's fuel use and emission factor limit to the amount of NOx emitted.  $k_i$  is dependent on the engine and the pollutant emitted. Calculation of k shall be accomplished using 40 CFR Part 60, Appendix A, Method 19, or an equivalent, District-approved method.

8.4.4 The baseline operational fuel levels shall be based on historic fuel records and calculated as either

8.4.4.1 The annual average or daily maximum of the actual fuel consumed for the replaced engine during the calendar years of 1995 and 1996; or

8.4.4.2 The annual average of the fuel consumed during another time period of at least two (2) consecutive years from 1992 to 1996 which is determined by the APCO as more representative of normal source operation; or

8.4.4.3 The annual average of the fuel consumed during a shorter period of at least one (1) year between 1992 and 1996 in cases where the engine has not been in operation for two (2) years so long as this represents the full operation history of the emissions unit and the engine has a valid Permit to Operate as of December 19, 1996.

8.4.5 Emissions units which have been in operation for less than one (1) year shall not be included in an AECP as an electrified unit.

## 8.5 AECP Requirements

8.5.1 The owner shall calculate and record the actual aggregate emissions ( $AE_{Actual}$ ), the aggregate emission limit ( $AE_{Limit}$ ), and, if applicable, the Avoided Emissions ( $AE_{Motor}$ ) for each day the AECP is used.

8.5.2 The owner shall operate all units in the AECP such that

$$AE_{Actual} < (AE_{Limit} + AE_{Motor})$$

and shall notify the APCO within 24 hours of any violation of this section.

8.5.3 Any owner of an engine subject to an AECP shall submit an updated or modified AECP prior to any modification of the engine(s) which would require an Authority To Construct and when new or amended rules are adopted which regulate the emissions from the engines.

8.5.4 The owner shall record daily fuel consumption for each engine, daily electrical consumption for each motor, and other parameters needed to demonstrate compliance with the applicable emission limits when operating under the AECP. These records shall be retained for at least two years and shall be made available to the APCO upon request.



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