RULE 333. CONTROL OF EMISSIONS FROM RECIPROCATING INTERNAL COMBUSTION ENGINES. (Adopted 12/03/1991, revised 12/10/1991, and 4/17/1997, and [*date of revised rule adoption*])

A. Applicability

1. The provisions of this rule shall apply to all any engines with a rated brake horsepower of 50 or greater and which are fueled by natural gas, field gas, liquefied petroleum gas, diesel fuel, gasoline, or any other liquid fuel.

B. Exemptions

1. Notwithstanding A.1., tThe requirements of this Rrule shall not apply to:

a. EnginesSpark ignition engines operating on gaseous fuel consisting of 75 percent or more of landfill gas on a volume basis determined by annual fuel use. To qualify for this exemption written documentation must shall be submitted with the Authority to Construct application to and approved by the Control Officer. The documentation must describe the fuel meters used, and the level of accuracy of the fuel meters, and calculations to correct volumes to standard conditions to demonstrate compliance. Separate fuel meters shall be used which that measures the volumes (ft^3 cubic feet) of landfill gas used and a separate fuel meter for the volume (ft^3) of all other gases gaseous fuel used. Fuel usage records shall be maintained identifying the volume of landfill gas and the volume of natural gas all other gaseous fuel used annually. The following method shall be used to determine the 75 landfill gas percent percentage on a volume basis:

$$\text{Percent of Fuel use Landfill Gas Percentage} = \frac{\text{Volume in } ft^3 \text{ cubic feet of landfill gas consumed annually} \times 100}{\text{Total Volume in } ft^3 \text{ cubic feet of all gas gaseous fuel consumed annually}}$$

The volumes in the above equation shall be corrected for standard conditions.

b. Engines that are exempt from permit under the provisions of Rules 202, Exemptions to Rule 201.

c. Any derated engine having a maximum allowable and enforceable output rating of less than 50 brake horsepower, provided such rating is specified by the District in an Authority to Construct or Permit to Operate and accepted by the engine owner or operator.

d. Any compression ignition emergency standby engines, as defined under California Code of Regulations, Title 17, Section 93115, Airborne Toxic Control Measure for Stationary Compression Ignition (CI) Engines.

2. Engines which operate Any engine that has a total aggregated operational period less than 200 hours per calendar year are is exempt from Sections D., E., F., and G. the requirements of this rule, with the exception of the engine identification requirement in Section D.1, the elapsed operating time meter requirement in Section D.2, the recordkeeping provisions in Section J.3, and the compliance schedules for these provisions specified in Section K. To qualify for this exemption, the engine owner or operator shall maintain and record in a log, as required in Section H, the engine hour meter reading every first working day of each calendar quarter.The hours per year operating period of a

relocated engine that performs the same function as the engine it displaced will be included in calculating the total aggregated operating period for determining applicability of this exemption.

3. Section G requirements for a Compliance Plan shall not be applicable to any compression ignition engines that are subject to an exhaust emission standard in the:

a. California Code of Regulations, Title 13, Section 2423, for off-road engines, or

b. 40 CFR, Part 89, for nonroad compression ignition engines.

C. Definitions

See Rule 102 for definitions not limited to this rule. For the purposes of this ~~R~~rule, the following definitions shall apply:

"Air-balanced pumping engine" means a noncyclically-loaded engine powering a well pump, with the pump using compressed air in a cylinder under the front of the walking beam to offset the weight of the column of rods and fluid in the well, eliminating the need for counterweights.

"Beam-balanced pumping engine" means a cyclically-loaded engine powering a 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.

"Crank-balanced pumping engine" means a cyclically-loaded engine powering a 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.

"**Cyclically-loaded engine**" means an engine that under normal operating conditions has an external load that varies ~~in shaft load~~ by 40 percent or more of rated brake horsepower during any load cycle or ~~recurrent periods of 30 seconds or less, or~~ is used to power ~~an oil~~ a well reciprocating pump~~ing unit~~ including beam-balanced or crank-balanced pumps. Engines powering air-balanced pumps are noncyclically-loaded engines.

~~1.~~ **"Engine"** means any spark or compression ~~ignited~~ ignition engine in which the pistons are contained within a cylinder and move back and forth in a straight line.

~~2. "**Cyclic engine**" means an engine that under normal operating conditions varies in shaft load by 40 percent or more of rated brake horsepower during recurrent periods of 30 seconds or less, or is used to power an oil well reciprocating pumping unit.~~

~~3. "**Noncyclic engine**" means any engine which is not a cyclic engine.~~

"Exhaust controls" means any device or technique used to treat an engine's exhaust to reduce emissions, and include (but are not limited) to catalysts, afterburners, reaction chambers, and chemical injectors.

~~4.~~ "**Existing engine**" means an engine ~~which~~ that by ~~December 3, 1991~~ [*date of revised rule adoption*];

~~a~~1. has been issued a valid ~~ATC~~ Authority to Construct, ~~or PTO~~ Permit to Operate, or Exemption to a Permit to Operate (or listed as *exempt* on an Authority to Construct or Permit to Operate) pursuant to District rules and regulations; or

~~b~~2. has been identified in an application for an ~~ATC~~ Authority to Construct submitted to and deemed complete by the District; or

c3. is an identical replacement as defined in Rule 202 A. (5) for an engine defined in Section C.4.a.has been operated in Santa Barbara County as exempt and now requires a Permit to Operate because of a Rule 202 exemption change effective [*date of revised rule adoption*].

5. "**New engine**" is an engine which is not an existing engine.

6. **"Field gas"** means gas which does not meet the standards as published by the Public Utilities Commission for natural gas (37 California Code of Regulations 589).

"Four-stroke engine" means any type of engine which completes the power cycle in two crankshaft revolutions, with intake and compression strokes in the first revolution and power and exhaust strokes in the second revolution.

7. "**Lean-burn engine**" means a spark ignited or compression ignited, Otto cycle, Diesel cycle or any two-stroke or four-stroke engine where the manufacturer's recommended operating air-to-fuel ratio divided by the stoichiometric air-to-fuel ratio is greater than 1.1. Any existing engine where there are no manufacturer's recommendations regarding the air-to-fuel ratio will be considered a lean-burn engine if the excess oxygen content of the exhaust at full load conditions that is operated with an exhaust stream oxygen concentration of is greater than 4 2 percent by volume, or greater. Where exhaust control is employed on such an existing engine, The the exhaust gas oxygen content shall be determined from the uncontrolled exhaust stream. Any engine modification that changes any rich-burn engine to a lean-burn engine or vice versa requires approval from the Control Officer in the form of a permit modification.

"**New engine**" is an engine that is not an existing engine.

"**Noncyclically-loaded engine**" means any engine which is not a cyclically-loaded engine.

8. **"Operating engine"** means an engine that is operating and consuming fuel for its intended application a minimum of 150 hours for each month during the 12 consecutive month period prior to the adoption of this Rule as certified by the engine owner or operator.

9. "**Rated brake horsepower**" means the maximum brake horsepower rating at maximum revolutions per minute (RPM) specified for the engine by the manufacturer. Alternately, the rated brake horsepower of an engine shall be the maximum allowable and enforceable rating specified by the District, stated in the Permit to Operate (PTO), and accepted by the engine operator.

"ppmv" means parts per million by volume, dry.

10. **"Rich-burn Eengine"** means a spark ignited, Otto cycle, or a any spark ignition, four-stroke naturally aspirated engine where the manufacturer-recommended operating air-to-fuel ratio divided by the stoichiometric air-to-fuel ratio is less than or equal to 1.1. Any existing engine where there are no manufacturer's recommendations regarding the air-to-fuel ratio will be considered a rich-burn engine if the excess oxygen content of the exhaust at full load conditions that is operated with an exhaust stream oxygen concentration of is less than or equal to 4 2 percent by volume. Where exhaust control is employed on such an existing engine, The the exhaust gas oxygen content shall be determined from the uncontrolled exhaust stream. Additionally, any engine which is designated as a rich burn engine on a District Permit on the date of rule adoption shall be a rich burn engine. Any engine modification that changes any rich-burn engine to a lean-burn engine or vice versa requires approval from the Control Officer in the form of a permit modification.

11. "**Diesel Engine**" means a compression ignited four stroke engine that is operated with an exhaust stream oxygen concentration of 4 percent by volume, or greater.

"Stoichiometric air-to-fuel ratio" means the chemically correct air-to-fuel ratio where all fuel and all oxygen in the air and fuel mixture will be consumed.

"Two-stroke engine" means a type of engine which completes the power cycle in single crankshaft revolution by combining the intake and compression operations into one stroke and the power and exhaust operations into a second stroke. This system requires auxiliary scavenging and inherently runs lean of the stoichiometric air-to-fuel ratio.

D. Requirements – Engine Identification, Meters, and Continuous Monitoring Systems

The owner or operator of any engine subject to this rule shall ensure each engine meets the following requirements in accordance with the compliance schedule specified in Section K.

1. Any engine subject to this rule shall have a permanently affixed plate, tag, or marking listing:

   a. the engine's make, model, and serial number; or

   b. the owner's or operator's unique identification number.

The plate, tag, or marking shall be made accessible and legible.

2. Each engine shall be equipped with a nonresettable elapsed operating time meter and the meter shall be maintained in proper operating condition.

3. Each engine shall be equipped with a nonresettable fuel meter or, where approved by the Control Officer in writing, an alternative device, method, or technique for determining fuel consumption. The fuel meter shall be calibrated periodically pursuant to the recommendations of the manufacturer and shall be maintained in proper operating condition.

4. Engines in the following category shall be equipped with a continuous oxides of nitrogen, carbon monoxide, and oxygen monitoring system approved by the Control Officer pursuant to an Authority to Construct:

   New engines rated at 1,000 brake horsepower or greater that:

   a. are installed on or after [*date of revised rule adoption*], and

   b. are subject to the emission limits specified in Section E, and

   c. have Permits to Operate allowing operations in excess of 2,000 hours per year.

   This system shall determine and record exhaust gas oxides of nitrogen concentrations and carbon monoxide in parts per million by volume (dry), corrected to 15 percent oxygen. The continuous monitoring system may be a continuous emissions monitoring system or an alternative approved by the Control Officer. Alternatives to a continuous emissions monitoring system must be submitted to and approved by the Control Officer. Continuous emission monitoring systems shall meet the District Continuous Emission Monitoring Protocol (1992) and applicable federal requirements described in 40 CFR Part 60. These include the performance specifications found in Appendix B, Specification 2, the quality assurance requirements found in Appendix F, and the reporting requirements of Parts 60.7(c), 60.7(d), and 60.13.

   The monitoring system shall have data gathering and retrieval capability as approved by the Control Officer. All data collected by the monitoring system shall be maintained for at least two years and made available for inspection by the Control Officer. Any Control Officer approved continuous monitoring system for oxides of nitrogen, carbon monoxide, and oxygen shall suffice in lieu of the quarterly monitoring required in Section F.3.

~~D~~E. Requirements - Emission Limits

Owners or operators of engines shall meet the following requirements ~~based on biennial source testing,~~ in accordance with the compliance schedule set forth in Section ~~I~~K:

1. ~~Noncyclic Rich~~ Rich-Burn Noncyclically-Loaded Spark Ignition Engines

   a. The emission concentrations, corrected for oxygen, from any such engine ~~Rich burn noncyclic engines~~ shall not exceed the following ~~concentration~~ limits ~~corrected for oxygen~~:

	Limit (~~ppmV~~ppmv at 15 percent oxygen)	
Pollutant	**~~15% Oxygen~~**	**~~3% Oxygen~~**
NOx	50	~~152~~
ROC	250	~~758~~
CO	4,500	~~13,653~~

   b. ~~Rich burn noncyclic engines shall meet~~ Engines using either combustion modifications or exhaust controls shall meet the oxides of nitrogen ~~(NOx) requirements~~ limit specified above, or the oxides of nitrogen ~~(NOx)~~ shall be reduced by at least 90 percent by mass of the uncontrolled emissions ~~across the control device~~. For engines with exhaust controls, the percent control shall be determined by measuring concurrently the oxides of nitrogen concentration upstream and downstream from the exhaust control. For engines without external control devices, the percent control shall be based on source test results for the uncontrolled engine and the same engine after the control device or technique has been employed. In this situation, the engine's typical operating parameters, loading, and duty cycle shall be documented and repeated at each successive post-control source test to ensure that the engine is meeting the percent reduction limit. The parts per million by volume (dry) limits for reactive organic compounds and carbon monoxide apply to all engines.

2. ~~Noncyclic Lean~~ Lean-Burn Spark Ignition Engines

   a. The emission concentrations, corrected for oxygen, from any such engine ~~Lean burn noncyclic engines~~ shall not exceed the following limits ~~as corrected for oxygen~~:

   Any engine with a rated brake horsepower of 50 or greater but less than 100:

	Limit (ppmv at 15 percent oxygen)
Pollutant	
NOx	200
ROC	750
CO	4,500

Any engine with a rated brake horsepower of 100 or greater:

Pollutant	Limit (~~ppmV~~ppmv at 15 percent oxygen) ~~15% Oxygen~~	~~3% Oxygen~~
NOx	125	~~380~~
ROC	750	~~2,275~~
CO	4,500	~~13,653~~

b. ~~Lean burn engines shall meet~~Any engine with a rated brake horsepower of 100 or greater using either combustion modifications or exhaust controls shall meet the oxides of nitrogen ~~(NOx)~~ requirements specified above, or the oxides of nitrogen ~~(NOx)~~ shall be reduced by at least 80~~%~~ percent by mass of the uncontrolled emissions ~~across the control device~~. For engines with exhaust controls, the percent control shall be determined by measuring concurrently the oxides of nitrogen concentration upstream and downstream from the exhaust control. For engines without external control devices, the percent control shall be based on source test results for the uncontrolled engine and the same engine after the control device or technique has been employed. In this situation, the engine's typical operating parameters, loading, and duty cycle shall be documented and repeated at each successive post-control source test to ensure that the engine is meeting the percent reduction limit. The parts per million by volume (dry) limits for reactive organic compounds and carbon monoxide apply to all engines.

3. ~~Cyclic~~ Rich-Burn Cyclically-Loaded Spark Ignition Engines

~~a. On or before March 2, 1992 the owner or operator of cyclic engines shall maintain an exhaust stream oxygen concentration of 6.5 percent or greater, by volume. Owners or operators of cyclic engines shall comply with the following:~~

~~i. An initial source test shall be performed within twelve months from December 3, 1991 for each engine. Subsequent source tests shall be performed in accordance with Section G.; and~~

~~ii. The exhaust stream oxygen concentration shall be monitored on a monthly basis utilizing a portable analyzer or any other method approved by the Control Officer. The instrument reading shall be recorded as set forth in Section H.~~

~~b.~~ The emission concentrations, corrected for oxygen, from any such engine ~~Cyclic engines~~ shall not exceed the following limits~~, in accordance with Section I.~~:

Pollutant	Limit (~~ppmV~~ppmv at 15 percent oxygen) ~~15% Oxygen~~	~~3% Oxygen~~
NOx	~~50~~300	~~152~~
ROC	250	~~758~~
CO	4,500	~~13,653~~

~~Alternatively, NOx emissions may be reduced by at least 90% of the uncontrolled emissions across the control device.~~

~~c. In lieu of D.3.a. and D.3.b. above, an engine owner or operator may choose for any cyclic engine to comply with Section D.1. of this rule by designating the cyclic engine as a noncyclic engine for the purposes of this Rule. In this case the owner or operator shall notify~~

~~the District in writing on or before March 2, 1992 which cyclic engines will be designated as noncyclic engines. These engines shall be included as part of the compliance plan as set forth in Section F.~~

4. Compression Ignition Engines and Dual-Fuel Engines

a. The emission concentrations, corrected for oxygen, from any such engine ~~Diesel engines~~ shall not exceed ~~8.4 grams per brake horsepower-hour of oxides of nitrogen or~~ the following limits ~~as corrected for oxygen~~:

	Limit (~~ppmV~~ppmv at 15 percent oxygen)	
Pollutant	**~~15% Oxygen~~**	**~~3% Oxygen~~**
NOx	~~797~~700	~~2,400~~
ROC	750	
CO	4,500	

b. Engines using either combustion modifications or exhaust controls shall meet the oxides of nitrogen limit specified above, or the oxides of nitrogen shall be reduced by at least 40 percent by mass of the uncontrolled emissions. For engines with exhaust controls, the percent control shall be determined by measuring concurrently the oxides of nitrogen concentration upstream and downstream from the exhaust control. For engines without external control devices, the percent control shall be based on source test results for the uncontrolled engine and the same engine after the control device or technique has been employed. In this situation, the engine's typical operating parameters, loading, and duty cycle shall be documented and repeated at each successive post-control source test to ensure that the engine is meeting the percent reduction limit. The parts per million by volume (dry) limits for reactive organic compounds and carbon monoxide apply to all engines.

~~5. Alternative Emission Control Plan (AECP)~~

~~An owner or operator of any existing engine subject to this rule may meet the NO_x emission control requirements of Sections D.1, D.2, and D.3.b, by controlling additional existing engines at the same stationary source, which are not otherwise subject to this rule, provided the owner or operator submits an Alternative Emission Control Plan that is enforceable by the District and is approved in writing by the Control Officer, ARB and EPA prior to implementation.~~

~~Any Alternative Emission Control Plan must be submitted by March 9, 1992.~~

~~The Alternative Emission Control Plan shall:~~

~~a. Include all information determined by the Control Officer as necessary to confirm that the requirements of this section will be met.~~

~~b. Include the control of all engines 20 horsepower and larger at the stationary source. All engines shall be controlled consistent with the applicable schedule specified in Section I.~~

~~c. Achieve at least 20 percent more tonnage of NOx emission reductions than otherwise required by Sections D.1, D.2 and D.3.b. The required tonnage of emission reductions shall be calculated using a 90% (80% for lean burn engines) reduction from an uncontrolled emission factor of 2,000 lbs of NOX/MMSCF fuel used, with the baseline fuel usage calculated in accordance with Rule 802.F.2. When engine specific fuel usage is not available, fuel use data will be apportioned to individual engines based on their estimated utilized horsepower, following a method approved by the Control Officer.~~

~~d. Specify NO_x, ROC and CO ppmv emission limits for each engine. NO_x ppmv limits for each engine shall be equal to or less than that emitted from the engine when the exhaust stream oxygen concentration is set at the maximum percentage achievable while maintaining stable engine operation. The ROC and CO ppmv limits specified in Sections D.1, D.2 and D.3.b. shall not be exceeded. All engines included in the AECP shall be included as non-exempt engines on District permits with these emission limits specified.~~

~~e. Calculate the uncontrolled emission factor for engines 20 to 49 horsepower by measuring the NO_x emissions in accordance with Section G. (except the test shall be conducted for 30 minutes) with the exhaust stream oxygen concentration adjusted to 2 percent or greater by volume. Baseline fuel usage for these engines shall be calculated as specified above.~~

~~f. Calculate the tonnage of emission reductions achieved to meet the requirements of Section D.5.c. by subtracting the controlled emission rate from the uncontrolled emission rate. The controlled emission rate shall be calculated using the controlled engine NO_x ppmv limit and the baseline fuel usage. The uncontrolled emission rate shall be calculated as specified in Section D.5.c for engines 50 horsepower and over and Section D.5.e for engines 20 to 49 horsepower.~~

~~g. Provide that emission reductions for any engine required under Regulation VIII shall not be used to reduce the emission reductions required of any other engine.~~

~~h. Include engine specific fuel usage monitoring, and other continuous monitoring on each engine determined necessary by the Control Officer to confirm continuous compliance with the required pollution reductions.~~

~~i. Exempt from the requirements of Section G and D.5.h., any 20 to 49 horsepower engines whose control is not required to meet the obligations established under Section D.5.c. These engines must, however, meet all other requirements in the rule, including requirements in Section E. The AECP shall specify any engines subject to this exemption.~~

~~j. Insure compliance with all other provisions of this rule, including but not limited to D.3.a, D.4 and D.5.~~

~~The AECP may be modified at a future date to incorporate equivalent replacement engines which meet the requirements of Rule 202.D.9. The emission limit for the new engine shall be the same as for the replaced engine.~~

~~All District costs for the review and enforcement of the AECP and for District participation in any field studies shall be reimbursed under the cost reimbursement provisions of Rule 210.~~

~~A violation of the AECP shall be a violation of this rule and any applicable permit.~~

~~6~~5. The use of anhydrous ammonia to meet the requirements of this rule is prohibited unless case-specific analysis indicates that the use is acceptable to the Control Officer.

~~E~~F. Requirements - Owner or Operator Engine Inspection~~s~~ and Maintenance Plan

~~All~~ Any engine~~s~~ subject to the requirements of Section ~~D~~ E shall be inspected by the engine owner or operator in accordance with a ~~District~~ District-approved ~~engine~~ Engine ~~inspection~~ Inspection and ~~maintenance~~ Maintenance ~~plan~~ Plan for each stationary source. ~~which~~ The owner or operator shall meet the following requirements for the Plan in accordance with the compliance schedule specified in Section K:

1. ~~The plan shall be submitted to the District by March 2, 1992.~~ Obtain the Control Officer's approval of the Plan. An Inspection and Maintenance Plan for each stationary source shall be submitted to the District in a format approved by the Control Officer.

2. ~~Such plan shall list~~ List all engines by engine classification~~, identified as either cyclics~~ (rich-burn noncyclically-loaded spark ignition, rich-burn cyclically-loaded spark ignition, lean-burn spark ignition, ~~and noncyclics~~compression ignition, or dual-fuel)~~,~~ and identify the method, engine and control equipment operating ~~parameters~~parameter ranges, and compliance values, including engine exhaust oxygen concentration ranges, to be used to verify compliance with Section ~~D~~E.

~~3. The plan shall require a minimum of one inspection for each engine every calendar quarter. The readings for each parameter identified in E.2. shall be recorded pursuant to Section H.~~

~~4~~3. A portable ~~NOx~~ emissions analyzer ~~or any other method approved by the Control Officer~~ shall be used to take ~~NOx~~ oxides of nitrogen and carbon monoxide emission readings and engine exhaust oxygen concentration readings to determine compliance with the emission limits or percent control specified in Section ~~D~~ E during ~~which~~ any quarter (or month, if performing monthly monitoring) in which a source test is not performed under Section ~~G~~ I and an engine is operated in excess of 20 hours per quarter. If such an engine cannot be operated for portable analyzer emissions testing due to mechanical failure or lack of fuel, the monitoring requirement may be waived provided written Control Officer approval is obtained prior to the end of the quarter (or month, if performing monthly monitoring). All emission readings shall be taken at an engine's typical duty cycle.~~The results shall be recorded pursuant to Section H~~. The analyzer shall be calibrated, maintained, and operated in accordance with the manufacturer's specifications and recommendations or a Control Officer approved protocol. The applicable control equipment parameters and engine operating parameters will be inspected and monitored in conformance with a regular inspection schedule listed in the Plan. A~~n~~ portable analyzer instrument reading in excess of the emission compliance values shall not be considered a violation ~~of this rule~~, so long as the ~~problem is corrected~~ engine is brought into compliance and a follow-up inspection is conducted within 15 days of the initial ~~inspection~~out-of-compliance reading. If an engine owner or operator or District staff find an engine to be operating outside the acceptable range for control equipment parameters, engine operating parameters, engine exhaust oxides of nitrogen or carbon monoxide concentrations, the owner or operator shall bring the engine into compliance within 15 days. Also, when there has been a portable analyzer instrument reading in excess of the emission compliance values or a source test result in excess of an emission limit or less than the percent control requirement, the inspection and maintenance monitoring schedule will be performed on a monthly basis and continue to be monthly until Rule 333 compliance is demonstrated in three consecutive months (by portable analyzer or source tests).

The results and ~~instrument~~ readings for each engine and control equipment operating parameter identified in the ~~inspection plan~~ Inspection and Maintenance Plan, the analyzer instrument readings, a description of the corrective actions taken, a determination of whether or not the engine is in compliance, and the ~~initials~~ name of the person recording the ~~measurement~~ information shall be recorded ~~on~~ in an inspection log consistent with the recordkeeping provisions specified in Section J.1.

4. Include preventive and corrective maintenance procedures. Before any change in operations can be implemented, the Plan must be revised as necessary, and the revised Plan must be submitted to and approved by the Control Officer.

~~F~~G. Requirements - Compliance Plan

~~A compliance~~ The owner or operator of any engine subject to the emission limits in Section E shall submit and obtain the Control Officer's approval of a Compliance ~~plan~~Plan. A new or revised Compliance Plan for each stationary source shall be submitted to the District in a format approved by the Control Officer in accordance with the time schedule specified in Section ~~I.2.~~ K unless otherwise specified by the Control Officer.~~ or I.3. to the District for each stationary source~~ The Compliance Plan shall describe all actions, including a schedule of

increments of progress, which will be taken to meet the applicable emissions limitations in Section E and the compliance schedule in Section K. The owner or operator shall ensure that the Compliance Plan meets the following requirements ~~and shall include~~:

1. ~~a l~~List of all engines ~~with~~ by classification (rich-burn noncyclically-loaded spark ignition, rich-burn cyclically-loaded spark ignition, lean-burn spark ignition, compression ignition, or dual-fuel), make, model, serial number (or owner's/operator's ID number), rated brake horsepower ~~and associated RPM~~, type of fuel (including higher heating value and percent or ~~ppm~~ parts per million by volume (dry) sulfur), engine application, ~~maximum~~ total hours of operation ~~per~~ in the previous year, typical daily operating schedule, fuel consumption (cubic feet of gas or gallons of liquid) for the previous one year period, engine location and engine ~~PTO~~ Permit to Operate number~~(if applicable);~~. ~~and~~

2. List manufacturer-tested typical emission rates or source test values, if available or documentation showing existing emissions of oxides of nitrogen, reactive organic compounds, and carbon monoxide~~;~~. ~~and~~

3. List the applicable emission limits.

~~3~~4. List the type of emission control device or method for each engine, and the temperature and flow rate of the exhaust gas, and any auxiliary devices used with the main control device (i.e., air-to-fuel ratio controller, exhaust gas monitor, etc.), ~~and~~ the proposed installation completion date for each engine to be controlled, stack modifications to facilitate continuous in-stack monitoring and source testing.

5. An Engine Inspection and Maintenance Plan, as specified in Section F, or at a minimum, a reference to and a statement incorporating the Engine Inspection and Maintenance Plan into the Compliance Plan.

~~4~~6. List of all existing ~~and operating~~ engines planned for shutdown or electrification and the proposed date of shutdown or electrification.

An owner or operator may modify a ~~compliance~~ Compliance ~~plan~~ Plan by submitting a modified ~~plan~~Plan to the District at least ~~thirty (~~30~~) calendar~~ days prior to modifying the equipment~~,~~ or control method ~~or compliance date~~ for any engine. ~~Modification of a compliance plan shall not alter the schedule of controlled horsepower required in Section I.~~

Approval of a ~~compliance~~ Compliance ~~plan~~ Plan does not relieve the owner or operator of engine(s) from the permitting requirements of District Rule 201.

H. [Reserved]

~~G~~I. Requirements - Source Testing

The owner or operator of any engine subject to the requirements of Section E shall comply with the following:

1. ~~Source test plans~~ Except as otherwise provided in Section I.8, an initial emissions source test shall be performed on each stationary internal combustion engine to verify compliance with Section E. ~~A~~ After the initial source test, source tests shall be performed biennially to demonstrate compliance with Section ~~D~~E. ~~S~~These source tests shall be performed within 30 ~~calendar~~ days of the anniversary date of the initial source test, unless the Control Officer approves a period longer than ~~thirty (~~30~~) calendar~~ days. Emissions source testing shall be conducted at an engine's maximum achievable load or, at a minimum, under the engine's typical duty cycle as demonstrated by historical operational data. Source test loads shall be finalized in the source test plan approved by the District per Section I.2. For facilities with more than 20 engines subject to Section E requirements, the Control Officer may, on a case-by-base basis, approve a source's written request to exclude one or more engines from

biennial testing. Such a request shall be submitted with the Plan required in Section I.2.

2. ~~a. An owner or operator of any engine shall~~ A Source Test Plan shall be submitted to the District and ~~obtain~~ the Control Officer's approval ~~of a source test plan~~shall be obtained prior to the start of a source test. The approved ~~p~~Plan shall be ~~on~~ filed with the District at least ~~thirty (~~30~~) calendar~~ days before the start of each source test~~ing~~. The District shall be notified of the date for source testing an engine at least ~~fourteen (~~14~~) calendar~~ days prior to testing to arrange a mutually agreeable test date. In addition to other information, the Source Test Plan shall describe which critical parameters will be measured for those parameters specified in the Engine Inspection and Maintenance Plan described in Section F.

~~b. A source test shall be performed biennially to demonstrate compliance with Section D. Source tests shall be performed within 30 calendar days of the anniversary date of the initial source test, unless the Control Officer approves a period longer than thirty (30) calendar days.~~

3. ~~c.~~ Source testing shall be performed by a source test contractor certified by the ~~California~~ Air Resources Board. District required ~~S~~source testing shall not be performed by a source owner or operator unless approved by the Control Officer.

4. For each source test performed, a Source Test Report shall be submitted to the District within 45 days of completing the test. Reactive organic compounds, oxides of nitrogen, and carbon monoxide concentrations shall be reported in parts per million by volume, corrected to 15 percent oxygen. For engines using either combustion modifications or exhaust controls, oxides of nitrogen shall be reported as a percent reduction from the combustion modification or control device.

5. ~~d. The owner or operator of~~ For any engine ~~which~~ that is found not to be in compliance with Section ~~D~~E~~.~~ as a result of source testing, ~~shall comply with~~ the following shall apply:

a. ~~i. A r~~Repeat a source test ~~shall be performed~~ to demonstrate compliance with Section ~~D.~~E within the time period specified by the District.

b. ~~ii.~~ Notwithstanding the provisions of Section ~~G.1.b.~~I.1, annual source tests shall be conducted on any noncompliant engine until two consecutive annual tests demonstrate the engine is in compliance with Section ~~D~~ E. When the engine is demonstrated to be in compliance with Section ~~D~~ E by two consecutive annual source tests, the engine shall comply with the provisions of Section ~~G.1.b~~I.1.

~~2~~6. Engine operating parameters (e.g., timing, manifold vacuum pressure, valve set points, etc.) shall be established using the results of the source test carried out pursuant to Section ~~G~~I.1.

~~3~~7. Test Methods

a. Source testing shall be performed in accordance with the following procedures:

~~NOx, CO, O_2: CARB Method 1-100~~

~~ROC: EPA Method 18 or EPA Method 25~~

i. Stack gas oxygen: Environmental Protection Agency Method 3A or Air Resources Board Method 100.

ii. Nitrogen oxides: Environmental Protection Agency Method 7E or Air Resources Board Method 100.

iii. Carbon monoxide: Environmental Protection Agency Method 10 or Air Resources Board Method 100.

iv. Reactive organic compounds: Environmental Protection Agency Method 18 with gas chromatography-flame ionization detection speciation analysis for C1, C2, C3, C4, C5, C6+ species.

v. Pollutant Mass Emission Rate (e.g., pounds per hour): Calculated from stack flow rate data obtained by either 1) the Environmental Protection Agency Methods 1 through 4, or 2) the Environmental Protection Agency ~~exhaust concentration, fuel flow and fuel composition data as per EPA~~ Method 19 ~~, Sections 2.1 and 3.2.1.~~ stack flow rate F factor (ratio of combustion gas volume to heat input), using fuel flow and fuel composition data.

vi. Fuel rate: ~~Appropriate~~ District-approved metering system, calibrated within 60 days of the test date. Public utility company regulated utility fuel meters relied on by operators for testing may be allowed an alternative calibration schedule per the Control Officer's discretion. Results must be corrected for ~~temperature and pressure (~~standard conditions ~~of 60°F and 29.92 inches of Mercury~~.

vii. Determination of the Fuel Composition and Higher Heating Value: The following applicable standards developed by the ASTM International: ~~ASTM Method~~

1) ASTM D ~~-~~ 1945-~~81~~03, "Standard Test Method for Analysis of Natural Gas by Gas Chromatography," ASTM International,

2) ASTM ~~Method~~ D ~~-~~ 3588-~~81~~98 (2003), "Standard Practice for Calculating Heat Value, Compressibility Factor, and Relative Density of Gaseous Fuels," ASTM International, ~~and~~

3) ASTM ~~Method~~ D ~~-~~ 1072-~~80.~~06, "Standard Test Method for Total Sulfur in Fuel Gases," ASTM International,

4) ASTM D 240-02 (2007), "Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter," ASTM International,

5) ASTM D 4809-06, "Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter (Precision Method)," ASTM International, and

6) ASTM D 1826-94 (2003), "Standard Test Method for Calorific (Heating) Value of Gases in Natural Gas Range by Continuous Recording Calorimeter," ASTM International.

The Control Officer may approve in writing alternative methods for determining the fuel composition or fuel higher heating value.

~~Pollutant Emission Rate: Calculated from exhaust concentration, fuel flow and fuel composition data as per EPA Method 19, Sections 2.1 and 3.2.1.~~

b. The Control Officer may approve in writing an alternative source test method provided that such method is comparable in accuracy to the procedure in ~~G.3.a~~ I.7.a ~~.~~ and has been

approved by the ~~ARB~~ Air Resources Board and the ~~EPA~~ Environmental Protection Agency.

c. At a minimum, three 30 minute test runs shall be performed, and the average concentration from the three runs shall be used for determining compliance unless alternative provisions are specified in an approved source testing plan.

8. Initial and biennial source testing requirements shall not be applicable to any compression ignition engines that are subject to an exhaust emission standard in the:

a. California Code of Regulations, Title 13, Section 2423, for off-road engines, or

b. 40 CFR, Part 89, for nonroad compression ignition engines.

However, a source test shall be triggered for such engine if the result from a portable analyzer emissions monitoring reading (e.g., a result obtained during the monitoring required by Section F.3) exceeds a threshold of 560 parts per million of oxides of nitrogen at 15 percent oxygen, unless the engine is brought into compliance with this threshold value and a follow-up portable analyzer monitoring inspection is conducted within 15 days of the initial over-the-threshold reading.

The owner or operator of the engine shall provide written notification to the Control Officer within two business days of a portable analyzer emissions monitoring reading in excess of the 560 parts per million of oxides of nitrogen at 15 percent oxygen threshold. In addition, portable analyzer monitoring results shall be reported to the APCD within three business days of any follow-up quarterly portable analyzer monitoring.

Source testing of a Tier 1, 2, 3 or 4 engine, if triggered per the above criteria, shall be completed within 60 days of the initial over-the-threshold reading and shall comply with Sections I.2, I.3, I.4, I.5.a, and I.7.

Any compression ignition engine that triggers a source test, and demonstrates compliance with the oxides of nitrogen standard in Section E.4, shall not be subject to another source test for two years from the date of the initial compliant source test. Any compression ignition engine that does not comply with the oxides of nitrogen standard in Section E.4 based on any source test, shall thereafter be subject to source testing on a biennial schedule starting from the date of the initial failed source test.

~~H~~J. Recordkeeping

1. The owner or operator of any engine subject to the requirements of ~~this rule~~ Section E shall maintain a written ~~engine~~ Engine ~~operation~~ Operation, Inspection, and Maintenance ~~log~~ Log containing the following information for each engine subject to an emission limit:

a~~)~~. Engine classification (rich-burn noncyclically-loaded spark ignition, rich-burn cyclically-loaded spark ignition, lean-burn spark ignition, compression ignition, or dual-fuel), make, model, and serial number or the owner's or operator's unique identification number.

b. ~~h~~Hours of operation, as determined by a nonresettable elapsed operating time meter, ~~each month for each engine~~ since the last inspection~~;~~ .

~~b)~~c. ~~l~~Location ~~and hours~~ of ~~engine~~ operation of the engine ~~as determined by an hour meter for each engine which operates less than 200 hours per calendar year~~.

~~c)~~d. ~~a~~ A summary of any maintenance performed on an emission control device~~;~~.

~~d)~~e. ~~a~~ A summary of any maintenance performed on an engine ~~which~~ that affects the emission control device~~.; and,~~

~~e)~~f. ~~the o~~Observations made ~~in~~ during each monthly or quarterly inspection, pursuant to the requirements of Section ~~E~~ F.3.

g. Date of each log entry and the printed or typed name of the person entering the log information.

h. For every engine that has been relocated, a notation to that effect identifying both the present and prior location, the reason(s) for the engine relocation, and the elapsed operating time meter readings for both the relocated engine and the engine being displaced.

2. Copies of all ~~engine~~ Engine Operation, ~~inspection~~Inspection, and ~~maintenance~~ Maintenance ~~logs~~ Logs shall be retained ~~by the operator~~ for a minimum of 2 years after the date of the last entry and shall be available to the District upon request. Thereafter, the Logs shall be retained for an additional 3 years either at the stationary source or in a readily available location that allows for expeditious District inspection and review.

3. For any exemption claimed under Section B.2, maintain a written Engine Exemption Log containing the following information for each engine subject of the claim in accordance with the compliance schedule in Section K:

a. Engine's classification (rich-burn noncyclically-loaded spark ignition, rich-burn cyclically-loaded spark ignition, lean-burn spark ignition, compression ignition, or dual-fuel), make, model, and serial number or the owner's or operator's unique identification number.

b. Hours of operation per quarter (or more often at the owner's or operator's discretion), as determined by a nonresettable elapsed operating time meter.

c. Location of operation of the engine.

d. Date of each log entry and the printed or typed name of the person entering the log information.

e. For every engine that has been relocated, a notation to that effect identifying both the present and prior location, the reason(s) for the engine relocation, and the elapsed operating time meter readings for both the relocated engine and the engine being displaced.

At a minimum, entries in the Engine Exemption Log shall be performed on the first day the engine is operated in a new quarter and when any engine is relocated. Copies of all such Logs shall be retained at the stationary source for a minimum of 2 years after the date of the last entry and shall be available to the District upon request. Thereafter, the Logs shall be retained for an additional 3 years either at the stationary source or in a readily available location that allows for expeditious District inspection and review.

~~I~~K. Compliance Schedule

The owner or operator of any engine subject to this rule shall meet the following compliance schedule:

1. New engines~~: shall comply with this rule on the date of adoption.~~

Commencing [*date of revised rule adoption*], any new engine shall comply with this rule the first time it is operated in the District or the outer continental shelf for which the District is the corresponding onshore area.

~~2. Owners or operators of existing noncyclic engines shall comply as follows:~~

~~a. by March 2, 1992 submit a Compliance Plan pursuant to Section F.; and~~

~~b. by September 3, 1992 control a sufficient number of engines to meet the requirements of Section D. for a minimum of 33% of the total rated brake horsepower of the engines at the stationary source; and~~

~~c. by June 3, 1993 control a sufficient number of engines to meet the requirements of Section D. for a minimum of 66% of the total rated brake horsepower of the engines at the stationary source; and~~

~~d. by March 8, 1994 control a sufficient number of engines to meet the requirements of Section D. for all engines.~~

~~3. Owners or operators of existing cyclic engines shall comply as follows:~~

~~a. by March 2, 1992 meet the requirements of Section D.3.a.~~

~~b. Within one year or sooner from date of adoption the Board of Directors of the Air Pollution Control District shall notice a public hearing at least thirty (30) days prior to the hearing date. The hearing will be held to review additional information pertaining to the requirements of Section D.1., D.2. and D.3.b.~~

~~c. by March 3, 1993 submit a Compliance Plan pursuant to Section F.; and~~

~~d. by March 3, 1994 all engines shall be controlled to the limits established by the Board of Directors of the Air Pollution Control District.~~

~~4. An existing and operating engine that is permanently shut down or electrified after the date of rule adoption can be included in determining the percent of total horsepower that meets the requirements of Section D.~~

~~5. An application for an ATC shall be filed 120 days before the compliance date for each engine set forth in I.2.b. and 180 days for engines set forth in I.2.c., I.2.d., and I.3.d.~~

2. Existing Engines:

a. For any engine subject to an emission limit:

The Rule 333 [*date of revised rule adoption*] revisions resulted in changes in the oxides of nitrogen (NOx) emission limits and the addition of reactive organic compound (ROC) and carbon monoxide emission limits as summarized in the attached Tables 1 and 2.

Any engine previously subject to any emission limit in the April 17, 1997 adopted Rule 333, shall continue to comply with the emission limit(s) until such time that compliance with a revised emission limit is required. Further, any engine subject to a revised emission limit, as indicated in attached Tables 1 or 2, shall comply with the Rule 333 Section E emission limits by [*two years from the date of revised rule adoption*] unless the engine is permanently removed.

Any engine that was previously exempt from Rule 333, but became subject to Rule 333 emission limits through the [*date of revised rule adoption*] Rule 202 revisions shall comply with the Rule 333 Section E emission limits by [*two years from the date of revised rule adoption*] unless the engine is permanently removed.

An initial source test demonstrating compliance with a new or revised emission limit shall be completed in accordance with Section I prior to [*two years from the date of revised rule adoption*]. The owner or operator of any engine to be modified or replaced to comply with the Section E emission limits shall submit an Authority to Construct application to the Control Officer by [*one year from the date of revised rule adoption*].

b. For any engine that will be permanently removed from service:

i. by [*one month from the date of revised rule adoption*], comply with the engine identification requirements in Section D.1;

ii. by [*six months from the date of revised rule adoption*], submit a statement to the Control Officer identifying the engine to be removed; and

iii. by [*two years from the date of revised rule adoption*], remove the engine.

c. For any engine subject to the exemption in Section B.2 (operating less than 200 hours per year):

i. by [*one month from the date of revised rule adoption*], comply with the engine identification requirements in Section D.1 and the recordkeeping provisions in Section J.3; and

ii. by [*six months from the date of revised rule adoption*], install and comply with the metering requirements in Sections D.2.

d. For any engine subject to engine identification, plans, or metering requirements in Section D:

i. by [*one month from the date of revised rule adoption*], comply with the engine identification requirements in Section D.1 and the recordkeeping provisions in Section J;

ii. by [*six months from the date of revised rule adoption*]:

1) submit a new/revised Engine Inspection and Maintenance Plan for the Control Officer's approval pursuant to Section F. Any previously approved Engine Inspection and Maintenance Plan will continue to be in force until the Control Officer approves a revised plan; and

2) except as specified in Section B.3, submit a new/revised Compliance Plan for the Control Officer's approval pursuant to Section G. Previously approved Compliance Plans will continue to be in force until the Control Officer approves a revised Compliance Plan; and

iii. by [*nine months from the date of revised rule adoption*], install and comply with the metering requirements in Sections D.2 and D.3.

Table 1: Summarized Oxides of Nitrogen Emission Limit Changes Resulting from the *[date of revised rule adoption]* Rule 333 Revision

Engine Type	Category Number	April 17, 1997 Adopted Rule 333 NOx Limits		*[Date of Revised Rule Adoption]* Adopted Rule 333 NOx Limits		Effect of Change
		% Control	ppmv (at 15% O2)	% Control	ppmv (at 15% O2)	
Rich-Burn Noncyclically-Loaded Spark Ignition Engines	1	90	50	90	50	No change
Lean-Burn Spark Ignition Engines in the 50 to less than 100 bhp Range	2	80	125	-	200	Increased emission limit
Lean-Burn Spark Ignition Engines Rated 100 bhp or Greater	3	80	125	80	125	No change
Rich-Burn Cyclically-Loaded Spark Ignition Engines	4	90	50	-	300	Increased emission limit
Compression Ignition Engines and Dual-Fuel Engines	5	-	797	40	700	Decreased emission limit

Table 2: Summarized Reactive Organic Compound and Carbon Monoxide Emission Limit Changes Resulting from the *[date of revised rule adoption]* Rule 333 Revision

Engine Type	Category Number	April 17, 1997 Adopted Rule 333 Limits, ppmv (at 15% O2)		[*Date of Revised Rule Adoption*] Adopted Rule 333 Limits, ppmv (at 15% O2)		Effect of Change
		ROC	CO	ROC	CO	
Rich-Burn Noncyclically-Loaded Spark Ignition Engines	1	250	4,500	250	4,500	No change
Lean-Burn Spark Ignition Engines in the 50 to less than 100 bhp Range	2	750	4,500	750	4,500	No change
Lean-Burn Spark Ignition Engines Rated 100 bhp or Greater	3	750	4,500	750	4,500	No change
Rich-Burn Cyclically-Loaded Spark Ignition Engines	4	250	4,500	250	4,500	No change
Compression Ignition Engines and Dual-Fuel Engines	5	-	-	750	4,500	New emission limits