AIR POLLUTION CONTROL DISTRICT
COUNTY OF SAN DIEGO

DATE: November 15, 2000

TO: San Diego County Air Pollution Control Board

SUBJECT: ADOPTION OF AMENDMENTS TO RULE 69.4 -- STATIONARY RECIPROCATING INTERNAL COMBUSTION ENGINES - REASONABLY AVAILABLE CONTROL TECHNOLOGY (RACT) (District: All)

SUMMARY:

Overview
Rule 69.4 implements federally mandated Reasonably Available Control Technology (RACT). It regulates emissions of nitrogen oxides (NOx), an ozone precursor, from 50 brake horsepower or greater stationary reciprocating internal combustion engines located at sources emitting 50 tons or more of NOx per year. The proposed amendments provide minor clarifications and ensure consistency with proposed new Rule 69.4.1 exemptions, definitions, and recordkeeping requirements only. No new emission standards are imposed.

In addition, the amendments exempt engines operated exclusively within a permitted test cell solely for research, development, or testing of various types of engines. The allowable non-emergency operating hours for exempt emergency engines located at nuclear power stations are reduced from 500 to 200 hours per year. In addition, engines used in conjunction with military tactical support equipment are no longer restricted to 1,000 hours of operation per calendar year.

A public workshop was held on February 17, 2000. The workshop report is provided in Attachment III.

Recommendation(s)
AIR POLLUTION CONTROL OFFICER

Adopt the resolution amending Rule 69.4 of the District Rules and Regulations and make appropriate findings:

(i) of necessity, authority, clarity, consistency, non-duplication and reference as required by Section 40727 of the State Health and Safety Code;

(ii) that amending Rule 69.4 will alleviate a problem and will promote attainment of ambient air quality standards (Section 40001 of the State Health and Safety Code);

(iii) that an assessment of the socioeconomic impact is not required by Section 40728.5 of the State Health and Safety Code because amending Rule 69.4 will not significantly affect air quality or emission limitations; and

(iv) that it is certain there is no possibility that amending Rule 69.4 may have a significant adverse effect on the environment, and this action is exempt from the provisions of the California Environmental Quality Act (CEQA) pursuant to California Code of Regulations, Title 14, Section 15061(b)(3).

Fiscal Impact
The recommended action will have no fiscal impact on the District.

Business Impact Statement
The amendments to Rule 69.4 impose no new requirements and, therefore, will have a negligible impact on business.

Advisory Board Statement
The Air Pollution Control Advisory Committee recommended amending Rule 69.4 at its October 25, 2000, meeting.

BACKGROUND:

Socioeconomic Impact Assessment
Section 40728.5 of the State Health and Safety Code requires the District to perform a socioeconomic impact assessment for new and revised rules and regulations significantly affecting air quality or emission limitations. Adopting amended Rule 69.4 will not affect air quality or emission limitations. Therefore, a socioeconomic impact assessment is not required.

Compliance with Board Policy on Adopting New Rules
On February 2, 1993, the Board directed that, with the exception of a regulation requested by business or a regulation for which a socioeconomic impact assessment is not required, no new or revised regulation shall be implemented unless specifically required by federal or state law. The proposed adoption of amended Rule 69.4 is consistent with this Board directive.

California Environmental Quality Act
The California Environmental Quality Act requires an environmental review for certain actions. The District has conducted a preliminary review of whether the California Environmental Quality Act applies to the proposed amendments to Rule 69.4. It is certain there is no possibility that adopting amended Rule 69.4 may have a significant adverse effect on the environment. Therefore, adoption of amended Rule 69.4 is exempt from the provisions of the California

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Environmental Quality Act pursuant to California Code of Regulations, Title 14, Section 15061(b)(3).

Comparison to Existing Requirements

Prior to adopting, amending, or repealing a rule or regulation, California Health and Safety Code Section 40727 requires findings of necessity, authority, clarity, consistency, non-duplication, and reference. As part of the consistency finding to ensure proposed rule requirements do not conflict with or contradict other District or federal regulations, Health and Safety Code Section 40727.2 requires the District to perform a written analysis identifying and comparing the air pollution control standards and other provisions of proposed Rule 69.4 amendments with existing or proposed District rules and guidelines and existing federal rules, requirements, and guidelines applying to the same source category.

The analysis is presented in Attachment II.

Additional Information

Attachment I contains the Resolution amending Rule 69.4 of the District's Rules and Regulations and Change Copy.

Attachment II contains the Comparative Analysis of Rule 69.4 pursuant to the Health and Safety Code Section 40727.2.

Attachment III contains the report on the public workshop held on February 17, 2000.

Respectfully submitted,

ROBERT R. COPPER
Deputy Chief Administrative Officer

R. J. SOMMERVILLE
Air Pollution Control Officer

SUBJECT: ADOPTION OF AMENDMENTS TO RULE 69.4 -- STATIONARY RECIPROCATING INTERNAL COMBUSTION ENGINES - REASONABLY AVAILABLE CONTROL TECHNOLOGY (RACT) (District: All)

AGENDA ITEM INFORMATION SHEET

CONCURRENCE(S)

COUNTY COUNSEL REVIEW	[X]	Yes (JD 10/30/20)		
GROUP/AGENCY FINANCE DIRECTOR	[]	Yes	[X]	N/A
CHIEF FINANCIAL OFFICER	[]	Yes	[X]	N/A
Requires Four Votes	[]	Yes	[X]	No
GROUP/AGENCY INFORMATION TECHNOLOGY DIRECTOR	[]	Yes	[X]	N/A
CHIEF TECHNOLOGY OFFICER	[]	Yes	[X]	N/A
DEPARTMENT OF HUMAN RESOURCES	[]	Yes	[X]	N/A

Other Concurrence(s): N/A

ORIGINATING DEPARTMENT: Air Pollution Control District County of San Diego

CONTACT PERSON(S):

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AUTHORIZED REPRESENTATIVE: _____

R. J. Sommerville, Air Pollution Control Officer

SUBJECT: ADOPTION OF AMENDMENTS TO RULE 69.4 -- STATIONARY RECIPROCATING INTERNAL COMBUSTION ENGINES - REASONABLY AVAILABLE CONTROL TECHNOLOGY (RACT) (District: All)

AGENDA ITEM INFORMATION SHEET
(continued)

PREVIOUS RELEVANT BOARD ACTIONS:
September 27, 1994 (4) Approved adoption of new Rule 69.4.

BOARD POLICIES APPLICABLE: N/A

BOARD POLICY STATEMENTS: N/A

CONTRACT NUMBER(S): N/A

RESOLUTION NO. 00-385

WEDNESDAY, NOVEMBER 15, 2000

Re Rules and Regulations of the)
Air Pollution Control District)
of San Diego County . . . . .)

RESOLUTION AMENDING RULE 69.4 OF REGULATION IV OF THE RULES AND REGULATIONS OF THE SAN DIEGO COUNTY AIR POLLUTION CONTROL DISTRICT

On motion of Member Horn, seconded by Member Cox, the following resolution is adopted:

WHEREAS, the San Diego County Air Pollution Control Board, pursuant to Section 40702 of the Health and Safety Code, adopted Rules and Regulations of the Air Pollution Control District of San Diego County; and

WHEREAS, said Board now desires to amend said Rules and Regulations; and

WHEREAS, notice has been given and a public hearing has been had relating to the amendment of said Rules and Regulations pursuant to Section 40725 of the Health and Safety Code.

NOW THEREFORE IT IS RESOLVED AND ORDERED by the San Diego County Air Pollution Control Board that the Rules and Regulations of the Air Pollution Control District of San Diego County be and hereby are amended as follows:

Proposed amended Rule 69.4 to read as follows:

RULE 69.4. STATIONARY RECIPROCATING INTERNAL COMBUSTION ENGINES - REASONABLY AVAILABLE CONTROL TECHNOLOGY

(a) APPLICABILITY

(1) Except as provided in Section (b), this rule shall apply to stationary internal combustion engines with a brake horsepower (bhp) rating of 50 or greater located at a major stationary source of oxides of nitrogen (NOx).

(2) An engine subject to this rule shall not be subject to Rule 68.

(b) **EXEMPTIONS**

(1) This rule shall not apply to the following:

(i) Engines used exclusively in connection with a structure designed for and used as a dwelling for not more than four families.

(ii) Engines used exclusively in agricultural operations for the growing of crops or the raising of fowl or animals.

(iii) Any engine when operated exclusively within a permitted test cell solely for the research, development, or testing of gas turbine engines or their components.

(iv) Any engine when operated exclusively within a permitted test cell solely for the research, development, or testing of reciprocating internal combustion engines or their components.

(2) The provisions of Section (d) of this rule shall not apply to the following:

(i) Any engine which operates less than 200 hours per calendar year.

(ii) Any emergency standby engine provided that operation of the engine for non-emergency purposes does not exceed 52 hours per calendar year.

(iii) Any emergency standby engine at a nuclear power generating station subject to the requirements of the Nuclear Regulatory Commission provided that operation of the engine for non-emergency purposes does not exceed 200 hours per calendar year.

(iv) Any engine used exclusively in conjunction with military tactical support equipment.

An owner or operator of an engine who is claiming an exemption pursuant to Subsection (b)(2) shall conduct annual maintenance of the engine as recommended by the engine manufacturer or as specified by any other maintenance procedure approved in writing by the Air Pollution Control Officer and shall maintain records in accordance with Subsections (e)(1) and (e)(2) of this rule.

(c) **DEFINITIONS**

For the purposes of this rule, the following definitions shall apply:

(1) **"Add-on Control Equipment"** means any technology that is used to reduce emissions from the exhaust gas stream of an engine and is installed downstream of the engine.

(2) **"Brake Horsepower Rating, bhp"** means the maximum continuous brake horsepower output rating as specified by the engine manufacturer and listed on the engine nameplate, if available, regardless of any derating.

(3) **"Emergency Standby Engine"** means an engine used exclusively in emergency situations, except as provided in Subsections (b)(2)(ii) and (b)(2)(iii), to drive an electrical generator, an air compressor or a water pump.

(4) **"Emergency Situation"** means any one of the following:

(i) An unforeseen electrical power failure from the serving utility or of on-site electrical transmission equipment.

(ii) An unforeseen flood or fire, or a life-threatening situation.

(iii) Operation of emergency generators for Federal Aviation Administration licensed or military airports for the purpose of providing power in anticipation of a power failure due to severe storm activity.

Emergency situation shall not include operation for purposes of supplying power for distribution to an electrical grid, operation for training purposes, or other foreseeable events.

(5) **"Fossil Derived Gaseous Fuel"** means gaseous fuel including, but not limited to, natural gas, methane, ethane, propane, butane, and gases stored as liquids at high pressure such as liquefied petroleum gas, but excluding waste derived gaseous fuel.

(6) **"Lean-Burn Engine"** means an engine that is designed to operate with an air-to-fuel ratio that is more than 1.1 times the stoichiometric air-to-fuel ratio.

(7) **"Major Stationary Source of NOx"** means a stationary source which emits or has the potential to emit 50 tons or more of NOx per year.

(8) **"Military Tactical Support Equipment"** means the same as defined in Rule 2.

(9) **"Portable Emission Unit"** means the same as defined in Rule 20.1.

(10) **"Reasonably Available Control Technology (RACT)"** means the lowest emission limit that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility.

(11) **"Rich-Burn Engine"** means an engine that is designed to operate with an air-to-fuel ratio less than or equal to 1.1 times the stoichiometric air-to-fuel ratio.

(12) **"Stationary Internal Combustion Engine" or "Engine"** means a spark or compression ignited, reciprocating internal combustion engine which is not a portable emission unit.

(13) **"Stationary Source"** means the same as is defined in Rule 2.

(14) **"Stoichiometric Air-to-Fuel Ratio"** means the chemically balanced air-to-fuel ratio at which all fuel and all oxygen in the air and fuel mixture are theoretically consumed by combustion.

(15) **"Uncontrolled NOx Emissions"** means NOx emissions from an engine before application of add-on control equipment.

(16) **"Waste Derived Gaseous Fuel"** means gaseous fuel including, but not limited to, digester gas and landfill gas, but excluding fossil derived gaseous fuel.

(d) **STANDARDS**

(1) A person shall not operate a stationary internal combustion engine subject to this rule unless:

(i) Uncontrolled NOx emissions from the following engines are reduced with add-on control equipment by not less than the following:

Engine Category	Weight Percent Reduction
Rich-burn engines using fossil derived gaseous fuel or gasoline	90
Lean-burn engines using fossil derived gaseous fuel	80
Engines using exclusively waste derived gaseous fuel	80

or

(ii) The emissions of NOx, in parts per million by volume (ppmv), calculated as nitrogen dioxide at 15% oxygen on a dry basis, or in grams of NOx per brake horsepower-hour, are not greater than the following:

Engine Category	Concentration of NOx g/bhp-hr (ppmv)
Rich-burn engines using fossil derived gaseous fuel or gasoline	0.9 (50)
Lean-burn engines using gaseous fuel	2.3 (125)
Engines using exclusively waste derived gaseous fuel	2.3 (125)
Engines using diesel or kerosene fuel	9.0 (700)

(2) For all engines subject to Subsection (d)(1) of this rule, emissions of carbon monoxide (CO), calculated at 15% oxygen on a dry basis, shall not exceed 4500 ppmv.

(3) An owner or operator of an engine subject to this rule shall conduct annual maintenance of the engine as recommended by the engine manufacturer or as specified by any other maintenance procedure approved in writing by the Air Pollution Control Officer.

(e) **MONITORING AND RECORDKEEPING REQUIREMENTS**

(1) An owner or operator of an engine subject to this rule shall keep the following records and shall maintain these records on-site for at least the same period of time as the engine to which the records apply is located at the site:

(i) engine manufacturer name and model number;

(ii) brake horsepower output rating;

(iii) combustion method (i.e. rich-burn or lean-burn);

(iv) fuel type;

(v) a manual of recommended maintenance as provided by the engine manufacturer, or other maintenance procedure as approved in writing by the Air Pollution Control Officer; and

(vi) records of annual engine maintenance, including dates maintenance was performed.

(2) In addition to the records required by Subsection (e)(1), an owner or operator of an engine exempt pursuant to Subsection (b)(2) from the requirements of Section (d) shall maintain an operating log containing, at a minimum, the following:

(i) dates and times of engine operation. If applicable, indicate whether the operation was for non-emergency purposes or during an emergency situation and the nature of the emergency, if available; and

(ii) total cumulative hours of operation per calendar year, based on actual readings of the engine hour or fuel meter.

The records specified in Subsection (e)(2)(i) are not required if total engine operations for any purpose, including emergency situations, do not exceed 52 hours in a calendar year.

(3) In addition to the records required by Subsection (e)(1), an owner or operator of a rich-burn engine subject to the requirements of Section (d) shall measure

and record at least once each calendar month those operating parameters determined necessary to ensure compliance by the Air Pollution Control Officer. Such operating parameters may include but are not limited to:

(i) temperature of the inlet and outlet of the control equipment;

(ii) engine air-to-fuel ratio; and

(iii) engine inlet manifold temperature and pressure.

(4) In addition to the records required by Subsection (e)(1), an owner or operator of a lean-burn engine using gaseous fuel subject to the requirements of Section (d) shall also measure and record at least once each calendar month those operating parameters determined necessary to ensure compliance by the Air Pollution Control Officer. Such operating parameters may include but are not limited to:

(i) engine air-to-fuel ratio or automatic air-to-fuel ratio control signal voltage;

(ii) engine exhaust gas temperature; and

(iii) engine inlet manifold temperature and pressure.

(5) In addition to the records required by Subsection (e)(1), an owner or operator of an engine using diesel fuel subject to the requirements of Section (d) shall also measure and record at least once each calendar month those operating parameters determined necessary to ensure compliance by the Air Pollution Control Officer. Such operating parameters may include but are not limited to:

(i) engine air-to-fuel ratio;

(ii) engine exhaust gas temperature; and

(iii) engine inlet manifold temperature and pressure.

(6) All records required by Subsections (e)(2) through (e)(5) shall be retained on-site for at least three years and made available to the District upon request.

(f) TEST METHODS

(1) To determine compliance with Section (d), measurement of NOx, CO, carbon dioxide (CO_2) and oxygen content of exhaust gas shall be determined in accordance with San Diego County Air Pollution Control District Test Method 100, Air Resources Board (ARB) Test Method 100 or equivalent Environmental Protection Agency (EPA) Test Method and a source test protocol approved in writing by the Air Pollution Control Officer.

(2) The averaging period to calculate NOx and CO emission concentrations and to determine compliance shall be at least 30 minutes and not more than 60 minutes. NOx and CO emission concentrations shall be calculated as an average of three subtests.

(3) Emissions source testing, if applicable, shall be performed at no less than 80 percent of the brake horsepower rating. If an owner or operator of an engine demonstrates to the satisfaction of the Air Pollution Control Officer that the engine cannot operate at these conditions, then emissions source testing shall be performed at the highest achievable continuous brake horsepower rating or under the typical duty cycle or typical operational mode of the engine.

IT IS FURTHER RESOLVED AND ORDERED that the subject amendments to Rule 69.4 of Regulation IV shall take effect upon adoption.

PASSED AND ADOPTED by the Air Pollution Control Board of the San Diego County Air Pollution Control District, State of California, this 15th day of November, 2000, by the following votes:

AYES: Cox, Jacob, Slater, Horn
NOES: Roberts
ABSENT:

APPROVED AS TO FORM AND LEGALITY
COUNTY COUNSEL
BY L. Dutton
SENIOR DEPUTY

I hereby certify that the foregoing is a full, true and correct copy of the Original Resolution which is now on file in my office.

THOMAS J. PASTUSZKA
Clerk of the Air Pollution Control Board

By_____
Grace Andoh, Deputy

Resolution No. 00-385
November 15, 2000 (APCB 3)

SAN DIEGO AIR POLLUTION CONTROL DISTRICT

CHANGE COPY

Proposed amended Rule 69.4 to read as follows:

RULE 69.4. STATIONARY RECIPROCATING INTERNAL COMBUSTION ENGINES - REASONABLY AVAILABLE CONTROL TECHNOLOGY (RACT)

(a) **APPLICABILITY**

(1) Except as provided in Section (b), this rule shall apply to stationary internal combustion engines with a brake horsepower (bhp) ~~output~~ rating of 50 ~~bhp~~ or greater located at a major stationary source of oxides of nitrogen (NOx).

(2) An engine subject to this rule shall not be subject to Rule 68.

(b) **EXEMPTIONS**

(1) ~~The provisions of this~~ This rule shall not apply to the following:

(i) Engines used exclusively in connection with a structure designed for and used as a dwelling for not more than four families.

(ii) Engines used exclusively in agricultural operations for the growing of crops or the raising of fowl or animals.

(iii) Any engine when operated exclusively within a permitted test cell solely for the research, development, or testing of gas turbine engines or their components.

(iv) Any engine when operated exclusively within a permitted test cell solely for the research, development, or testing of reciprocating internal combustion engines or their components.

(2) The provisions of Section (d) of this rule shall not apply to the following:

(i) Any engine which operates less than 200 hours per calendar year.

(ii) Any emergency standby engines ~~operated either during emergency situations or for maintenance purposes,~~ provided that ~~the~~ operation of the engine for ~~maintenance~~ non-emergency purposes does not exceed 52 hours per calendar year.

(iii) Any emergency standby engine at a nuclear power generating station subject to the requirements of the Nuclear Regulatory Commission~~, either during emergency situations or for maintenance purposes,~~ provided that ~~the~~ operation of the

engine for ~~maintenance~~ non-emergency purposes does not exceed 200 ~~500~~ hours per calendar year.

(iv) Any engine used exclusively in conjunction with military tactical ~~deployable~~ support equipment ~~operated at military sites, provided that the operation of the engine does not exceed 1000 hours per calendar year~~.

An owner or operator of an engine who is claiming an exemption pursuant to Subsection (b)(2) shall conduct annual maintenance of the engine as recommended by the engine manufacturer or as specified by any other maintenance procedure approved in writing by the Air Pollution Control Officer and shall maintain records in accordance with Subsections (e)(1) and (e)(2) of this rule.

(c) **DEFINITIONS**

For the purposes of this rule, the following definitions shall apply:

(1) **"Add-on Control Equipment"** means any technology that is used to reduce ~~oxides of nitrogen~~ emissions from the exhaust gas stream of an engine and is installed downstream of the engine.

(2) **"Brake Horsepower ~~Output~~ Rating, (bhp)"** means the maximum continuous brake horsepower output rating as specified by the engine manufacturer and listed on the engine nameplate, if available, regardless of any derating.

(3) **"Emergency Standby Engine"** means an engine used exclusively in emergency situations, except as provided in Subsections (b)(2)(ii) and (b)(2)(iii), to drive an electrical generator, an air compressor or a water pump.

(4) **"Emergency Situation"** means any one of the following:

(i) An unforeseen electrical power failure from the serving utility or of on-site electrical transmission equipment.

(ii) An unforeseen flood or fire, or a life-threatening situation.

(iii) Operation of emergency generators for Federal Aviation Administration licensed or military airports for the purpose of providing power in anticipation of a power failure due to severe storm activity. ~~shall be considered an emergency situation.~~

Emergency situation shall not include operation for purposes of supplying power for distribution to an electrical grid, operation for training purposes, or other foreseeable events.

~~(5)~~ ~~**"Existing Engine"** means an engine which commenced operation in San Diego County on or before September 27, 1994.~~

(5)~~(6)~~ **"Fossil Derived Gaseous Fuel"** means gaseous fuel including, but not limited to, natural gas, methane, ethane, propane, butane, and gases stored as liquids at high pressure such as liquefied petroleum gas, ~~and~~ but excluding waste derived gaseous fuel.

(6)~~(7)~~ **"Lean-Burn Engine"** means an engine that is designed to operate with an air-to-fuel ratio that is more than 1.1 times the stoichiometric air-to-fuel ratio.

(7)~~(8)~~ **"Major Stationary Source of NOx"** means a stationary source ~~that~~ which emits or has the potential to emit ~~25~~ 50 tons or more of NOx per year. ~~If the San Diego County Air Pollution Control District is reclassified to a "serious" ozone non-attainment area by the federal Environmental Protection Agency, then a major stationary source of NOx will mean a stationary source that emits or has the potential to emit 50 tons or more of NOx per year.~~

(8)~~(9)~~ **"Military Tactical ~~Deployable~~ Support Equipment"** means the same as defined in Rule 2. ~~equipment operated by the United States armed forces or National Guard which is designed specifically for military use in an off-road, dense terrain and/or hostile environment or on board military combat vessels and is capable of being moved from one location to another. This equipment requires the ability to perform in a uniform manner with a minimum amount of maintenance which has been standardized throughout the United States military and/or NATO forces.~~

~~(10) **"New Engine"** means an engine installed in San Diego County which commenced operation after September 27, 1994.~~

(9)~~(11)~~ **"Portable Emission Unit"** means the same as defined in Rule 20.1. ~~an emission unit which is designed and equipped to be easily movable and, as installed, easily capable of being moved from one stationary source to another, as determined by the Air Pollution Control Officer. Portable emission units are periodically moved and may not be located more than 180 days at any one stationary source within any consecutive 12 month period. Days when portable emission units are stored in a designated holding or storage area shall not be counted towards the 180 day limit, provided the emission unit was not operated on that calendar day except for maintenance and was in the designated holding area the entire calendar day.~~

(10) **"Reasonably Available Control Technology (RACT)"** means the lowest emission limit that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility.

(11)~~(12)~~ **"Rich-Burn Engine"** means an engine that is designed to operate with an air-to-fuel ratio less than or equal to 1.1 times the stoichiometric air-to-fuel ratio.

(12)~~(13)~~ **"Stationary Internal Combustion Engine" or "Engine"** means a spark or compression ignited, reciprocating internal combustion engine which is not a portable emission unit.

(13)~~(14)~~ **"Stationary Source"** means the same as is defined in Rule ~~20.1~~ 2.

(14)~~(15)~~ **"Stoichiometric Air-to-Fuel Ratio"** means the chemically balanced air-to-fuel ratio at which all fuel and all oxygen in the air and fuel mixture are theoretically consumed by combustion.

(15)~~(16)~~ **"Uncontrolled NOx Emissions"** means NOx emissions from an engine ~~calculated in parts per million by volume as nitrogen dioxide at 15% oxygen on a dry basis or in grams of NOx per brake horsepower-hour,~~ before application of add-on ~~air pollution~~ control equipment ~~or combustion modifications~~.

(16)~~(17)~~ **"Waste Derived Gaseous Fuel"** means gaseous fuel including, but not limited to, ~~sewage sludge~~ digester gas and landfill gas, ~~and~~ but excluding fossil derived gaseous fuel.

(d) **STANDARDS**

(1) A person shall not operate a stationary internal combustion engine subject to this rule unless:

(i)~~(ii)~~ Uncontrolled NOx emissions from ~~such engine~~ the following engines are reduced with add-on control equipment by not less than the following:

Engine Category	Weight Percent Reduction
Rich-burn engines using ~~exclusively~~ fossil derived gaseous fuel or gasoline	90
Lean-burn engines using ~~exclusively~~ fossil derived gaseous fuel	80
Engines using exclusively waste derived gaseous fuel	80
~~Engine using diesel or kerosene fuel~~	~~25~~

or

(ii)~~(i)~~ The emissions of ~~oxides of nitrogen (~~NOx~~)~~, ~~calculated~~ in parts per million by volume (ppmv), calculated as nitrogen dioxide at 15% oxygen on a dry basis, or in grams of NOx per brake horsepower-hour, are not greater than the following:

Engine Category	Concentration of NOx g/bhp-hr (ppmv)
Rich-burn engines using ~~exclusively~~ fossil derived gaseous fuel or gasoline	0.9 (50)
Lean-burn engines using ~~exclusively fossil derived~~ gaseous fuel	2.3 (125)
Engines using exclusively waste derived gaseous fuel	2.3 (125)
Engines using diesel or kerosene fuel	9.0 (700)

(2) For all engines subject to Subsection (d)(1) of this rule, emissions of carbon monoxide (CO), calculated ~~in parts per million by volume (ppmv)~~ at 15% oxygen on a dry basis, shall not exceed 4500 ppmv.

(3) An owner or operator of an engine subject to this rule shall conduct annual maintenance of the engine as recommended by the engine manufacturer or as specified by any other maintenance procedure approved in writing by the Air Pollution Control Officer.

(e) **MONITORING AND RECORDKEEPING REQUIREMENTS**

(1) An owner or operator of an engine subject to this rule shall keep the following records~~.~~ and shall maintain these records ~~The records required by this section shall be kept~~ on-site for at least the same period of time as the engines to which the records apply ~~are~~ is located at the site:

(i) engine manufacturer name and model number;

(ii) brake horsepower output rating;

(iii) combustion method (i.e. rich-burn or lean-burn);

(iv) fuel type;

(v) a manual of recommended maintenance as provided by the engine manufacturer, or other maintenance procedure as approved in writing by the Air Pollution Control Officer; and

(vi) records of annual engine maintenance, including dates ~~of~~ maintenance was performed.

(2) In addition to the records required by Subsection (e)(1), an owner or operator of an engine exempt pursuant to Subsection (b)(2) from the requirements of Section (d) shall maintain an operating log containing, at a minimum, the following:

(i) dates and times of engine operation. ~~indicating, if applicable,~~ If applicable, indicate whether the operation was ~~during emergency situation or~~ for ~~maintenance~~ non-emergency purposes or during an emergency situation and the nature of the emergency, if available; and

(ii) total cumulative ~~annual~~ hours of operation~~.~~ per calendar year, based on actual readings of the engine hour or fuel meter.

The records specified in Subsection (e)(2)(i) are not required if total engine operations for any purpose, including emergency situations, do not exceed 52 hours in a calendar year.

(3) In addition to the records required by Subsection (e)(1), an owner or operator of a rich-burn engine subject to the requirements of Section (d) ~~using add-on control equipment~~ shall ~~keep the following~~ measure and record at least once each calendar month~~ly records~~ those operating parameters determined necessary to ensure compliance by the Air Pollution Control Officer. Such operating parameters may include but are not limited to:

(i) temperature of the inlet and outlet of the control ~~device~~ equipment;

(ii) engine air-to-fuel ratio; and

(iii) engine inlet manifold temperature and pressure.

(4) In addition to the records required by Subsection (e)(1), an owner or operator of a lean-burn engines using ~~exclusively~~ gaseous fuel subject to the requirements of Section (d) shall also ~~keep the following~~ measure and record at least once each calendar month~~ly records~~ those operating parameters determined necessary to ensure compliance by the Air Pollution Control Officer. Such operating parameters may include but are not limited to:

(i) engine air-to-fuel ratio ~~and~~ or automatic air-to-fuel ratio control signal voltage;

(ii) engine exhaust gas temperature; and

(iii) engine inlet manifold temperature and pressure.

(5) In addition to the records required by Subsection (e)(1), an owner or operator of an engine using diesel fuel subject to the requirements of Section (d) shall also ~~keep monthly records of operating parameters that are necessary to demonstrate continuous compliance, such as~~ measure and record at least once each calendar month those operating parameters determined necessary to ensure compliance by the Air Pollution Control Officer. Such operating parameters may include but are not limited to:

(i) engine air-to-fuel ratio;

(ii) engine exhaust gas temperature; and

(iii) engine inlet manifold temperature and pressure.

(6) ~~Except as otherwise specified in this rule, all~~ All records required by ~~Section~~ Subsections (e)(2) through (e)(5) shall be retained on-site for at least three years and made available to the District upon request.

(f) TEST METHODS

(1) To determine compliance with Section (d), measurement of ~~oxides of nitrogen~~ NOx, ~~carbon monoxide~~ CO, carbon dioxide (CO_2) and ~~stack gas~~ oxygen content of exhaust gas shall be ~~conducted~~ determined in accordance with ~~the Air Resources Board~~

~~(ARB)~~ San Diego County Air Pollution Control District Test Method 100, ~~as approved by the U.S. Environmental Protection Agency (EPA)~~ Air Resources Board (ARB) Test Method 100 or equivalent Environmental Protection Agency (EPA) Test Method and a source test protocol approved in writing by the Air Pollution Control Officer.

(2) The averaging period to calculate NOx and CO ~~carbon monoxide~~ emissions concentrations and to determine compliance shall be at least ~~thirty~~ 30 minutes and not more than 60 minutes. NOx and CO emission concentrations shall be calculated as an average of three subtests.

(3) Emissions source testing, if applicable, shall be performed at no less than 80 percent of the brake horsepower ~~output~~ rating. If an owner or operator of an ~~existing~~ engine demonstrates to the satisfaction of the Air Pollution Control Officer that the engine cannot operate at these conditions, then emissions source testing shall be performed at the highest achievable continuous brake horsepower rating or under the typical duty cycle or typical operational mode of the engine.

~~(g) COMPLIANCE SCHEDULE~~

~~The owner or operator of an engine subject to the requirements of Section (d) of this rule shall meet the following increments of progress:~~

~~(1) For an existing engine which does not need modification and/or add-on control equipment, submit documentation showing that the engine is in compliance with all applicable rule requirements not later than May 31, 1995.~~

~~(2) For an existing engine which requires modification and/or add-on control equipment:~~

~~(i) By January 27, 1995, submit to the Air Pollution Control Officer an application for Authority to Construct and Permit to Operate a modified engine or add-on control equipment as necessary to comply with the applicable requirements of Section (d).~~

~~(ii) By May 31, 1995, modify the engine or install add-on control equipment as necessary to comply with the applicable requirements of Section (d).~~

~~(3) For a new engine, comply with all applicable requirements of this rule upon installation and startup.~~

COMPARATIVE ANALYSIS FOR RULE 69.4

Pursuant to California Health and Safety Code Section 40727, the District is required to perform findings of necessity, authority, clarity, consistency, non-duplication, and reference prior to adopting, amending, or repealing a rule or regulation. As part of the consistency finding to ensure proposed rule requirements do not conflict with or contradict other District or federal regulations, Health and Safety Code Section 40727.2(a) requires the District to perform a written analysis identifying and comparing the air pollution control standards and other provisions of proposed amended Rule 69.4 with existing or proposed District rules and guidelines and existing federal rules, requirements, and guidelines applying to the same source category.

Rule 69.4 controls nitrogen oxide (NOx) emissions from stationary engines located at major source facilities emitting 50 tons or more per year of NOx. A Comparative Analysis of amended Rule 69.4 with proposed Rule 69.4.1 and Best Available Control Technology (BACT) is provided in Table 1.

Rule 69.4.1 was developed pursuant to state requirements for Best Available Retrofit Control Technologies (BARCT). The rule applies to stationary internal combustion engines (the same source category as Rule 69.4). BACT is a requirement of the New Source Review regulations, developed according to federal guidelines.

Rule 69.4 applies to fewer sources than Rule 69.4.1. Rule 69.4 applies to engines located at major stationary sources of NOx, as compared to Rule 69.4.1, which applies to engines located at all stationary sources, and BACT, which applies to new engines at all sources. The emission standards of Rule 69.4 are less stringent than Rule 69.4.1, due to less stringent federal requirements for Reasonably Available Control Technologies (RACT). BACT emission standards are established for more general engine categories than Rule 69.4 emission standards, though the emissions limits are nearly equivalent. Requirements for monitoring, recordkeeping and source testing in Rule 69.4 are less stringent than in Rule 69.4.1, but more specific than BACT. There are no conflicts or contradictions between Rule 69.4, Rule 69.4.1 and BACT requirements.

Table 1 - Comparative Analysis of Rule 69.4

Items for Comparison	Rule 69.4	Rule 69.4.1	Best Available Control Technology
Applicability	Stationary IC engines > 50 bhp	Stationary IC engines > 50 bhp	New IC engines > 50 bhp
Exemption	• Exempt from rule: Portable engines Agricultural engines Family dwelling engines Test cell research engines • Exempt from emission standards: Military tactical engines Emergency standby engines Engines <200 hours/year Nuclear power plant engines	• Exempt from rule: Portable engines Agricultural engines Family dwelling engines Test cell research engines Military tactical engines • Exempt from emission standards: Existing emergency standby engines Existing engine <200 hours/year Nuclear power plant engines	• Exempt from rule: Agricultural engines Military tactical engines Family dwelling engines Engines with emissions less than 10 lbs/day of all criteria pollutants
Emission Standards	A. <u>NOx Standard:</u> • Gas engines: Rich burn natural gas or gasoline: 50 ppmv Waste gas: 125 ppmv Lean burn: 125 ppmv • Diesel engines: 700 ppmv (approximately 9 g/bhp-hr) B. <u>CO Standard:</u> 4500 ppmv C. <u>VOC Standard:</u> N/A *(ppmv concentrations calculated at 15% O2)*	A. <u>NOx Standard:</u> • Gas engines: Rich burn natural gas or gasoline: 25 ppmv Rich burn waste gas: 50 ppmv Lean burn: 65 ppmv • Diesel engines: High-use, new low-use, new cyclic, new emergency standby: 6.9 g/bhp-hr Low-use: 700 ppmv (approximately 9 g/bhp-hr) B. <u>CO Standard:</u> 4500 ppmv C. <u>VOC Standard:</u> • Rich burn gas engines: 250 ppmv • Other engines: 750 ppmv *(ppmv concentrations calculated at 15% O2)*	A. <u>NOx Standard:</u> • Gas engines: 1 g/bhp-hr (approximately 56 ppmv) • Diesel engines: Engines < 200 bhp: 7.2 g/bhp-hr Engines between 200 bhp and 750 bhp: 6.9 g/bhp-hr B. <u>CO Standard:</u> N/A C. <u>VOC Standard:</u> • All engines: 1.5 g/bhp-hr (approximately 311 ppmv for gas engines) *(ppmv concentrations calculated at 15% O2)*

Items for Comparison	Rule 69.4	Rule 69.4.1	Best Available Control Technology
Control Technology Standard	N/A	• Gas engines: N/A • Diesel engines: High use, all replacement engines: Tier I certified off-road engines Low-use engines: Tier I certified off-road engines; or combination of any two of the following: Turbocharger, aftercooler, or 4° injection timing retard	• Gas engines: electric motor, non-selective catalytic reduction (NSCR), lean burn engines • Diesel engines: Engines <200 bhp: Turbocharger, aftercooler, or 4° injection timing retard Engines between 200 bhp and 750 bhp: 85% efficient selective catalytic reduction (SCR), or if not cost effective, Turbocharger, aftercooler, or 4° injection timing retard
Fuel Requirement	N/A	California Diesel fuel	California Diesel fuel
Monitoring Requirements	• Monitor operating parameters that are indicative of engine emissions	• Monitor operating parameters that are indicative of engine emissions • Install engine hour meters or fuel meters	• Pending evaluation on case-by-case basis, no specific requirements
Recordkeeping Requirements	Keeping records of: • Engine descriptions, fuel type, maintenance procedure manual • Engine operating hours per calendar year • Engine inspection and maintenance • Applicable engine operating parameters	Keeping records of: • Engine descriptions, CARB fuel certification, maintenance procedure manual • Engine operating hours per calendar year • Engine inspection and maintenance • Applicable engine operating parameters	• Pending evaluation on case-by-case basis, no specific requirements
Source Test Requirements	• Pending evaluation on case-by-case basis, no specific requirements	Source testing once every 24 months for engines subject to emission standard requirements	• Pending evaluation on case-by-case basis, no specific requirements

AIR POLLUTION CONTROL DISTRICT
COUNTY OF SAN DIEGO

RULE 69.4 - STATIONARY RECIPROCATING INTERNAL COMBUSTION ENGINES - REASONABLY AVAILABLE RETROFIT CONTROL TECHNOLOGY

WORKSHOP REPORT

A notice for a second workshop for proposed Rule 69.4 was mailed to all known owners and operators of stationary reciprocating internal combustion (IC) engines in San Diego County. Notices were also mailed to all Economic Development Corporations and Chambers of Commerce in San Diego County, the U.S Environmental Protection Agency (EPA), the California Air Resources Board (ARB), and other interested parties. The workshop was held on February 17, 2000. Written comments were received from EPA and ARB. The comments and District responses are as follows:

1. EPA WRITTEN COMMENT

Since Air Pollution Control Officer discretion is allowed to approve the operating parameters to be monitored and recorded, Sections (e)(4) and (e)(5) should specify the minimum operational data that must be maintained in all cases.

DISTRICT RESPONSE

Section (e)(1) specifies minimum operating parameter data that must be maintained for each engine. Sections (e)(3), (4), and (5) specify that in addition to the records required by (e)(1), the owner or operator of a rich-burn, lean-burn, or diesel fueled engine, respectively, "shall measure and record at least once each calendar month those operating parameters determined necessary to ensure compliance by the Air Pollution Control Officer." Each section continues by specifying a list of the parameters that may require monitoring.

Over the five years this rule has been in effect, the District has observed it is not always necessary or even possible to monitor all the listed parameters to ensure compliance. Occasionally, sources propose alternative monitoring that is sufficient. Given that determining the operating parameters to be monitored is made on a case-by-case basis, Rule 69.4 allows Air Pollution Control Officer discretion on a case-by-case basis. Moreover, since Rule 69.4 applies only to major NOx stationary sources, EPA will be reviewing these source-specific parametric monitoring determinations in conjunction with the site's Title V permits.

2. EPA WRITTEN COMMENT

The proposed rule allows Air Pollution Control Officer discretion regarding approval of source test protocols. The rule should specify source test frequency and methodology for each class of engine.

DISTRICT RESPONSE

The District disagrees. The current State Implementation Plan approved version of Rule 69.4 does not specify source test frequency requirements. Most federal New Source Performance Standards and RACT rules do not specify source test frequency. As part of the District's overall compliance program, source testing is performed on various types of equipment as necessary to determine compliance. Frequency can be affected by the size of the source, presence of Continuous Emission Monitors or Continuous Parametric Monitors, and compliance margin and history. Testing methodologies are specified in Section (f) of the rule.

3. ARB WRITTEN COMMENT

The District should include a source test requirement to verify compliance with the emission standards. It is suggested that, at a minimum, the compliance source test be conducted every 8,760 hours of operation or every 24 months, whichever period is shorter.

DISTRICT RESPONSE

In addition to Rule 69.4 which implements federal RACT and applies only to engines located at major stationary sources, the District is developing Rule 69.4.1 which implements BARCT and applies to all stationary engines of 50 brake horsepower and more. Rule 69.4.1 contains a requirement to conduct a source test every 24 months, unless specified otherwise by the Air Pollution Control Officer. Since engines subject to Rule 69.4 are also subject to Rule 69.4.1, they will already be subject to the suggested source test frequency requirements.

4. ARB WRITTEN COMMENT

To improve stringency and to ensure compliance with Title V record retention requirements, Section (e)(6) should be modified to include a five-year record retention requirement for Title V sources.

DISTRICT RESPONSE

Title V sources will have a specific requirement to retain records for five years as a part of the federal Title V permit program. Therefore, it is not necessary to include this requirement in Rule 69.4. Moreover, should this Title V requirement change in the future, the District does not want to have to make conforming amendments to Rule 69.4 and other rules which may apply to Title V sources.

AIR POLLUTION CONTROL DISTRICT
COUNTY OF SAN DIEGO

DATE: November 15, 2000

TO: San Diego County Air Pollution Control Board

SUBJECT: ADOPTION OF NEW RULE 69.4.1 -- STATIONARY RECIPROCATING INTERNAL COMBUSTION ENGINES - BEST AVAILABLE RETROFIT CONTROL TECHNOLOGY (BARCT) (District: All)

SUMMARY:

Overview
Proposed new Rule 69.4.1 implements state-mandated requirements for Best Available Retrofit Control Technology (BARCT) and all feasible control measures as reflected in the San Diego Regional Air Quality Strategy. The new rule will regulate NOx emissions from existing, new or replacement stationary reciprocating internal combustion engines with a manufacturer's output rating of 50 brake horsepower or greater. It will reduce oxides of nitrogen (NOx) emissions by approximately 481 tons per year. Approximately 207 existing engines at 90 facilities will be subject to new requirements.

The NOx emission standards can be achieved by using combustion modification techniques such as turbocharging or aftercooling, replacement with a new, cleaner engine or by using add-on controls. New carbon monoxide emission standards for affected engines and volatile organic compound emission standards for rich-burn engines are also specified to prevent increases of these pollutants as NOx emissions are reduced.

Rule 69.4.1 also requires installation of a non-resettable fuel or elapsed operating time meter, periodic inspection and annual maintenance of the engine and any air pollution control system, and monitoring of specified operational characteristics of the engine as recommended by the engine manufacturer and approved by the District. Emissions testing requirements, including a requirement for biennial testing, and test methods to determine compliance are also specified. All diesel-fueled engines will be required to use California Diesel Fuel certified by the California Air Resources Board (ARB).

For approximately 900 *existing* emergency standby and low-use engines, the rule requires annual engine maintenance, installation of an operating hour meter, records to demonstrate compliance and for diesel-fired engines, the use of California Diesel Fuel. These engines are not subject to any new emission standards.

During the rule development process, ARB suggested the District consider requiring selective catalytic reduction (SCR) for high-use diesel engines. The District identified technical and economic feasibility issues related to using this technology and rejected ARB's suggestion. ARB recently clarified this suggestion to mean the District should continue to evaluate the applicability and cost-effectiveness of SCR for certain classes or categories of diesel engines located in San Diego County and, if appropriate, consider revising Rule 69.4.1 at a later date to incorporate a requirement for SCR on such classes or categories of engines. ARB also requested the District closely monitor performance and cost-effectiveness of SCR installed on diesel engines in California and development of ARB's NOx and particulate matter control measures for diesel engines and propose future revisions to Rule 69.4.1 as deemed appropriate by the District. Particulate matter from diesel engines has been classified as a toxic air contaminant. The District has agreed to closely follow the applicability of SCR for diesel engines and consider such amendments to Rule 69.4.1 at a later date.

Also during the rule development process, the issue of requiring emission testing for certified engines was raised. The District determined that engines certified by ARB and/or the Environmental Protection Agency (EPA) at emission rates at or below Rule 69.4.1 requirements should not be required to perform biennial emissions testing until an appropriate field test method is developed for certified engines. In the interim, the District will rely on ARB/EPA certification statements for each engine to determine compliance.

In conjunction with adopting proposed new Rule 69.4.1, District Rule 11 (Exemption From Rule 10 Permit Requirements), Rule 12 (Registration of Specified Equipment) and Rule 69.4 (Stationary Reciprocating Internal Combustion Engines) are separately being proposed for revision. Amendments to Rules 11 and 12 will bring currently exempt or registered engines into the permit system to facilitate implementing the requirements of Rule 69.4.1. The Rule 69.4 amendments will update the rule for engines located at federal major sources of NOx and provide consistency with Rule 69.4.1 language.

Public workshops were held on April 29, 1999, and February 17, 2000. The workshop reports are provided in Attachment V.

Recommendation(s)
AIR POLLUTION CONTROL OFFICER

Adopt the resolution adopting new Rule 69.4.1 into the District Rules and Regulations and make appropriate findings:

(i) of necessity, authority, clarity, consistency, non-duplication and reference as required by Section 40727 of the State Health and Safety Code;

(ii) that adopting new Rule 69.4.1 will alleviate a problem and will promote attainment of ambient air quality standards (Section 40001 of the State Health and Safety Code);

(iii) that an assessment of the socioeconomic impact of the proposed amendments has been prepared and that the socioeconomic impacts of the proposed new rule have been actively considered and the District has made a good faith effort to minimize adverse socioeconomic impacts; and

(iv) that an analysis of the effectiveness of the proposed new rule, including an analysis of the cost-effectiveness of the potential control options, has been prepared pursuant to Health and Safety Code Section 40920.6, and that the proposed rule emission limits represent cost-effective options; and

(v) that there is no reasonable possibility that the proposed new rule may have a significant adverse effect on the environment, and that adoption of the proposed new rule is categorically exempt from the provisions of the California Environmental Quality Act (CEQA) pursuant to California Code of Regulations, Title 14, Section 15308, as an action taken to assure the maintenance or protection of the environment and where the regulatory process involves procedures for protection of the environment.

Fiscal Impact
The recommended action will have no fiscal impact on the District.

Business Impact Statement
Adopting Rule 69.4.1 will affect the regulated business community by imposing new requirements for stationary internal combustion engines. Adopting this regulation is mandated by state law. The District worked closely with an industry workgroup to minimize the economic impacts of the rule and ensure the requirements are cost-effective.

Advisory Board Statement
The Air Pollution Control Advisory Committee recommended adopting new Rule 69.4.1 at its October 25, 2000, meeting.

BACKGROUND:
Attachment I contains background information, information on compliance with Board policy on adopting new rules, information on compliance with the California Environmental Quality Act, and Health and Safety Code Sections 40727.2 and 40920.6.

SUBJECT: ADOPTION OF NEW RULE 69.4.1 -- STATIONARY RECIPROCATING INTERNAL COMBUSTION ENGINES - BEST AVAILABLE RETROFIT CONTROL TECHNOLOGY (BARCT) (District: All)

Additional Information

Attachment II contains the Resolution adopting new Rule 69.4.1 into the District's Rules and Regulations.

Attachment III contains the Socioeconomic Impact Assessment of Rule 69.4.1 pursuant to the Health and Safety Code Section 40728.5.

Attachment IV contains the Comparative Analysis of Rule 69.4.1 pursuant to the Health and Safety Code Section 40727.2.

Attachment V contains the report on the public workshop held on April 29, 1999, and the report on the public workshop held on February 17, 2000.

Respectfully submitted,

Richard J. Smith

ROBERT R. COPPER
Deputy Chief Administrative Officer

for R. J. SOMMERVILLE
Air Pollution Control Officer

SUBJECT: ADOPTION OF NEW RULE 69.4.1 -- STATIONARY RECIPROCATING INTERNAL COMBUSTION ENGINES - BEST AVAILABLE RETROFIT CONTROL TECHNOLOGY (BARCT) (District: All)

AGENDA ITEM INFORMATION SHEET

CONCURRENCE(S)

COUNTY COUNSEL REVIEW	[X]	Yes		10/31/00.
GROUP/AGENCY FINANCE DIRECTOR	[]	Yes	[X]	N/A
CHIEF FINANCIAL OFFICER	[]	Yes	[X]	N/A
Requires Four Votes	[]	Yes	[X]	No
GROUP/AGENCY INFORMATION TECHNOLOGY DIRECTOR	[]	Yes	[X]	N/A
CHIEF TECHNOLOGY OFFICER	[]	Yes	[X]	N/A
DEPARTMENT OF HUMAN RESOURCES	[]	Yes	[X]	N/A

Other Concurrence(s): N/A

ORIGINATING DEPARTMENT: Air Pollution Control District County of San Diego

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AUTHORIZED REPRESENTATIVE: Richard J. Smith
for R. J. Sommerville, Air Pollution Control Officer

SUBJECT: ADOPTION OF NEW RULE 69.4.1 -- STATIONARY RECIPROCATING INTERNAL COMBUSTION ENGINES - BEST AVAILABLE RETROFIT CONTROL TECHNOLOGY (BARCT) (District: All)

AGENDA ITEM INFORMATION SHEET
(continued)

PREVIOUS RELEVANT BOARD ACTIONS: N/A

BOARD POLICIES APPLICABLE: N/A

BOARD POLICY STATEMENTS: N/A

CONTRACT NUMBER(S): N/A

ATTACHMENT I

SUBJECT: ADOPTION OF NEW RULE 69.4.1 -- STATIONARY RECIPROCATING INTERNAL COMBUSTION ENGINES - BEST AVAILABLE RETROFIT CONTROL TECHNOLOGY (BARCT)

BACKGROUND INFORMATION

San Diego County is classified as a federal and state serious ozone non-attainment area. As a result, the District is required to adopt rules reflecting Reasonably Available Control Technology (RACT) as mandated by the federal Clean Air Act and Best Available Retrofit Control Technology (BARCT) and all feasible measures as required by the California Clean Air Act.

Rule 69.4 currently implements federal RACT requirements for NOx emissions from stationary internal combustion engines located at facilities defined as federal major sources (facilities emitting 50 tons or more of NOx per year). Rule 69.4 is also the federal control requirement regarding internal combustion engines at sources subject to the Federal Operating Permit Program (Title V).

In order to separate federal and state control requirements, proposed new Rule 69.4.1 is not being recommended for approval into the federal State Implementation Plan (SIP) because it implements more stringent, state-mandated BARCT control requirements deemed feasible at all facilities, not just those at federal major sources. As a result, the Environmental Protection Agency (EPA) will have no involvement with this rule.

Rule 69.4.1 applies to any existing, new or replacement stationary reciprocating internal combustion engine in San Diego County with an output rating of 50 brake horsepower or more. The primary purpose of the rule is to control NOx emissions by specifying emission rate limits according to usage, engine configuration, and fuel type. The NOx emission standards can be met by using combustion modification techniques such as turbocharging and aftercooling, replacement with a new, cleaner (EPA/California Air Resources Board (ARB) certified) engine or by using add-on controls.

The rule also specifies a carbon monoxide (CO) emission rate limit of 4,500 ppmv for affected engines and a volatile organic compound (VOC) emission rate limit of 250 ppmv for rich-burn engines to prevent increases of these pollutants as NOx emissions are reduced. While most well tuned engines will meet the CO and VOC emission limits with no additional controls, some engines may require an oxidation catalyst.

In addition, Rule 69.4.1 requires a non-resettable fuel or elapsed operating time meter to determine annual hours of operation. It requires periodic inspection and annual maintenance of the engine and any air pollution control system, and monitoring of specified operational characteristics of the engine as recommended by the engine manufacturer and approved by the District. All diesel-fueled engines subject to the rule are required to use cleaner burning (oxides of sulfur and particulate matter) ARB-certified diesel fuel. Emission testing requirements,

including a requirement for biennial testing, and source test methods and procedures are also specified.

Records of brake horsepower output rating, combustion method, fuel type, manufacturer's name and model number, and engine inspection and maintenance dates must be maintained for all engines. Other monitoring and recordkeeping may be required depending on how the engine is operated, combustion conditions, and fuel type. For engines with add-on control equipment, continuous monitors to measure and record operational characteristics of the engine and control equipment are required, as determined necessary by the District to ensure compliance.

Engines located at residential dwellings with not more than four families and engines used in agricultural operations are exempt from the rule. Engines operated exclusively within a permitted test cell solely for the research, development, or testing of various types of engines and engines used in conjunction with military tactical support equipment are also exempt from the rule.

Since emergency standby engines are operated only for maintenance, testing or emergency purposes, their emissions impact is substantially less. Accordingly, approximately 900 *existing* emergency standby and low-use engines are exempted from the emission standards. Instead, these engines are required to perform annual engine maintenance, use California Diesel Fuel, install an operating hour meter, and maintain records to demonstrate compliance. Since many facilities have emergency engines, almost every industry sector will be affected by these new requirements.

The rule also provides a compliance schedule allowing existing engines up to six months to start using California Diesel Fuel and two years to demonstrate compliance with all other requirements, including emission standards. New emission standards will apply to approximately 207 engines at 90 facilities. The affected industries include shipbuilding, mineral processing, manufacturing, military, airports, public agencies, and utilities. New and replacement engines must comply with all requirements upon startup. When the rule is fully implemented in two years, NOx emissions from existing sources will be reduced by approximately 481 tons per year.

ISSUES:

There are two issues associated with proposed new Rule 69.4.1, requiring selective catalytic reduction (SCR) add-on control devices for diesel-fired engines and requiring emission testing for certified engines. During the rule development process, ARB suggested the District consider requiring SCR for high-use diesel engines. The District determined SCR is not technically or economically feasible for such engines at this time. When SCR was installed on certain diesel engines, particulate and trace heavy metal catalyst poisoning resulted in exceptionally high annual operation and maintenance costs. The annualized costs of installing and maintaining SCR is approximately four times higher than the annualized cost of installing a new certified engine. SCR was installed on one diesel-fired engine located in San Diego County. The engine is no longer in service due to operational difficulties and related excessive down time. Because of these serious technological and cost-effectiveness issues, the District rejected ARB's suggestion to require SCR for diesel-fired engines. ARB recently clarified this suggestion to mean the District should continue to evaluate the applicability and cost-effectiveness of SCR to certain classes or categories of diesel engines in San Diego County and, if appropriate, consider

revising Rule 69.4.1 at a later date to require use of SCR on such engines. ARB also requested the District closely monitor performance and cost effectiveness of SCR on diesel engines in California and development of ARB's NOx and particulate matter control measures for diesel engines and propose future revisions to Rule 69.4.1 as deemed appropriate by the District. Particulate matter from diesel engines has been classified as a toxic air contaminant. The District has agreed to closely follow the applicability of SCR for diesel engines and consider such amendments to Rule 69.4.1 at a later date. The District is also not currently proposing a future effective date for installing SCR on diesel engines because ARB is uncertain when such controls might be required statewide and what emission control levels might be specified. ARB is also uncertain how SCR might affect particulate matter levels from diesel engines. ARB advised the District it will not propose control measures for NOx and particulate matter from diesel engines before mid-2002.

In regard to requiring emission testing, Federal and State law require that new off-road engines be certified to meet established emission standards at the time of manufacture. Certification requires emissions testing and technical analysis to assure the engines meet federal and state emission standards and will continue to meet them for at least eight years. The emissions testing performed in the factory uses an averaged variable load test that cannot be duplicated in the field to determine ongoing compliance. ARB and EPA are currently working to develop a field test to measure certified engine emissions in a manner consistent with the certified testing performed at the factory. Therefore, Rule 69.4.1 provides special consideration for certified engines in determining ongoing compliance. Engines certified by ARB and/or EPA at emission rates at or below Rule 69.4.1 emission rate limits are not required to perform biennial emissions testing if the engine is maintained in accordance with the manufacturer's instructions and there is no evidence of engine tampering. The rule requires certified engines be tested biennially after an appropriate test method is developed. The District is planning to sample emissions from certified engines. If test data shows consistently suspect emission rates, ARB and EPA will be informed so appropriate corrective action can be taken.

Socioeconomic Impact Assessment

A Socioeconomic Impact Assessment was prepared for proposed new Rule 69.4.1. It showed costs to local businesses as a result of Rule 69.4.1 are directly related to their equipment needs and usage level. Some firms already meeting the proposed emission standards will incur minimal costs due to increased monitoring, recordkeeping and testing. Most affected facilities are expected to fully absorb all associated compliance costs with minimal impact. For some smaller industrial segments, the impact will be a larger percent of their total revenues. However, the two-year compliance period is sufficient to allow the additional compliance costs to be absorbed with minimal impacts. The impacts on the regional economy as a whole are expected to be negligible. Overall, adoption of new Rule 69.4.1 is not expected to pose significant impacts on the affected industry sectors in San Diego County.

The Socioeconomic Impact Assessment is presented in Attachment III.

Compliance with Board Policy on Adopting New Rules

On February 2, 1993, the Board directed that, with the exception of a regulation requested by business or a regulation for which a socioeconomic impact assessment is not required, no new or revised regulation shall be implemented unless specifically required by federal or state law. The

adoption of new Rule 69.4.1 is required by state law and is, therefore, consistent with this Board directive.

California Environmental Quality Act

The California Environmental Quality Act (CEQA) requires an environmental review for certain actions. The District has conducted a preliminary review of whether the California Environmental Quality Act applies to proposed new Rule 69.4.1. No significant adverse impacts on the environment have been suggested; no such impacts are reasonably possible. Adopting the proposed new rule will not have a significant adverse effect on the environment and is categorically exempt from the provisions of the California Environmental Quality Act pursuant to California Code of Regulations, Title 14, Sections 15308, as an action taken to assure the maintenance or protection of the environment where the regulatory process involves procedures for protection of the environment.

Comparison to Existing Requirements

Prior to adopting, amending, or repealing a rule or regulation, California Health and Safety Code Section 40727 requires findings of necessity, authority, clarity, consistency, non-duplication, and reference. As part of the consistency finding to ensure proposed rule requirements do not conflict with or contradict other District or federal regulations, Health and Safety Code Section 40727.2 requires the District to perform a written analysis identifying and comparing the air pollution control standards and other provisions of proposed new Rule 69.4.1 with existing or proposed District rules and guidelines and existing federal rules, requirements, and guidelines applying to the same source category.

The requirements of new Rule 69.4.1 have been compared to the requirements of Rule 69.4 which implements federal RACT requirements, and the District's New Source Review rules for stationary internal combustion engines. The analysis is presented in Attachment IV.

Incremental Cost-Effectiveness Analysis

To ensure alternative methods of complying with emission control requirements, monitoring, and recordkeeping requirements of a proposed rule and associated costs are considered prior to adopting rules or regulations to meet state Best Available Retrofit Control Technology (BARCT) or all feasible measure requirements, Health and Safety Code Section 40920.6 requires the District to identify one or more potential control options which achieves the emission reduction objectives for the regulation, calculate the incremental cost-effectiveness for the potential control options, and consider and review in a public meeting the effectiveness of the proposed control option and the incremental cost-effectiveness between the potential control options.

There are three control options which provide the necessary emission reduction objectives for Rule 69.4.1. These options include combustion modification, engine replacement and add-on controls. The cost-effectiveness of each control option varies depending on engine size and hours of operation. The cost-effectiveness for combustion modification and engine replacement ranges from $0.30 - $3.80 per pound of NOx controlled. The cost-effectiveness for typical add-on controls ranges from $2 - $7 per pound of NOx controlled. Rule 69.4.1 allows an engine owner or operator to choose the control option which is most cost-effective for their engine. Therefore, there are no incremental costs to analyze between the three control options.

RESOLUTION NO. 00-386

WEDNESDAY, NOVEMBER 15, 2000

NEW ADDED RULE

Re Rules and Regulations of the)
Air Pollution Control District)
of San Diego County . . . . . .)

RESOLUTION ADDING NEW RULE 69.4.1 TO REGULATION IV OF THE RULES AND REGULATIONS OF THE SAN DIEGO COUNTY AIR POLLUTION CONTROL DISTRICT

On motion of Member Horn, seconded by Member Cox, the following resolution is adopted:

WHEREAS, the San Diego County Air Pollution Control Board, pursuant to Section 40702 of the Health and Safety Code, adopted Rules and Regulations of the Air Pollution Control District of San Diego County; and

WHEREAS, said Board now desires to amend said Rules and Regulations; and

WHEREAS, notice has been given and a public hearing has been had relating to the amendment of said Rules and Regulations pursuant to Section 40725 of the Health and Safety Code.

NOW THEREFORE IT IS RESOLVED AND ORDERED that the San Diego County Air Pollution Control Board finds that the proposed new Rule 69.4.1 will not have significant effect on the environment and that an Environmental Impact Report need not be prepared pursuant to the California Environment Quality Act; and:

NOW THEREFORE IT IS RESOLVED AND ORDERED by the San Diego County Air Pollution Control Board that the Rules and Regulations of the Air Pollution Control District of San Diego County be and hereby are amended as follows:

Proposed new Rule 69.4.1 is to read as follows:

RULE 69.4.1. STATIONARY RECIPROCATING INTERNAL COMBUSTION ENGINES - BEST AVAILABLE RETROFIT CONTROL TECHNOLOGY (BARCT)

(a) **APPLICABILITY**

(1) Except as provided in Section (b), this rule shall apply to stationary internal combustion engines with a brake horsepower (bhp) rating of 50 or greater.

(2) An engine subject to this rule and located at a major stationary source of oxides of nitrogen (NOx) is also subject to the applicable requirements of Rule 69.4.

(3) An engine subject to this rule shall not be subject to Rule 68.

(b) **EXEMPTIONS**

(1) This rule shall not apply to the following:

(i) Engines used exclusively in connection with a structure designed for and used as a dwelling for not more than four families.

(ii) Engines used exclusively in agricultural operations for the growing of crops or the raising of fowl or animals.

(iii) Any engine when operated exclusively within a permitted test cell solely for the research, development, or testing of gas turbine engines or their components.

(iv) Any engine when operated exclusively within a permitted test cell solely for the research, development, or testing of reciprocating internal combustion engines or their components.

(v) Any engine used exclusively in conjunction with military tactical support equipment.

(2) The provisions of Subsections (d)(1) through (d)(3), (e)(1), (e)(2), (f)(1), (f)(3), (g)(3), (g)(4), (g)(5) and (i)(1) of this rule shall not apply to the following:

(i) Any existing engine which operates less than 200 hours per calendar year, as determined by a non-resettable meter that measures elapsed operating time.

(ii) Any existing emergency standby engine provided that operation of the engine for non-emergency purposes does not exceed 52 hours per calendar year. Operation for testing or maintenance purposes may be allowed for not more than 100 hours per year, with written authorization from the Air Pollution Control Officer, provided that an owner or operator demonstrates to the satisfaction of the Air Pollution Control Officer that such additional operation is necessary.

(iii) Any existing emergency standby engine at a nuclear power generating station subject to the requirements of the Nuclear Regulatory Commission provided that operation of the engine for non-emergency purposes does not exceed 200 hours per calendar year.

(3) The provisions of Subsections (e)(1), (e)(2), (f)(1), (g)(3), (g)(4), (g)(5) and (i)(1) of this rule shall not apply to:

(i) Any new or replacement emergency standby engine, provided that operation of the engine for non-emergency purposes does not exceed 52 hours per calendar year. Operation for testing or maintenance purposes may be allowed for not more than 100 hours per year, with written authorization from the

Air Pollution Control Officer, provided that an owner or operator demonstrates to the satisfaction of the Air Pollution Control Officer that such additional operation is necessary.

(ii) Any new or replacement engine which operates less than 200 hours per calendar year, as determined by a non-resettable meter that measures elapsed operating time.

(4) The provisions of Subsections (d)(1) through (d)(3) of this rule shall not apply to existing low-use diesel engines equipped with any two of the following: turbocharger, aftercooler, or injection timing retard by 4 degrees.

An owner or operator of an engine who is claiming an exemption pursuant to Subsections (b)(2), (b)(3) or (b)(4) shall maintain records in accordance with Subsections (g)(1) and (g)(2) of this rule.

(c) DEFINITIONS

For the purposes of this rule, the following definitions shall apply:

(1) **"Add-on Control Equipment"** means any technology that is used to reduce emissions from the exhaust gas stream of an engine and is installed downstream of the engine.

(2) **"Best Available Retrofit Control Technology (BARCT)"** means an emission limitation that is based on the maximum degree of reduction achievable, taking into account environmental, energy, and economic impacts by each class or category of source.

(3) **"Brake Horsepower Rating, (bhp)"** means the maximum continuous brake horsepower rating as specified by the engine manufacturer and listed on the engine nameplate, if available, regardless of any derating.

(4) **"Calendar Year"** means the same as defined in Rule 2.

(5) **"California Diesel Fuel"** means any fuel that is commonly or commercially known, sold or represented as diesel fuel No. 1-D or No. 2-D, and which meets the requirements specified in Sections 2281 and 2282 of Title 13 of the California Code of Regulations.

(6) **"Capacity Factor"** means the ratio, expressed as a percentage, of the annual fuel consumption to the manufacturer's specified maximum annual fuel consumption or manufacturer's specified maximum hourly fuel consumption times 8760 hours, whichever is less.

(7) **"Certified Engine"** means an engine certified to comply with the Tier 1, Tier 2, or Tier 3 emission standards specified in Section 89.112 of the Code of Federal

Regulations (40 CFR Part 89) - Control of Emissions of Air Pollution from Non-Road Diesel Engines or with the Tier 1, Tier 2, or Tier 3 emission standards specified in Section 2423 of Title 13 of the California Code of Regulations - California Regulations for New 1996 and Later Off-Road Compression-Ignition Engines.

(8) **"Cyclic Engine"** means an engine, such as gantry cranes, having an external load which varies by approximately 40 percent or more of rated capacity under normal operating conditions during any load cycle.

(9) **"Emergency Standby Engine"** means an engine used exclusively in emergency situations, except as provided in Subsections (b)(2)(ii), (b)(2)(iii) and (b)(3)(i), to drive an electrical generator, an air compressor or a water pump.

(10) **"Emergency Situation"** means any one of the following:

(i) An unforeseen electrical power failure from the serving utility or of on-site electrical transmission equipment.

(ii) An unforeseen flood or fire, or a life-threatening situation.

(iii) Operation of emergency generators for Federal Aviation Administration licensed or military airports for the purpose of providing power in anticipation of a power failure due to severe storm activity.

Emergency situation shall not include operation for purposes of supplying power for distribution to an electrical grid, operation for training purposes, or other foreseeable events.

(11) **"Engine Family"** means a group of engines expected to have similar emission and other characteristics throughout their useful life as specified in Section 89.116, 40 CFR 89.

(12) **"Engine Tampering"** means removing or rendering inoperative any device or design element of the engine or its emission control system; or the manufacturing or installation of a part or a component which objective is to bypass, defeat, or render inoperative a device or design element of the engine or its emission control system.

(13) **"Existing Engine"** means an engine which commenced operation in San Diego County on or before (*date of adoption*).

(14) **"Fossil Derived Gaseous Fuel"** means gaseous fuel including, but not limited to, natural gas, methane, ethane, propane, butane, and gases stored as liquids at high pressure such as liquefied petroleum gas, but excluding waste derived gaseous fuel.

(15) **"High-use Engine"** means an engine operating at a capacity factor of greater than 15%.

(16) **"Lean-burn Engine"** means an engine that is designed to operate with an air-to-fuel ratio that is more than 1.1 times the stoichiometric air-to-fuel ratio.

(17) **"Load Cycle"** means the time interval between consecutive commencement of application of external load to an engine.

(18) **"Low-use Engine"** means an engine operating at a capacity factor of 15% or less.

(19) **"Military Tactical Support Equipment"** means the same as defined in Rule 2.

(20) **"New Engine"** means an engine which commenced operation in San Diego County after (*date of adoption*).

(21) **"Portable Emission Unit"** means the same as defined in Rule 20.1.

(22) **"Replacement Engine"** means an engine that meets the definition of a replacement emission unit in Rule 20.1.

(23) **"Rich-Burn Engine"** means an engine that is designed to operate with an air-to-fuel ratio less than or equal to 1.1 times the stoichiometric air-to-fuel ratio.

(24) **"Stationary Internal Combustion Engine" or "Engine"** means a spark or compression ignited, reciprocating internal combustion engine which is not a portable emission unit.

(25) **"Stationary Source"** means the same as defined in Rule 2.

(26) **"Stoichiometric Air-to-Fuel Ratio"** means the chemically balanced air-to-fuel ratio at which all fuel and all oxygen in the air and fuel mixture are theoretically consumed by combustion.

(27) **"Uncontrolled NOx Emissions"** means NOx emissions from an engine before application of add-on control equipment.

(28) **"Volatile Organic Compound (VOC)"** means the same as defined in Rule 2.

(29) **"Waste Derived Gaseous Fuel"** means gaseous fuel including, but not limited to, digester gas and landfill gas, but excluding fossil derived gaseous fuel.

(d) **STANDARDS**

(1) A person shall not operate a stationary internal combustion engine subject to this rule unless:

(i) Uncontrolled NOx emissions from the following engines are reduced with add-on control equipment by not less than the following:

Engine Category	Weight Percent Reduction
Rich-burn engines using fossil derived gaseous fuel or gasoline	96
Lean-burn engines using fossil derived gaseous fuel	90
Engines using exclusively waste derived gaseous fuel	90
Engines using diesel or kerosene fuel	90

or

(ii) The emissions of NOx, in parts per million by volume (ppmv), calculated as nitrogen dioxide at 15% oxygen on a dry basis, or in grams of NOx per brake horsepower-hour, as indicated, are not greater than the following:

Engine Category	Concentration of NOx
Rich-burn engines using fossil derived gaseous fuel or gasoline	25 ppmv
Rich-burn engines using exclusively waste derived gaseous fuel	50 ppmv
Lean-burn engines using gaseous fuel	65 ppmv
Existing low-use engines using diesel or kerosene fuel	9.0 g/bhp-hr or 700 ppmv
Existing cyclic engines using diesel or kerosene fuel	9.0 g/bhp-hr or 700 ppmv
High-use engines using diesel or kerosene fuel	6.9 g/bhp-hr or 535 ppmv
New or replacement low-use engines using diesel or kerosene fuel	6.9 g/bhp-hr or 535 ppmv
New or replacement cyclic engines using diesel or kerosene fuel	6.9 g/bhp-hr or 535 ppmv

(2) For all engines subject to Subsection (d)(1) of this rule, emissions of carbon monoxide (CO), calculated at 15% oxygen on a dry basis, shall not exceed 4,500 ppmv.

(3) For all rich-burn engines subject to Subsection (d)(1) of this rule, emissions of VOC, calculated as methane at 15% oxygen on a dry basis, shall not exceed 250 ppmv.

(4) Any engine subject to this rule and operating on diesel fuel shall use only California Diesel Fuel.

(e) MONITORING REQUIREMENTS

(1) An owner or operator of an engine without add-on control equipment, except engines specified in Subsections (b)(2) or (b)(3), shall monitor the operating

parameters recommended by the engine manufacturer and any additional operating parameters identified by the Air Pollution Control Officer. Such operating parameters may include, but are not limited to:

(i) engine air-to-fuel ratio;

(ii) engine inlet manifold temperature and pressure; and

(iii) oxygen content of the exhaust gas.

Where the Air Pollution Control Officer determines that it is not feasible to monitor operating parameters of an engine or such monitoring may not be indicative of air contaminant emissions, the requirements of this subsection may be waived provided that periodic inspection and maintenance are conducted as specified in Section (f).

(2) An owner or operator of an engine with add-on control equipment shall install, operate and maintain in calibration, devices that continuously monitor the operational characteristics of the engine and any NOx emission reduction system as determined necessary to ensure compliance by the Air Pollution Control Officer. Such operational characteristics may include, but are not limited to:

(i) engine air-to-fuel ratio;

(ii) temperature of exhaust gas at the inlet and outlet of the add-on control equipment;

(iii) oxygen content of exhaust gas at the inlet and outlet of the add-on control equipment; and

(iv) flow rate of NOx reducing agent added to the engine exhaust gas.

(3) An owner or operator of an engine subject to this rule shall install a non-resettable totalizing fuel meter and/or non-resettable meter that measures elapsed operating time as determined appropriate by the Air Pollution Control Officer.

(f) INSPECTION AND MAINTENANCE REQUIREMENTS

(1) An owner or operator of an engine subject to this rule, except engines specified in Subsections (b)(2) or (b)(3), shall conduct periodic inspections of the engine and any add-on control equipment, as applicable, to ensure that the engine and control equipment is operated in compliance with the provisions of this rule. Inspections shall be conducted at least once every 4000 hours of operation, or every six months, whichever is less.

(2) An owner or operator of an engine subject to this rule shall conduct periodic maintenance of the engine and any add-on control equipment, as applicable, as recommended by the engine and control equipment manufacturers or as specified by

any other maintenance procedure approved in writing by the Air Pollution Control Officer. The periodic maintenance shall be conducted at least once each calendar year.

(3) Notwithstanding the frequencies specified in Subsections (f)(1)and (f)(2), the Air Pollution Control Officer may require an owner or operator of an engine to conduct inspections and/or maintenance of the engine and any associated add-on control equipment more frequently if deemed necessary to assure compliance with this rule.

(g) **RECORDKEEPING REQUIREMENTS**

(1) An owner or operator of an engine subject to this rule shall keep the following records and shall maintain these records on-site for at least the same period of time as the engine to which the records apply is located at the site:

(i) engine manufacturer name and model number;

(ii) brake horsepower rating;

(iii) combustion method (i.e. rich-burn or lean-burn);

(iv) fuel type;

(v) California Diesel Fuel certification, if applicable; and

(vi) a manual of recommended maintenance as provided by the engine manufacturer, or other maintenance procedure as approved in writing by the Air Pollution Control Officer.

Where the information specified in Subsections (g)(1)(i) through (g)(1)(iv) is contained in a District Permit to Operate or Certificate of Registration, and is the most current information, an additional record of this information shall not be required.

(2) An owner or operator of an engine exempt pursuant to Subsections (b)(2) or (b)(3) shall maintain an operating log containing, at a minimum, the following:

(i) dates and times of engine operation. If applicable, indicate whether the operation was for non-emergency purposes or during an emergency situation and the nature of the emergency, if available;

(ii) total cumulative hours of operation per calendar year, based on actual readings of engine hour or fuel meter; and

(iii) records of periodic engine maintenance, including dates maintenance was performed.

The records specified in Subsection (g)(2)(i) are not required if total engine operations for any purpose, including emergency situations, do not exceed 52 hours in a calendar year.

(3) An owner or operator of an engine subject to this rule, except engines specified in Subsections (b)(2) or (b)(3), shall maintain a log containing at a minimum, the following:

(i) records of engine inspection, including dates an inspection was performed; and

(ii) records of engine maintenance, including dates maintenance was performed and the nature of the maintenance.

(4) An owner or operator of an engine subject to this rule, except engines specified in Subsections (b)(2) or (b)(3), shall measure and record at least once each calendar month the applicable operating parameters identified pursuant to Subsections (e)(1) or (e)(2).

(5) An owner or operator of a low-use engine operating on diesel or kerosene fuel and subject to the requirements of Section (d)(1) shall maintain records of total cumulative hours of operation or total fuel consumption per calendar year, as applicable.

(6) All records required by Subsections (g)(2) through (g)(5) shall be retained on-site for at least three years and made available to the District upon request.

(h) **TEST METHODS**

(1) All testing performed to determine compliance with the emission limits of Subsections (d)(1), (d)(2) and/or (d)(3), except as provided in Subsection (h)(3), shall be conducted in accordance with the following procedures:

(i) Measurement of NOx, CO, carbon dioxide (CO2) and oxygen content of exhaust gas shall be determined in accordance with the San Diego County Air Pollution Control District Test Method 100, Air Resources Board (ARB) Test Method 100 or equivalent Environmental Protection Agency (EPA) Test Method.

(ii) Measurement of VOC emissions shall be determined in accordance with EPA Test Methods 25A and/or 18.

(iii) NOx, VOC, and CO emission concentrations shall be calculated as an average of three subtests. The averaging period to calculate NOx and CO emission concentrations and to determine compliance shall be at least 30 minutes and not more than 60 minutes unless otherwise specified in writing by the Air Pollution Control Officer.

(2) Specifications for California Diesel Fuel, if not provided by a vendor, shall be determined by the test methods specified in Sections 2281 and 2282 of Title 13 of the California Code of Regulations.

(3) For an engine operating on diesel or kerosene fuel without add-on control equipment and certified by EPA or ARB at an emission rate equal to or below the applicable emission rate limits of Section (d), measurements of NOx, CO, CO2, and oxygen content of exhaust gas shall be conducted in accordance with a test method approved by the District and ARB. Until such test method is approved, such engine shall be deemed in compliance with the emission rate limits of Section (d), provided the requirements of Subsection (i)(4) are met.

(4) If a portable emission analyzer is used to provide emission data, the analyzer shall be calibrated and operated in accordance with a protocol approved in writing by the Air Pollution Control Officer.

(i) **SOURCE TEST REQUIREMENTS**

Except as provided in Subsection (i)(4), source tests shall be conducted according to the following:

(1) After initial compliance has been determined, any engine subject to the requirements of Subsections (d)(1), (d)(2) and/or (d)(3), except engines specified in Subsection (b)(3), shall be source tested at least once every 24 months, unless otherwise specified in writing by the Air Pollution Control Officer.

(2) Emissions source testing shall be conducted using the test methods specified in Section (h) and a source test protocol approved in writing by the Air Pollution Control Officer prior to testing.

(3) Emissions source testing shall be performed at no less than 80 percent of the brake horsepower rating. If an owner or operator of an engine demonstrates to the satisfaction of the Air Pollution Control Officer that the engine does not operate at these conditions, then emissions source testing shall be performed at the highest achievable continuous brake horsepower rating, or under the typical duty cycle or operational mode of the engine.

(4) Notwithstanding the requirements of Subsection (i)(1), any engine operating on diesel or kerosene fuel without add-on control and certified by EPA or ARB at emission rates equal to or below the applicable emission rate limits of Section (d) shall not require an initial or periodic source test, until an appropriate test method is approved by the District and ARB, provided the following requirements are met:

(i) The engine family has been tested and certified according to an EPA or ARB approved procedure, and the certification documents are provided to the District.

(ii) The engine family does not participate in the federal ABT program specified in 40 CFR 89, Subpart C and adopted by reference by ARB.

(iii) The engine and its emission control system are maintained as specified in Section (f).

(iv) There is no evidence of engine tampering.

(j) COMPLIANCE SCHEDULE

(1) For an engine operating on diesel fuel, comply with the requirements of Subsection (d)(4) by (*six months after date of adoption).*

(2) The owner or operator of an existing engine subject to the requirements of this rule shall meet the following increments of progress:

(i) By (*six months after date of adoption*), submit to the Air Pollution Control Officer an application to modify conditions on the Permit to Operate or to convert a Certificate of Registration to a Permit to Operate, as necessary to comply with the applicable requirements of this rule. The application shall include the following information for the engine that will be evaluated for compliance with this rule:

(A) The information required by Section (g)(1),

(B) emission rate data and source of such data, and

(C) description of how compliance will be achieved (e.g. retrofit, replacement).

(ii) By (*two years after date of adoption*), submit to the Air Pollution Control Officer documentation which demonstrates that the engine is in compliance with the Section (d)(1) through (d)(3) emission limits for NOx, CO and VOC, and all other applicable requirements of this rule.

(3) For a new or replacement engine, including a new or replacement engine operating less than 200 hours per calendar year or a new or replacement emergency standby engine, comply with all applicable requirements of this rule upon installation and startup.

IT IS FURTHER RESOLVED AND ORDERED that the subject addition of Rule 69.4.1 to Regulation IV shall take effect upon adoption.

PASSED AND ADOPTED by the Air Pollution Control Board of the San Diego County Air Pollution Control District, State of California, this 15th day of November, 2000, by the following votes:

AYES: Cox, Jacob, Slater, Horn
NOES: None
ABSENT: Roberts

APPROVED AS TO FORM AND LEGALITY
COUNTY COUNSEL
BY L. Dutton
SENIOR DEPUTY

I hereby certify that the foregoing is a full, true and correct copy of the Original Resolution which is now on file in my office.

THOMAS J. PASTUSZKA
Clerk of the Air Pollution Control Board

By_____
Grace Andoh, Deputy

Resolution No. 00-386
November 15, 2000 (APCB 4)

COMPARATIVE ANALYSIS FOR RULE 69.4.1

Pursuant to California Health and Safety Code Section 40727, the District is required to perform findings of necessity, authority, clarity, consistency, non-duplication, and reference prior to adopting, amending, or repealing a rule or regulation. As part of the consistency finding to ensure proposed rule requirements do not conflict with or contradict other District or federal regulations, Health and Safety Code Section 40727.2(a) requires the District to perform a written analysis identifying and comparing the air pollution control standards and other provisions of proposed new Rule 69.4.1 with existing or proposed District rules and guidelines and existing federal rules, requirements, and guidelines applying to the same source category.

Rule 69.4.1 is a new rule developed to control nitrogen oxide (NOx) emissions from stationary engines. A Comparative Analysis of proposed Rule 69.4.1 with existing Rule 69.4 and Best Available Control Technology (BACT) is provided in Table 1.

Rule 69.4 was developed pursuant to federal Reasonably Available Control Technology (RACT) requirements, and is included in the State Implementation Plan (SIP). It applies to stationary internal combustion engines (the same source category as Rule 69.4.1) located at major stationary sources of NOx. BACT is a requirement of the New Source Review regulations, also developed according to federal guidelines.

Rule 69.4.1 applies to more sources than Rule 69.4 or BACT. Rule 69.4.1 applies to engines located at all stationary sources, as compared to Rule 69.4, which applies only to engines located at major stationary sources of NOx, and BACT, which applies only to new engines. Rule 69.4.1 establishes more stringent emission standards than Rule 69.4, due to more stringent state requirements for Best Available Retrofit Control Technologies (BARCT). Rule 69.4.1 is consistent with the California Air Resources Board's proposed RACT/BARCT Determination for Stationary Internal Combustion Engines. BACT emission standards are established for more general engine categories than Rule 69.4.1 standards, though the emissions limits are nearly equivalent. Requirements for monitoring, recordkeeping and source testing in Rule 69.4.1 are more stringent and specific than in Rule 69.4 and BACT. There are no conflicts or contradictions between Rule 69.4.1, Rule 69.4 and BACT requirements.

Table 1 - Comparative Analysis of Rule 69.4.1

Items for Comparison	Rule 69.4.1	Rule 69.4	Best Available Control Technology
Applicability	Stationary IC engines > 50 bhp	Stationary IC engines > 50 bhp	New IC engines > 50 bhp
Exemption	• Exempt from rule: Portable engines Agricultural engines Family dwelling engines Test cell research engines Military tactical engines • Exempt from emission standards: Existing emergency standby engines Existing engine <200 hours/year Nuclear power plant engines	• Exempt from rule: Portable engines Agricultural engines Family dwelling engines Test cell research engines • Exempt from emission standards: Military tactical engines Emergency standby engines Engines <200 hours/year Nuclear power plant engines	• Exempt from rule: Agricultural engines Military tactical engines Family dwelling engines Engines with emissions less than 10 lbs/day of all criteria pollutants
Emission Standards	A. <u>NOx Standard:</u> • Gas engines: Rich burn natural gas or gasoline: 25 ppmv Rich burn waste gas: 50 ppmv Lean burn: 65 ppmv • Diesel engines: High-use, new low-use, new cyclic, new emergency standby: 6.9 g/bhp-hr Low-use: 700 ppmv (approximately 9 g/bhp-hr) B. <u>CO Standard:</u> 4500 ppmv C. <u>VOC Standard:</u> • Rich burn gas engines: 250 ppmv *(ppmv concentrations calculated at 15% O2)*	A. <u>NOx Standard:</u> • Gas engines: Rich burn natural gas or gasoline: 50 ppmv Waste gas: 125 ppmv Lean burn: 125 ppmv • Diesel engines: 700 ppmv (approximately 9 g/bhp-hr) B. <u>CO Standard:</u> 4500 ppmv C. <u>VOC Standard:</u> N/A *(ppmv concentrations calculated at 15% O2)*	A. <u>NOx Standard:</u> • Gas engines: 1 g/bhp-hr (approximately 56 ppmv) • Diesel engines: Engines < 200 bhp: 7.2 g/bhp-hr Engines between 200 bhp and 750 bhp: 6.9 g/bhp-hr B. <u>CO Standard:</u> N/A C. <u>VOC Standard:</u> • All engines: 1.5 g/bhp-hr (approximately 311 ppmv for gas engines) *(ppmv concentrations calculated at 15% O2)*

Items for Comparison	Rule 69.4.1	Rule 69.4	Best Available Control Technology
Control Technology Standard	• Gas engines: N/A • Diesel engines: High use, all replacement engines: Tier I certified off-road engines Low-use engines: Tier I certified off-road engines; or combination of any two of the following: Turbocharger, aftercooler, or 4° injection timing retard	N/A	• Gas engines: electric motor, non-selective catalytic reduction (NSCR), lean burn engines • Diesel engines: Engines <200 bhp: Turbocharger, aftercooler, or 4° injection timing retard Engines between 200 bhp and 750 bhp: 85% efficient selective catalytic reduction (SCR), or if not cost effective, Turbocharger, aftercooler, or 4° injection timing retard
Fuel Requirement	California Diesel fuel	N/A	California Diesel fuel
Monitoring Requirements	• Monitor operating parameters that are indicative of engine emissions • Install engine hour meters or fuel meters	• Monitor operating parameters that are indicative of engine emissions	• Pending evaluation on case-by-case basis, no specific requirements
Recordkeeping Requirements	Keeping records of: • Engine descriptions, CARB fuel certification, maintenance procedure manual • Engine operating hours per calendar year • Engine inspection and maintenance • Applicable engine operating parameters	Keeping records of: • Engine descriptions, fuel type, maintenance procedure manual • Engine operating hours per calendar year • Engine inspection and maintenance • Applicable engine operating parameters	• Pending evaluation on case-by-case basis, no specific requirements
Source Test Requirements	Source testing once every 24 months for engines subject to emission standard requirements	• Pending evaluation on case-by-case basis, no specific requirements	• Pending evaluation on case-by-case basis, no specific requirements

SOCIOECONOMIC IMPACT ASSESSMENT

PROPOSED RULE 69.4.1 -
STATIONARY RECIPROCATING INTERNAL COMBUSTION ENGINES –
BEST AVAILABLE RETROFIT CONTROL TECHNOLOGY (BARCT)

SEPTEMBER 2000

Prepared by

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and

Jack Faucett Associates

SOCIOECONOMIC IMPACT ASSESSMENT

PROPOSED RULE 69.4.1-
STATIONARY RECIPROCATING INTERNAL COMBUSTION ENGINES -
BEST AVAILABLE RETROFIT CONTROL TECHNOLOGY

TABLE OF CONTENTS

EXECUTIVE SUMMARY

This report presents the results of a socioeconomic impact assessment (SIA) of the San Diego County Air Pollution Control District's proposed new Rule 69.4.1 -- Stationary Reciprocating Internal Combustion Engines – Best Available Retrofit Control Technology (BARCT). The rule implements Best Available Retrofit Control Technology (BARCT) requirements of the California Health and Safety Code.

The purpose of the rule is to provide BARCT level control of nitrogen oxides (NOx) emissions from stationary reciprocating internal combustion engines. The rule imposes NOx, CO and VOC emission rate limits on the engine exhaust depending on the type of engine, mode of operation, type of fuel used and annual hours of operation. If implemented, the rule will reduce NOx emissions by approximately 481 tons per year.

Rule 69.4.1 applies new emission standards and requirements to approximately 207 engines in San Diego county located at 90 businesses representing seven different industry sectors. Approximately 44% of these engines are already in compliance with the emission standards. The rule will also affect approximately 900 existing emergency standby engines by specifying annual maintenance requirements and requiring use of cleaner burning California Diesel Fuel.

The rule provides a range of options for complying with the emission standards, including retrofitting, replacement or installing add-on control equipment. All options provided are considered cost-effective. Compliance with the rule will not result in significant economic impacts on affected industries.

STATUTORY REQUIREMENTS

Section 40728.5 of the California Health & Safety Code requires the Air Pollution Control District to perform a socioeconomic impact assessment for any new or amended rules that will significantly affect air quality or emissions limitations. The Health & Safety Code specifies the following elements be included in the socioeconomic impact assessment:

a. The necessity of adopting, amending, or repealing the rule or regulation in order to attain state and federal ambient air quality standards.

b. The type of industries or business, including small business, affected by the rule.

c. The range of probable costs, including costs to industry or business, including small business, of the rule.

d. The emission reduction potential of the rule.

THE NECESSITY OF ADOPTING RULE 69.4.1

The fuel combustion processes that occur in engines result in emissions of nitrogen oxides (NOx), mostly nitric oxide (NO) and nitrogen dioxide (NO_2). NO_2 is a criteria pollutant regulated under both the federal and California Clean Air Acts. In addition, NOx together with volatile organic compounds (VOC) are precursors of ozone, also a criteria pollutant that forms as a result of photochemical reactions in the presence of sunlight.

San Diego County attains both federal and state standards for NO_2. However, it does not meet the federal and state ambient air quality standards for ozone. The county is classified by both the Environmental Protection Agency (EPA) and California Air Resources Board (ARB) as a serious ozone non-attainment area. Reducing emissions of NOx to the atmosphere is a key part of San Diego's ozone standard attainment strategy.

The California Clean Air Act requires San Diego County to provide a plan that includes every feasible measure to control ozone precursors and attain the state ambient air quality standard for ozone at the earliest practicable date. The 1991 San Diego County Regional Air Quality Strategy (RAQS) is San Diego County's plan to attain the state ambient air quality standard for ozone and includes further control of stationary internal combustion engines as a feasible measure to reduce NOx emissions from combustion sources.

In addition, the California Clean Air Act requires that serious ozone non-attainment areas reduce emissions from existing stationary sources by implementing Best Available Retrofit Control Technology (BARCT). BARCT is defined as "an emission limitation that is based on the maximum degree of reduction achievable, taking into account environmental, energy and economic impacts by each class or category of sources." New proposed Rule 69.4.1 will reflect BARCT for stationary internal combustion engines as required by state law. The rule is similar to the draft RACT/BARCT guidance document currently under development by the ARB. Rules similar to or more stringent then proposed Rule 69.4.1 have already been adopted by other California air districts that do not attain state air quality standards for ozone.

RULE 69.4.1 REQUIREMENTS

Rule 69.4.1 is a new rule developed to control the emissions of nitrogen oxides (NOx) from stationary reciprocating internal combustion engines. The rule applies to existing, new or replacement stationary reciprocating internal combustion engines in San Diego County that have an output rating of 50 brake horsepower or more. The rule specifies NOx emission rate limits, and alternative NOx emission reduction percentages for engines utilizing add-on control equipment, based on the engine design, level of use, and fuel. The rule also specifies carbon monoxide and VOC emission limits for all engines subject to the NOx emission limits of the rule. (See Table 1 below) All diesel-fueled engines subject to the rule will also be required to use cleaner burning California Air Resources Board-certified diesel fuel.

Table 1 – Emission Standards for Rule 69.4.1

Engine Category	NOx Emission Rate (g/bhp-hr)	NOx Concentration (ppmv)	NOx Percent Reduction	CO Concentration (ppmv)	VOC Concentration (ppmv)
Rich-burn - fossil derived gaseous fuel or gasoline	N/A	25	96	4,500	250
Rich-burn - exclusively waste derived gaseous fuel	N/A	50	90	4,500	250
Lean-burn – any fuel	N/A	65	90	4,500	N/A
All high-use – diesel or kerosene fuel	6.9	535	90	4,500	N/A
Existing: low-use & cyclic – diesel or kerosene fuel	9.0	700	N/A	4,500	N/A
New or replacement: low-use & cyclic – diesel or kerosene fuel	6.9	535	N/A	4,500	N/A

Rule 69.4.1 requires installation of non-resettable fuel or elapsed operating time meters, periodic inspection and annual maintenance of the engine and any air pollution control systems, and monitoring of specified operational characteristics of an engine as recommended by the engine manufacturer and approved by the District. Records must be kept for affected engines of brake horsepower output rating, combustion method, fuel type, manufacturer's name and model number, and engine inspection and maintenance dates. Other monitoring and recordkeeping maybe required depending on how the engine is operated, combustion conditions and fuel type. For engines with add-on control equipment, the rule requires the installation of continuous monitors to measure and record operational characteristics of the engine and NOx emission reduction system, as determined necessary by the District to ensure compliance.

Rule 69.4.1 also specifies source test requirements, and source test methods and procedures. The rule provides a compliance schedule allowing existing engines up to two years to demonstrate compliance with the new emission standards. New and replacement engines must comply upon startup.

Engines located at residential dwellings with not more than four families and engines used in agricultural operations are exempt from the rule. Engines operated exclusively within a permitted test cell solely for the research, development, or testing of various types of engines are also exempt from the rule. Engines operating less than 200 hours per year and engines used exclusively to provide emergency power are exempt from the emissions standards, provided operation for non-emergency purposes does not exceed 52 hours per year. In addition, engines used in conjunction with military tactical support equipment are not subject to the emission standards.

CONTROL OPTIONS

Control of nitrogen oxides (NOx) emissions from internal combustion engines can be achieved by retrofitting the engine using combustion modification, using add-on control equipment, or replacing the existing engine with a new low-emission certified engine.

Retrofitting techniques for control of NOx emissions from diesel engines using combustion modification include turbocharging, aftercooling and fuel injection timing retard. The control efficiencies of NOx emissions from these technologies range from 10 percent for turbocharging or aftercooling to 30 percent for injection timing retard. For gaseous engines, retrofitting techniques using combustion modification include adjusting the combustion air to fuel ratio by replacing or modifying the engine turbocharger, and adjusting the fuel ignition timing through the use of electronic fuel injection. The control efficiencies of these techniques are in the same range as for diesel engines.

Retrofitting techniques for controlling NOx emissions using add-on control equipment include selective catalytic reduction (SCR) for both lean-burn diesel engines and gaseous engines, and non-selective catalytic reduction (NSCR) for rich burn gaseous engines. These technologies provide high NOx reductions, in the range of 90 to 96 percent. However, both technologies require high capital and annual operating and maintenance costs. NOx Tech® is another add-on control technology that is relatively new and applies to lean burn engines in the higher brake horsepower range. This technology can reduce NOx emissions by 90 percent, and can provide additional reductions of CO, VOC and particulate emissions. The operating and maintenance costs of NOx Tech® technology must be determined on a case-by-case basis.

Replacing existing engines with new, low-emission engines is an option for both diesel and gaseous engines. For diesel engines, EPA/ARB certified off-road engines are available in various sizes with certified emissions meeting the requirements of proposed Rule 69.4.1. New, low-emission gaseous engines are also available without using add-on control equipment. Though the capital cost of engine replacement is high compared to the capital cost of retrofitting, the long-term benefits of the engine replacement option outweigh most retrofitting options in terms of engine emissions, engine operating and maintenance costs, engine fuel efficiency.

COMPLIANCE COSTS

Cost estimates were developed through discussions with engine users, vendors, suppliers, and manufacturers. While it is possible a facility might incur costs higher than those estimated in this section, these costs reflect a conservatively high estimate of any marginal costs a business would incur. The economic impacts of the rule were assessed separately for different industry-categories based on industries' responses to compliance costs and other relevant information discussed in this report.

Tables 2-5 provide estimated compliance costs broken out by compliance options, engine brake horsepower ratings, and engine and fuel types. The total capital costs include local sales tax, applicable installation fees (direct and indirect charges) as well as District permitting costs. For retrofitted engines, source test costs are applied as total capital costs. Total annual costs include maintenance and biennial emission compliance testing. Where applicable, fuel penalty costs are

added to the total annual costs. Other assumptions embedded in the annual cost estimates include a 10% annual interest rate, ten year equipment life for new engines, and five year equipment life for retrofitted engines.

Table 2 shows the compliance costs for high-use diesel engines using engine replacement, retrofitting using combustion modification, or installing SCR. Costs are grouped by engine brake horsepower ratings as costs rise with increased engine size. The SCR compliance option always shows the highest cost for each engine rating subgroup.

Table 2. Compliance Costs for High-Use Diesel Engines

	Replace Engines		Retrofit Engine*		Retrofit Engine **		Install SCR	
Engine Rating (bhp)	Capital Costs	Annual Costs	Capital Costs	Annual Costs	Capital Costs	Annual Costs	Capital Costs	Annual Costs
50 - 199	$13,083- $31,231	$2,258- $5,261	$7,294- $10,118	$5,636- $8,275	$6,294- $8,390	$5,272- $7,646	~ $63,355	~ $21,728
200 - 399	$31,231- $53,541	$5,261- $8,891	$10,118- $13,694	$8,275- $11,725	$8,390- $9,994	$7,646- $10,378	$65,183- $76,080	$24,713- $32,064
400 - 599	$53,541- $79,511	$8,891- $13,116	$13,694- $18,294	$11,725- $15,547	$9,994- $12,794	$10,378- $13,545	$76,080- $99,641	$32,064- $41,494
600 - 799	$79,511- $105,481	$13,116- $17,342	$18,294- $22,994	$15,547- $19,406	$12,794- $15,949	$13,545- $19,336	$99,641- $124,909	$41,494- $50,017
800 - 999	$105,481- $135,161	$17,342- $22,171	$22,994- $27,494	$19,406- $23,193	$15,494- $18,294	$19,336- $19,844	$124,909- $150,174	$42,537- $50,017
1000 +	$135,161+	$22,171+	$27,494+	$23,193+	$18,294+	$19,844+	$150,174+	$50,017+

*Retrofitting currently uncontrolled diesel engines with turbocharger, aftercooler and four degree retard.
**Retrofitting existing turbocharged diesel engines with aftercooler and four degree retard.

Table 3 shows the compliance costs for low-use diesel engines using engine replacement or engine retrofitting through combustion modifications. Since these engines are low-use, SCR installation would not be cost-effective and is not considered.

Table 3. Compliance Costs for Low-Use Diesel Engines

	Replace Engine		Retrofit Engine*		Retrofit Engine**	
Engine Rating (bhp)	Capital Costs	Annual Costs	Capital Costs	Annual Costs	Capital Costs	Annual Costs
50 - 199	$13,083- $31,231	$2,129- $5,081	$4,401- $7,225	$1,979- $4,618	$3,401- $4,401	$1,615- $3,590
200 - 399	$31,231- $53,541	$5,081- $8,711	$7,225- $10,801	$4,618- $8,068	$4,401- $7,101	$3,590- $6,721
400 - 599	$53,541- $79,511	$8,711- $12,936	$10,801- $15,401	$8,068- $11,891	$7,101- $9,901	$6,721- $9,889
600 - 799	$79,511- $118,466	$12,936- $17,632	$15,401- $20,101	$11,891- $15,750	$9,901- $12,801	$9,889- $13,092
800 - 999	$118,466- $135,151	$17,632- $21,991	$20,101- $24,601	$15,750- $19,536	$12,801- $15,401	$13,092- $16,187
1000 +	$135,161+	$21,991+	$24,601+	$19,536+	$15,401+	$16,187+

*Retrofitting currently uncontrolled diesel engines with turbocharger, aftercooler and four degree retard.
**Retrofitting existing turbocharged diesel engines with aftercooler and four degree retard.

Table 4 shows the compliance costs for NSCR installation and catalyst replacement for uncontrolled rich burn gas engines. Table 5 shows the compliance costs for combustion modification and engine replacement of lean burn gas engines.

Table 4. Compliance Costs for Rich-Burn Gas Engines

	Replace NSCR Catalyst		Install NSCR	
Engine Rating (bhp)	Capital Costs	Annual Costs	Capital Cost	Annual Costs
around 150	n/a	n/a	$18,558	$11,799
around 330	$5,017	$5,267	n/a	n/a
around 500	$5,185-$5,795	$5,435-$6,045	n/a	n/a

Table 5. Compliance Costs for Lean-Burn Gas Engines

	Installing electronic fuel injector for timing control		Replacing turbocharger		Purchasing new engines	
Engine Rating (bhp)	Capital Costs	Annual Costs	Capital Costs	Annual Costs	Capital Costs	Annual Costs
800-1000	$12,019	$13,076-$13,791	$69,429-$69,749	$27,112-$27,912	$368,074	$59,886
1000-1350	$12,019	$16,038	$70,755	$30,425	$468,244	$76,183

AFFECTED SOURCES

District permit files provide information on the known engine population in San Diego County. Presently, there are approximately 1,100 engines permitted/registered with the District. Portable engines are not affected by the rule and are not included in this inventory. There are currently 207 engines that will be subject to all Rule 69.4.1 requirements. Approximately 90 or 44% of these engines are already in compliance with the emission standards. In addition, approximately 900 existing emergency standby engines and engines operated less than 200 hours per year are exempted from Rule 69.4.1 emission standards, but are subject to new fuel, recordkeeping and monitoring requirements.

Some small, less than 200 bhp engines are currently exempt from permit requirements. These engines will become subject to Rule 69.4.1 upon adoption. Many of these currently exempt engines are likely emergency standby engines and will therefore only be subject to new fuel, recordkeeping and monitoring requirements. There are currently 91 engines in the District's inventory of permitted engines with brake horsepower ratings between 50 and 200. While it is difficult to estimate how many of these currently exempt engines will be affected by the rule, the number is not expected to exceed 200.

EMISSION REDUCTIONS

Rule 69.4.1 will significantly reduce the quantity of NOx emitted to the atmosphere. There will be an overall NOx emission reduction of about 481 tons per year from currently registered and/or permitted stationary internal combustion engines subject to the rule.

AFFECTED INDUSTRIES

Proposed Rule 69.4.1 will affect many diverse industrial sectors in San Diego County. Businesses and entities directly affected by the rule will be those who use stationary internal combustion engines in their daily operations. Distributors, wholesale vendors, other suppliers and manufacturers of the regulated products are expected to experience little impact from the rule.

Businesses affected by Rule 69.4.1 fall into many different industries as designated by SIC code. As the rule affects a wide spectrum of San Diego County's local economy, this socioeconomic assessment divides local industries into seven more manageable broad industry categories: *Manufacturing, Mineral, Shipbuilding, Utilities, Airport, Military* and *Services*.

> "*Manufacturing*" includes all manufacturing segments that are not rock/mineral industry or shipbuilding industry related. End users of the *manufacturing* group use their engines in applications such as compressors, generators and other production related tasks.
>
> "*Mineral*" includes companies using engines for rock/mineral related manufacturing and processing, special construction (such as dredging) and other industrial applications like concrete and asphalt recycling operations.
>
> "*Shipbuilding*" includes manufacturing and associated sectors in the shipbuilding and repair industries. It excludes dredging operations.
>
> "*Utilities*" includes the transportation, communication and utilities sectors with the exception of airport and air transport related segments. Many government agencies with municipal utility services also belong in this group. Landfills and non-mineral recycling facilities (e.g. mulching) are included in this group as well.
>
> "*Airport*" includes airport and air transport related segments that use airport ground support engines. These engines provide backup electrical power or compressed air to aircraft on the ground.
>
> "*Military*" includes military operators of stationary internal combustion engines used in non-tactical support areas such as hospitals and on-base public works.
>
> "*Services*" includes a wide spectrum of SIC groups, including retail, finance, insurance, real estate, services, health care and all other (non-military) government services sectors. Mainly, this group addresses engine operators in building operation, management, and maintenance (office, recreational facilities, parks, hotels, and schools). These engines are used most commonly as emergency standby engines or for cogeneration.

Table 6 provides a breakdown of the 207 permitted/registered engines subject to the emission standards of Rule 69.4.1 by industry group, fuel type, engine category, and compliance status.

Table 6
Engines Subject to Rule 69.4.1 Emission Standards by Industry Group, Fuel Type, Engine Category & Compliance Status

Industry Group	Fuel Type	Engine Category	Number of Engines	Number in Compliance	Percent in Compliance
Manufacturing	Diesel	High Use	3	1	
(11 sources)		Low Use	1	1	
	Natural Gas	Lean Burn	16	11	
		subtotal	*20*	*13*	*65%*
Mineral	Diesel	High Use	33	7	
(20 sources)		Low Use	9	2	
		Cyclic	7	4	
		subtotal	*49*	*13*	*27%*
Shipbuilding	Diesel	High Use	8	0	
(3 sources)		Low Use	2	2	
		Cyclic	12	12	
		subtotal	*22*	*14*	*64%*
Utilities	Diesel	High Use	12	8	
(16 sources)		Low Use	3	2	
	Natural Gas	Lean Burn	4	4	
	Natural Gas	Rich Burn	1	0	
	Waste Gas	Lean Burn	15	13	
		subtotal	*35*	*27*	*77%*
Airport	Diesel	High Use	27	6	
(13 sources)		Low Use	17	2	
		subtotal	*44*	*8*	*18%*
Military	Diesel	High Use	3	0	
(7 sources)		Low Use	5	4	
		Cyclic Use	2	2	
	Natural Gas	Lean Burn	4	0	
		subtotal	*14*	*6*	*43%*
Services	Diesel	High Use	0	0	
(10 sources)		Low Use	2	0	
	Natural Gas	Lean Burn	14	9	
		Rich Burn	7	0	
		subtotal	*23*	*9*	*39%*
	Grande Total		**207**	**90**	**44%**

ECONOMIC IMPACTS – EVALUATION METHODS

To evaluate the economic impacts of Rule 69.4.1, two different approaches were used. First, to gauge the significance of compliance costs and their economic impacts, the estimates of total compliance costs for the seven industry groups were compared to their output level (expressed in either 'value of shipments' or 'revenue') for each group as taken from the 1997 Economic Census.

Annual compliance costs which are less than one-tenth of one percent (0.1%) of the total sector output would not be considered a significant economic impact for these businesses.

As a measure of output, the Economic Census on manufacturers recorded 'value of shipments,' which covers net selling value of receipts, sales, and/or revenue from both primary and secondary products. It also includes output value of contract work, installation and/or repair work. The Economic Census as administered by US Census Bureau profiles the US economy every 5 years, from the national to the local level.

The second method used to evaluate the economic impacts was to contact a number of businesses in all seven industry-groups by telephone to determine business responses to potential compliance costs from the proposed rule. Respondents were asked background information about their business and how they expected their business would react under a hypothetical compliance situation. Nearly 60 businesses were contacted for telephone interviews, though only 24 chose to participate in the telephone survey. The 24 participants represent a cross section of the San Diego County economy. Not all participants provided complete information. However, the interviews provided valuable information about the affected industries, their typical reactions and responses to compliance options and associated costs.

The typical business response is based on incurring some level of costs and reacting to those expenses in various ways. Firms and entities may choose to raise fees/prices to offset all or part of the increased operating costs. For a company to raise fees/prices to its customers, it is assumed that the business is capable of doing so in the market place. For such companies, the rule would cause no real economic impact. Other response options include reduction of production, operating hours, staffing level, capital expenditure and investments. Businesses absorbing all of or parts of the costs will incur direct expenses for new equipment, and additional repair and maintenance services. The magnitude of these expenses is dependent on the individual characteristics of a given facility.

Based on business responses, not many of the affected firms are able to easily raise their prices or fees. It is anticipated that only a few businesses would actually increase prices to offset some or all of the potential compliance costs. No participant in the survey indicated that s/he would increase fees and prices when faced with additional business expenses associated with rule compliance. For many businesses that participated in the telephone survey, raising prices will result in a loss of business volume, which in turn is likely to result in a bigger profit loss than would occur from absorbing increased compliance/regulatory costs.

Rule 69.4.1 provides several different compliance options, hence the compliances costs used for this assessment are provided in ranges, based on the actual size and type of engine. Since installing SCR would be significantly more costly than the other two compliance options, the data assumes none of the affected facilities will choose this option. The anticipated business responses based on the telephone surveys and an analysis of the overall impacts are provided below for each industry. The overall significance of Rule 69.4.1's economic impacts were evaluated on the basis of the business responses to compliance costs.

ECONOMIC IMPACTS BY INDUSTRY SECTOR

Manufacturing

Businesses grouped in *Manufacturing* represent a broad variety of manufacturing facilities that may or may not utilize stationary internal combustion engines. According to the 1997 Economic Census, this group had over 3,300 establishments and over 110,000 employees in San Diego County. *Manufacturing* is a multibillion-dollar industry group, and had over $20 billion in its total 'value of shipments' in 1997. Not all businesses counted in the 1997 Economic Census use stationary internal combustion engines in their daily operations.

There are 11 facilities in this group operating 20 engines or approximately 10% of the total engines subject to proposed Rule 69.4.1. Most of these engines are rated at less than 400 brake horsepower. Sixty-five percent or 13 of these engines already meet the proposed emission standards. Annualized compliance costs for the remaining eight engines are estimated to range from $81,670 to $308,100. Assuming the worst case scenario, $308,100 is less than 0.002% of the total output for this industry (expressed in value of shipments). When compared with the industry output, the estimated annual compliance costs are less than one-tenth of one percent (0.1%), and would not be considered a significant economic impact for these businesses. Therefore, direct impacts from the rule on this industry sector as a whole, are expected to be little.

Four out of 11 manufacturing companies participated in the survey. Three reported that their engines are either exempt from the emission standards (emergency stand by engines) or already meet the proposed emission standards. One of the three participants reported that if his situation were otherwise, his most likely business actions would be: reducing operations/production; reducing profitability by absorbing the cost; or reducing staffing at the affected site.

The fourth participant stated that his company will incur additional costs to comply with Rule 69.4.1, and when faced with this expense, the rule may affect three to four full time employees. The worst case scenario for this facility was considered. The business mainly uses engines for co-generating electricity, saving a portion of its manufacturing facility's electricity expense. If the realized savings shrink due to increased compliance costs, co-generation activities may become non-economically viable for the business. Those employed in co-generation activities would be reassigned to other job posts within the company or become unemployed.

However, the San Diego regional economy is strong with a very low unemployment rate (near 3%). While the number of sites operating co-generation engines has been diminishing across San Diego County, in light of recent electricity deregulation and rising costs of electricity, co-generation activities may become more viable alternatives for many firms. All interviewed facilities reported about average profitability in their industries and indicated that complying with Rule 69.4.1 would not close their businesses.

Mineral

This industry includes different specialty segments ranging from non-metallic mineral/rock manufacturing and processing to special construction activities, like dredging, and concrete and asphalt recycling. Non-metallic mineral/rock related industries such as cement and concrete industries had about 40 establishments and 1,000 employees in 1997, according to the Economic Census. Output of the *Mineral* industry as a whole, measured in 'value of shipments,' exceeded

$200 million. Concrete and related products (ready-mix) dominate this sector's overall value of output. Not all businesses counted in the 1997 Economic Census use stationary internal combustion engines in their daily operations.

There are 20 different engine operators in the *Mineral* sector. The group represents 49 engines or 23% of the total engines subject to proposed Rule 69.4.1. Most of these engines are rated at less than 200 brake horsepower. Only 27% or 13 of these engines currently meet the proposed emission standards. An additional 11 engines would meet the emission standard requirements if they were reclassified as "low-use" engines (i.e., operated at 15% or less of their operating capacity). This equates to 1314 hours of operation per year, which may be acceptable for some of the smaller engines used in this industry.

Annualized compliance costs for the remaining 36 engines are estimated to range from $214,437 to $302,800. Assuming the worst case scenario, $302,800 for the whole industry is approximately 0.15% of its total sector output (expressed in value of shipments). When compared with the industry output, the lower annual compliance costs slightly exceed one-tenth of one percent (0.11%), and could be considered a slightly significant economic impact for the industry. It is expected that *Mineral* as a whole will not be significantly affected by Rule 69.4.1, though some smaller facilities will be impacted.

Four businesses in *Mineral* were contacted. Three businesses responded to the survey effort. Two interviewed businesses reported that they currently meet the District's proposed emission standards and would not face significant negative impacts from the rule. One industry representative noted that most companies (over 80%) would not be significantly impacted because most firms in the industry group are large enough to absorb additional costs as a part of their operating budgets.

While it is expected that most businesses will be able to absorb the costs of complying with the proposed standards without significant adverse impacts on their profitability, there is a possibility that some smaller businesses will be adversely affected. Some small businesses may not be in a market position to invest monies to replace or retrofit affected engines, or to absorb the increased compliance costs.* It should also be noted that Rule 69.4.1 provides two years for any non-compliant engine to reach full compliance status. Smaller facilities that are currently viable in the market place may be able to sustain in the market place by securing long-term loans to cover compliance costs.

Shipbuilding

This industry includes shipbuilding, and associated repair and maintenance. According to the 1997 Economic Census, there were 21 establishments in the area of shipbuilding and related activities in San Diego County. *Shipbuilding* employed over 6,800 people in San Diego County and nearly $800 million worth of goods were produced in 1997. Only a portion of this industry group operates stationary internal combustion engines.

The group represents 22 engines or approximately 11% of the total engines subject to proposed Rule 69.4.1. Most of these engines are rated at less than 400 brake horsepower. More than 64%

* An industry representative stated that a handful of smaller facilities would be adversely affected by the rule. However, upon further investigation, these companies could not be identified.

or 14 of these engines currently meet the proposed emission standards. Compliance costs for the remaining eight engines are estimated to range from $53,200 to $76,800. Assuming the worst case scenario, $76,800 is less than 0.01% of the total sector output (expressed in value of shipments). When compared with the industry output, the estimated annual compliance costs are much less than one-tenth of one percent (0.1%), and would not be considered a significant economic impact. Therefore, direct impacts from the rule on this industry sector as a whole, are not expected to be significant.

There are not many distinct operators in this sector. All three engine operators were contacted for survey purposes and only one facility responded. While there are many engines at the facility, only one engine is potentially affected by the rule. Once source testing is performed to show the engine compliance status, this interviewed business may or may not purchase a replacement engine. Based on business responses, overall impacts are not expected to be significant.

Utilities

This industry includes not only utility providers in a conventional sense, but also transportation, communication entities and non-rock/mineral related recycling at landfill facilities. This group had over 1,900 establishments with nearly 42,000 employees in 1997 according to the Economic Census. Only a portion of this industry group operates stationary internal combustion engines. Municipal water districts, electricity providers, transfer stations, transportation and communication facilities are examples of engine operators. *Utilities* is a multibillion-dollar industry group, and had over $2 billion in revenue in 1997.

This sector represents 16 engine operators, using 35 engines or approximately 17% of the total engines subject to proposed Rule 69.4.1. This group has the most diverse group of engine types and fuels utilized. Nearly 77% or 27 of these engines already meet the proposed emissions standards. Compliance costs for the remaining nine engines are estimated to range from $80,458 to $218,700. Assuming the worst case scenario, $218,700 is less than 0.011% of the total sector output (expressed in revenue). When compared with the industry output, the estimated annual compliance costs are much less than one-tenth of one percent (0.1%), and therefore, would not be considered significant economic impacts for businesses. Direct impacts from the rule on this industry sector as a whole, are not expected to be significant.

Eight companies were contacted in the utilities group. Three facilities chose to participate in the survey. Two facilities reported that their engines already meet the proposed standards, and will not incur additional compliance costs. One site reported having two engines that may be affected by the rule. This company is likely to absorb any and all costs associated with complying with Rule 69.4.1. Based on the business responses, overall impacts on utilities are not expected to be significant.

Airport

This industry includes establishments primarily engaged in providing specialized services for air transportation. According to the 1997 Economic Census, the 'airport operations and terminal services' segment of the economy had 20 establishments with over 830 employees. Output of this industry group in 1997 was over $30 million in revenue. The revenue covers net receipts, sales and the value of other goods and services provided by the establishments. Not all terminal services include ground power support activities.

This sector has 13 engine operators with 44 engines, or approximately 21% of the total engines. Most of these engines are rated at less than 200 brake horsepower. Only 18% or 8 of these engines already meet the proposed emission standards. Compliance costs for the remaining 36 engines are estimated to range from $143,100 to $221,900. When compared with the total industry output, the estimated annual compliance costs range from 0.48 to 0.74% of the total sector output (expressed in revenue). These values exceed one-tenth of one percent (0.1%), and could be considered a significant economic impact. However, most ground power support activities are performed in conjunction with operations for large airline companies. The overall economic impacts for these larger parent companies is likely to be insignificant.

Five out of eleven operators of airport ground support units contacted by JFA participated in the survey effort. Not all participants provided full information. All companies need to comply with the rule in the future. A total of 11 engines between the five companies would be either replaced or retrofitted to meet the standards. As the nature of the business is closely linked to air travel and transportation, all five respondents reported they are unable to raise their fees/prices without negative business consequences. However, one industry respondent noted that most firms would be able to absorb any related expenses. Independent companies that are not integral parts of larger airlines may face a more difficult time absorbing costs and reducing profits. Larger companies have advantages in their larger economy of scale. Larger companies with operations in San Diego and in other parts of the country may exchange engine units to comply, resulting in less capital expenditure. It is anticipated that most companies will simply retrofit or replace their engines with little impacts. Several participants reported that the industry is very competitive, but also very profitable. Based on the interviews, it is believed that the overall impacts would not be significant.

Military

This sector represents 30 different military sites that provided over 100,000 jobs in 1997. It is estimated that the overall output of the military sector in the region is nearly $8 billion. Although there is a significant number of engines operating in military locations in San Diego County, most of them are exempted from the proposed rule as military tactical support equipment.

Seven operators have a total of 14 engines subject to Rule 69.4.1. This group has the smallest population of engines subject to the proposed rule. About 43% or 6 of these engines currently meet the proposed emission standards. Compliance costs for the remaining 8 engines are estimated to range from $65,890 to $262,800. This segment of the economy provides billions of dollars in output. Compared with its $8 billion estimated output, annualized compliance costs would be less than 0.0004% of the sector, and would not be considered significant economic impacts. When compared with the industry output, the estimated annual compliance costs are much less than one-tenth of one percent (0.1%), and thus would not be considered a significant economic impact. Therefore, direct impacts from the rule on this industry sector as a whole, are not expected to be significant.

Three out of five contacted facilities chose to participate in the survey. All participants reported that their compliance actions would not have direct negative impacts such as layoffs at their facilities. The participants reported that they would seek additional operating budget if necessary. Any increased operating costs due to the rule may require a budget increase from the

federal government in the future. Upon analysis of the estimated annualized compliance costs and the participants' input, it is expected that Rule 69.4.1 will have little impact on this sector.

Services

This industry includes many diverse segments of the San Diego economy like retail, wholesale, office employment, food services, hotels, hospitals, schools and private recreational parks. Well over 50,000 establishments with 650,000 employees were reported in 1997. This is a large sector of the economy, and is estimated to have nearly $100 billion in revenue, which covers total sales, shipments, receipts, and, other business done by establishments.

There are ten facilities, with 23 engines subject to proposed Rule 69.4.1. Most of these engines are gaseous fueled. About 39% or 9 of these engines already meet the proposed emission standards. Compliance costs for the remaining 14 engines are estimated to range from $156,100 to $404,700. Considering the worst case scenario, $404,700 is less than 0.0004% of the total sector output (expressed in revenue). When compared with the industry output, the estimated annual compliance costs are less than one-tenth of one percent (0.1%), and would not be considered significant economic impacts for businesses. Therefore, direct impacts from the rule on this industry sector as a whole, are not expected to be significant.

Relatively few members of this group operate stationary internal combustion engines. The entities counted in the Economic Census , include offices, restaurants, retail stores and other operations, which do not independently operate any heavy equipment. Some individual building managers and operators, who lease or rent spaces to businesses, may own and operate stationary internal combustion engines for power generation or other purposes. According to industry representatives, the majority of engines in this group are for emergency use, which are exempted from the emission standard requirements of Rule 69.4.1.

Fourteen different businesses belonging in *Services* were contacted to gather business responses to potential compliance costs. Of the 14, there were a handful of consultants, vendors and other service providers that are knowledgeable in internal stationary engines and deal with companies in *Services.* For business responses to direct impacts from compliance costs, nine potentially affected facilities were contacted for information. Of those, five facilities participated in the survey effort.

One facility reported that all its engines are for emergency use only and are exempted from the emission standards. Three facilities in the areas of education and health care expect little or no impact resulting from the rule as compliance costs would become part of a much larger operating budget. One site with two potentially affected engines would consider transferring operations outside San Diego County or selling parts of its operations when faced with increased compliance costs. However, this company has an annual operating budget near $100 million. Worst case annualized compliance costs would be less than 0.1% of the annual operating budget. This facility also reported 'about average' profitability. Therefore, the direct impacts from Rule 69.4.1 on this company would likely be small. In *Services* as a whole, overall impacts from compliance options would not be significant.

IMPACT OF COMPLIANCE ON COMPETITIVENESS

Rule 69.4.1 is likely to have little impact on competitiveness in the following industry categories: *Shipbuilding, Utilities, Airport, Military* and *Services*. In *Manufacturing*, one business claimed that additional costs of compliance options might cause its co-generation operations to be less practical. However, it is important to note that co-generation of electricity may become more practical in light of recent increases in electricity costs. In *Mineral*, some of the smaller operators will be slightly impacted.

While competition is strong in the various industry segments, many businesses compete with one another and would face similar compliance costs. For outside competitors to enter and compete in San Diego County, they must meet the same emission standards that the affected San Diego entities face. Unless the affected entities are already experiencing difficulties in the market, the impact of compliance on region's overall competitiveness is expected to be minimal.

IMPACTS AND OVERALL SIGNIFICANCE ON REGIONAL ECONOMY

The overall significance of Rule 69.4.1's economic impact was evaluated on the basis of business responses to compliance costs and their impacts on the affected industries. Once adopted, Rule 69.4.1 will allow two years before affected businesses must comply. This is important to note because the two-year period allows affected businesses to plan gradual commitments of their resources. With ample time to investigate and consider available options, the costs associated with full compliance are not unexpected expenses in business planning. There should not be any unanticipated shock in the economy stemming from the rule.

In addition to having a long compliance time frame, most industries affected by the rule generate sufficient output to absorb Rule 69.4.1's compliance costs in the near future. Upon analysis of economic characteristics of different industries in the San Diego region, it is estimated that most affected industries would be able to incur additional expenses and remain in the market place in the short run. Many business responses collected support this conclusion.

Most facilities that responded to the survey noted that most if not all of the compliance costs would be absorbed. Many businesses expressed their inability to pass on their costs to consumers in general. Based on the telephone interviews, little if any compliance costs associated with Rule 69.4.1 would be passed onto general consumers in the short run.

Therefore, the rule is not expected to have any significant overall impacts on San Diego County's regional economy.

CONCLUSIONS

The predominant trend in the engine manufacturing industry is to produce engines with lower emissions. This trend is in large part due to air quality regulations. It is also driven by a combination of factors such as public health issues, workers' health matters, and growing awareness of environmental concerns. A similar trend is also reflected among many users of

stationary internal combustion engines in San Diego County. These San Diego County businesses have been adapting to the changes and share similar goals for cleaner air.

Rule 69.4.1 related costs to local businesses are directly correlated to their equipment needs and usage level. Some firms that already meet the District's proposed emission standards will incur minimal costs in monitoring, recordkeeping and testing. Most entities are expected to fully absorb all associated compliance costs with minimal impact. The regional economy as a whole is expected to also absorb the cost impacts from the rule without any significant impacts. Overall, Rule 69.4.1 is not expected to pose any significant impacts on the affected industry sectors in San Diego County.

AIR POLLUTION CONTROL DISTRICT
SAN DIEGO COUNTY

RULE 69.4.1 STATIONARY RECIPROCATING INTERNAL COMBUSTION ENGINES - BEST AVAILABLE RETROFIT CONTROL TECHNOLOGY (BARCT)

WORKSHOP REPORT

A workshop notice was mailed to all known owners and operators of stationary reciprocating internal combustion (IC) engines in San Diego County. Notices were also mailed to all Economic Development Corporations and Chambers of Commerce in San Diego County, the U.S. Environmental Protection Agency (EPA), the California Air Resources Board (ARB), and other interested parties. The workshop was held on April 29, 1999. Oral and written comments were received during and after the workshop from the affected businesses and ARB. The comments and District responses are as follows:

1. WRITTEN COMMENT

The procurement process for stationary diesel engines can take many months and sometimes years to complete. Many engines ordered today or specified for bid months ago will not be installed until after Rule 69.4.1 is adopted. For the engines that are already in the procurement process, and do not comply with the proposed emission standards, the District should either delay the rule implementation dates or allow the installation of non-complying engines provided it is demonstrated that the procurement process was initiated before the rule adoption.

DISTRICT RESPONSE

The proposed emission standards for diesel engines in Rule 69.4.1 have been revised to incorporate the EPA Tier 1 New Emission Standards for Nonroad Diesel Engines adopted in April 1994 as an alternative to compliance by installing add-on control equipment. This regulation required all diesel engines manufactured after January 1, 1996, to comply with the oxides of nitrogen (NOx) emission standard of 6.9 grams per brake horse power-hour (g/bhp-hr). The implementation date for engines rated at 750 bhp and below was January 1, 1998. For engines larger than 750 bhp the implementation date is January 1, 2000. The proposed rule compliance dates have been revised to provide enough lead time to procure and install combustion modifications or add-on control equipment for existing engines, or replace them with complying engines. New engines that are currently in procurement should be certified and should comply with the proposed standards.

2. WRITTEN COMMENT

It may be desirable to use ARB Test Method 100 which requires less calibration gases and allows for quality data to be obtained in less time.

DISTRICT RESPONSE

Section (h) has been revised to allow using ARB Test Method 100 as an alternative to District Test Method 100.

3. **WRITTEN COMMENT**

Test methods used to certify compliance with EPA off-road engine standards are significantly different from traditional field tests used for compliance purposes. Some efforts will be needed to determine the best method of conducting source tests in a manner that reflects the EPA certification process.

DISTRICT RESPONSE

The District agrees. ARB is presently developing a field compliance test method for portable diesel engines which would be compatible with both the EPA and ARB test procedures used for certification. In the meantime, the District will accept EPA or ARB certification data as a surrogate for a field compliance test for new or replacement diesel engines. Rule 69.4.1 has been revised to reflect this.

4. **WRITTEN COMMENT**

It is requested that the District consider a categorical exemption for diesel powered cranes from emission control requirements of the proposed Rule 69.4.1. This request is based on data that show that NOx emissions from the diesel engines used to power gantry cranes are quite small. In addition, cost evaluation of the possible control options demonstrates that controlling NOx emissions from diesel crane engines is not cost-effective.

DISTRICT RESPONSE

The District agrees that existing cyclic engines should not be subject to the same emission standards as high-use diesel engines. Therefore, proposed Rule 69.4.1 requires them to comply with less stringent NOx emission standards (700 ppm at 15% oxygen). District test data show that these engines are capable of meeting the proposed standards without additional emission controls, provided the engines are properly maintained. However, proposed Rule 69.4.1 does require that new and replacement low-use or cyclic engines meet the same NOx emission limit as high-use engines.

5. **WRITTEN COMMENT**

As proposed, Rule 69.4.1 is applicable to new emergency generators that are eligible for registration pursuant to District Rule 12 and therefore are exempt from New Source Review (NSR). This will essentially make the proposed rule that represents the BARCT as stringent as the Best Available Control Technology (BACT) requirements of the NSR which applies only to new and modified sources. Based on the definition in the Health and Safety Code, BARCT requirements should be less stringent than BACT because they apply to existing equipment.

DISTRICT RESPONSE

The District disagrees. The BARCT definition in the Health and Safety Code does not address the stringency of BARCT in comparison to BACT. It simply states that BARCT "means an emission limitation that is based on the maximum degree of reduction achievable, taking into account environmental, energy, and economic impacts by each class or category of source." In fact, in many cases BACT and BARCT levels of control are the same. For example, the BACT emission rate limit for new or modified industrial and commercial boilers less than 50 MM BTU is 30 ppm of NOx at

3% oxygen (see the District's NSR BACT Guidance Document, p. 3-3, 1998). This limit is the same as the NOx emission standard of Rule 69.2 (Industrial and Commercial Boilers, Process Heaters and Steam Generators) which represents BARCT. Also, for coating operations that use volatile organic compound (VOC) containing materials, District rules representing BARCT requirements are often also considered BACT for small sources where add-on control technology is not cost effective.

6. WRITTEN COMMENT

The proposed rule creates an undue burden on the owners of emergency generators because it will subject them to the testing and recordkeeping requirements of Subsections (g) and (e). It is suggested that both new and existing emergency generators and engines operating less than 200 hours per year be altogether exempt from Rule 69.4.1 requirements.

DISTRICT RESPONSE

The District agrees that new or replacement engines that are subject to the exemptions specified in Subsections (b)(2)(i) and (ii) should also be exempt from the majority of administrative requirements. Rule 69.4.1 has been revised to delete all monitoring and source test requirements for these engines except for the requirement of Subsection (e)(3) to install a non-resettable fuel meter or elapsed operating time meter. Also, the recordkeeping requirements of Subsections (g)(1) and (g)(2) are still applicable to emergency generators and other engines exempt under this Subsection because these records are necessary for determining compliance with the rule.

7. WRITTEN COMMENT

Rule 69.4.1 defines a "low-use engine" as an engine with a capacity factor of 15% . It is not clear why this capacity factor was chosen. Based on available data, it is recommended that a capacity factor of 20% be used to define "low-use engine."

DISTRICT RESPONSE

The 15% capacity factor is the operating level at which NOx emission control measures such as Selective Catalytic Reduction (SCR) or engine replacement become cost effective for diesel engines of all sizes. ARB has proposed a definition of "low fuel consumption" diesel engines as engines consuming less than 25,000 gallons of diesel fuel per year. This fuel consumption corresponds to the amount of fuel used by a 500 bhp engine operating between 900 and 1,000 hours per year, or approximately a 10-11% capacity factor.

8. WRITTEN COMMENT

The NOx emission standards for cyclic engines should be based on an integrated average using the time frame of the most recent source test conducted by the District. This information should be conveyed in Subsection (d)(1)(i).

DISTRICT RESPONSE

District Test Method 100 already allows variation in the source test duration for specific applications with written District approval. This will accommodate testing of cyclic engines where emissions may be averaged over a longer test period.

9. WRITTEN COMMENT

In Subsections (d)(1)(ii)(2) through (4) emission standards are indicated for carbon monoxide (CO) and VOCs. It is believed that the intent of Rule 69.4.1 is to control NOx emissions. If there is a concern about VOC emissions resulting from certain control technologies the rule should specifically address that issue. All IC engines should not be subject to VOC emission standards and should not require source testing.

DISTRICT RESPONSE

Several common NOx emission reduction techniques result in increases in CO and VOC (ozone precursor) emissions. The VOC and CO emission standards in the proposed rule will ensure that NOx reduction measures do not result in excessive emissions of other criteria pollutants. Other District rules regulating combustion sources such as Rule 69.2 (Industrial and Commercial Boilers, Process Heaters and Steam Generators) provide emission limits for carbon monoxide. In addition, the ARB draft RACT/BARCT Guidance has both VOC and CO emission standards for all types of IC engines. The District will further evaluate this and consult with ARB regarding the necessity and values of the proposed emission limits.

10. WRITTEN COMMENT

The monitoring of the operational characteristics required by Subsections (e)(1)(i), (ii), and (iii) is not possible for older existing engines. The option of not monitoring these parameters should be provided in the rule. The rule should emphasize that this requirement is applicable only to engines where monitoring of these parameters is feasible.

DISTRICT RESPONSE

The District agrees. For some older engines, especially diesel engines, it may not be possible to monitor operating parameters. In some engines the operating parameters that can be monitored, such as inlet manifold temperature or pressure, may not necessarily be related to the engine's emissions. Therefore, Sections (e) and (f) have been revised to address this concern.

11. WRITTEN COMMENT

Since Subsection (f)(2) already contains maintenance requirements for engines, the inspection requirements in Subsection (f)(1) are not needed and should be deleted.

DISTRICT RESPONSE

The District disagrees. Both inspection and maintenance practices are necessary to enhance on-going compliance with Rule 69.4.1. Inspections are necessary to determine whether the engines and emission controls are operating in compliance with the emission standards of the rule, while maintenance is needed to ensure on-going proper engine operation. For example, an inspection could include checking monitored parameters, observing engine/control equipment operation, and measuring exhaust NOx emissions with a portable monitor. An inspection may indicate that additional maintenance is required.

12. WRITTEN COMMENT

Subsections (g)(6)(i), (ii), and (iii) contain recordkeeping requirements that are not possible to implement for older existing diesel engines. The rule should contain an option stating that these parameters should be determined if feasible.

DISTRICT RESPONSE

The District agrees. Subsection (g)(6) has been revised to reflect this comment.

13. WRITTEN COMMENT

Recordkeeping requirements of Subsection (g)(6)(iv) only apply to SCR equipment and, accordingly, should not be specified in the rule.

DISTRICT RESPONSE

Subsection (g)(6) provides examples of engine operating parameters for which records are to be kept. These records, as stated in the first paragraph of Section (g), may include but are not limited to the parameters listed in Subsections (g)(6)(i) through (iv). However, Subsection (g)(6)(iv) has been revised to clarify that the flow rate of NOx reducing agent only needs to be measured and recorded if this equipment is installed.

14. WRITTEN COMMENT

Subsection (h)(1)(i), "Test Methods," should state that a modified District Test Method 100 may be appropriate to address time averaging and unique stack configurations which do not specifically meet the test method requirements.

DISTRICT RESPONSE

The District disagrees. Test Method 100 already allows variation in the test duration and stack configuration for specific applications with written District approval. These variations must be specified in a source test protocol as required by Subsection (i)(2).

15. WRITTEN COMMENT

Source test requirements in Subsection (i)(1) should address the entire stationary source. A source with multiple identical units should be required to test only one representative unit.

DISTRICT RESPONSE

The District disagrees. Each engine has unique performance characteristics and yields different emission profiles during testing. One engine emission profile is not representative of other "identical" engine emission profiles. For example, District source test results for completely identical rich-burn, natural gas engines equipped with a Non-Selective Catalytic Reduction system (NSCR) and located at the same site showed that NOx emissions can vary significantly, sometimes by as much as an order of magnitude. However, the District is evaluating the performance of

portable NOx monitors that may be usable as a screening tool and might allow streamlining some engine source testing.

16. WRITTEN COMMENT

Subsection (i)(3), "Source Test Requirements." should allow the flexibility for unique operating modes of certain engines by allowing a source test to be performed under typical operating conditions.

DISTRICT RESPONSE

The District agrees. Presently, Subsection (i)(3) only provides flexibility for engines continuously operating at less than 80% of the brake horse power rating. This subsection has been revised to address engines with unique operating modes.

17. WRITTEN COMMENT

Would the exemption specified in Subsection (b)(2)(i) apply to four existing engines operating at the same stationary source for a total of not more than 800 hours per year, even if one or two engines operate for slightly longer than 200 hours? These engines are located at an existing natural gas transmission compressor station and operate only when the natural gas demand exceeds normal level.

DISTRICT RESPONSE

Subsection (b)(2)(i) applies to each engine. However, a District analysis showed that controlling the engines specified above is not cost-effective. Therefore, Subsection (b) has been revised to include an additional exemption for the above four engines. A proposed new exemption in Subsection (b)(2)(vi) limits the aggregate operations of the four engines operation to a total of 800 hours per calendar year provided each engine operates less than 300 hours per calendar year.

18. WRITTEN COMMENT

Is it possible to use an existing engine which operates less than 200 hours per year and, therefore, is exempt from the rule emission standards pursuant to Subsection (b)2)(1) for an unlimited time in case of an emergency?

DISTRICT RESPONSE

No. Only emergency standby engines can operate for an unlimited time in an emergency situation. Such engines are limited to 52 hours per year for non-emergency operation.

19. WRITTEN COMMENT

The District stated that proposed Rule 69.4.1 would be further revised prior to enactment to reflect revisions to current ARB standards for off-road diesel engines. Those revisions are expected to conform to similar standards EPA has already adopted. However, the anticipated EPA standards have not been promulgated, and so cannot yet provide a basis for ARB regulation or proposed Rule 69.4.1.

DISTRICT RESPONSE

The final EPA standards for off-road diesel engines (Tier 2) were adopted in 1998 and have already been included in the Code of Federal Regulation (40 CFR 89). However, the implementation dates of this regulation for diesel engine manufacturers start in 2002 through 2006, depending on the size of engine. Therefore, Rule 69.4.1 has been revised to, instead, incorporate the Tier 1 NOx emission standards (6.9 g/bhp-hr), which were promulgated by EPA in 1994, as an alternative to compliance by installing add-on emission controls. This standard is now in effect for off-road diesel engines below 750 bhp, and will be in effect for engines larger than 750 bhp after January 1, 2000. This standard already can be met by some existing engines. For others, compliance could be achieved by engine combustion modifications, installing add-on control equipment, or replacing with a Tier 1 certified engine.

20. WRITTEN COMMENT

The ARB and EPA standards are new engine, pre-sale certification standards rather than in-use standards. They will be linked to protocols for certification testing. Protocols of this kind cannot be practically applied to diesel engines in use at a stationary source. For example, ARB and EPA standards are expressed as weighted averages of emissions from multiple modes of operation. In some modes, these engines necessarily exceed the standard specified. Therefore, the standards cannot be adopted as an absolute limit on emissions, which is the typical form of standards for stationary emission sources.

DISTRICT RESPONSE

In general, the District agrees with this assessment. (See also the response to Comment #3.) However, ARB is presently developing a field source test that will harmonize EPA certification tests with field test methods used by state and local agencies to ensure rule compliance.

As an interim measure, where a source elects to replace an existing engine with a certified engine, the District proposes accepting EPA or ARB certification in lieu of an initial source test for the purposes of demonstrating compliance with Rule 69.4.1 emission standards. Subsequent compliance tests will be specified in the rule as contingent on a test method developed by ARB.

21. WRITTEN COMMENT

The mobile source standards of EPA mobile source programs allow fleet and model-year engine averaging, trading, and the payment of non-conformance penalties as alternatives to strict and uninterrupted compliance with stated standards for each and every engine. Because this flexibility does not exist in stationary source programs, these standards may not rationally be carried across to stationary engines.

DISTRICT RESPONSE

According to current information, some engine manufacturers already make diesel engines of various sizes which comply with the EPA Tier 1 standards. The latest draft of proposed Rule 69.4.1 incorporates EPA's Tier 1 NOx emission standards promulgated by EPA in 1994 and which are already in effect for engines rated at 750 bhp or smaller and manufactured in the United States. For larger engines, these standards will be effective by January 2000. Every new engine must meet

EPA's Tier 1 standards to be certified because the averaging provision for Tier 1 engines does not apply for off-road diesel engines operating in California.

22. WRITTEN COMMENT

Some of the federal emission standards for off-road diesel engines are not yet effective, therefore diesel engine manufacturers are not yet offering a full range of products that meet these standards. As proposed, Rule 69.4.1 would require that existing diesel engines be replaced with engines that, in some cases, are not yet available for purchase.

DISTRICT RESPONSE

Please see the response to Comment #21.

23. WRITTEN COMMENT

There is a danger that a technology-forcing (or technology anticipating) rule would impose significant costs on sources who have replaced diesel engines recently, or who were compelled to replace engines before new, fully compliant engines were available. The District should not promulgate a rule that requires engines to be retired too early in their economic lifetime.

DISTRICT RESPONSE

Tier 1 complying diesel engines are available in a variety of sizes. If a recently installed diesel engine was recently manufactured, the diesel engine is likely to have low NOx emissions and should be able to meet the proposed rule standards without modification. Some modifications may be required for some existing engines to meet rule standards. Cost-effective emission control techniques such as turbocharging, aftercooling, and fuel injection timing retard are available, as well as the option of installing add-on control equipment. .

24. WRITTEN COMMENT

Cost-effectiveness calculations should not be based on potential emissions from diesel engines because many of these engines are not used intensively and, therefore, emit far less NOx than their potential to emit (PTE). A new cost-effectiveness analysis should be conducted based on actual fuel use profiles for engines, before the District determines whether presumed control measures are cost-effective.

DISTRICT RESPONSE

The District disagrees. Typically, the District's rule development analysis includes cost-effectiveness calculations based on PTE as reflected in permit conditions. Actual emissions based on historical fuel use or mode of operations would not necessarily reflect future use of an engine. There is no assurance that an engine will not be operated at up to permitted levels at some time in the future. Moreover, emission reductions are typically based on emissions allowable under the proposed rule, even though actual future emissions may be less.

If an engine operator were to apply for and accept current operating levels as enforceable permit conditions, these "actual" emissions will be used for cost-effectiveness calculations.

25. WRITTEN COMMENT

"BARCT" stands for "best available retrofit control technology." While the definition of BARCT in state law does not repeat the term "retrofit," the use of the word "retrofit" in the term itself carries even more force. Moreover, looking to the history of how this term has been applied in California, it is clear that BARCT standards must be based on retrofit technologies - not on the replacement of grand-fathered or permitted equipment.

DISTRICT RESPONSE

The District disagrees. The proposed rule does not require engine operators to replace engines. The rule standards can be achieved either by engine combustion modifications, add-on control devices, or by engine replacement. The engine operator selects how compliance will be achieved.

BARCT is not a specific "retrofit" technology; it is defined in the state Health and Safety Code as "an emission limitation." Consequently, as stated in the ARB guidance document "Determination of Reasonably Available Control Technology and Best Available Retrofit Control Technology," published in 1990, the emission limitation determined to be BARCT can be achieved by different means, such as "add-on controls, process modifications, alternate fuels, etc."

The proposed emission standards, and options for compliance, in Rule 69.4.1 meet the Health and Safety Code and ARB definitions of BARCT.

26. WRITTEN COMMENT

The workshop report should identify the retrofit control technology that the District has determined is achievable, considering economic and other factors. The expected cost-effectiveness of that retrofit technology for each distinct application of the technology should also be disclosed, and the analysis underlying that cost-effectiveness determination discussed.

DISTRICT RESPONSE

The District has determined that add-on control technologies such as NOx catalytic reduction (selective catalytic reduction (SCR) and others); combustion modifications such as turbocharging, aftercooling, fuel injection timing retard; and diesel engine replacement with new, cleaner engines are the control technologies that have been proven feasible and cost-effective for diesel engines. The proposed standards and emission control requirements of Rule 69.4.1 were derived based on a District analysis of the technological and economic feasibility of these available control options for IC engines, conducted in the earlier stages of rule development. The number of engines known to the District to be affected by the rule, their NOx emissions, and expected emission reductions were evaluated using the District permit and registration database, EPA and manufacturers' supplied NOx emission factors, and estimated control efficiencies and costs of NOx emission reduction technology. Some of this information has already been provided to interested parties and is available from the District upon request.

However, the workshop report is not a proper instrument to discuss these issues in depth. The technological and economic feasibility of the proposed rule, including the expected cost to industry and the cost-effectiveness of various control options, will be addressed in detail in the Socioeconomic Impact Analysis (SIA) to be conducted as a part of the Rule 69.4.1 development

process. The SIA is prepared after the public workshop and comment process is completed and will be made available for public review and comment. This analysis will include the absolute and incremental cost-effectiveness of the various control options for complying with Rule 69.4.1.

27. WRITTEN COMMENT

It is understood that the District has concluded that selective catalytic reduction is not BARCT for diesel engines. This conclusion is agreeable, and the ARB comments do not state that SCR is BARCT for these engines. The workshop report should state that SCR is not BARCT for diesel engines in San Diego.

DISTRICT RESPONSE

The District did not conclude that SCR is not a BARCT option for all types and sizes of engines. SCR is technically feasible and cost-effective for some natural-gas fired engines and large diesel engines. In some cases, the cost of installing SCR will be significant and replacing an engine with an electric motor or certified engine will be preferred options for an operator. The proposed rule allows for those options. As stated in the response to the previous comment, such issues cannot be fully and efficiently discussed in the workshop report. They will be addressed in detail in the Socioeconomic Impact Assessment.

28. WRITTEN COMMENT

It is understood that the District is basing diesel engine standards on work done to support ARB regulations, as specified in the California Code of Regulations (13 CCR Section 2423), for new, off-road diesel engines. If the District intends to continue down this path, the workshop report should clearly state that this is the technical basis for the proposed rule. It is believed that the use of standards developed for new diesel engines is not appropriate in a BARCT rule, unless there is technical evidence to show that those standards can be met using feasible and cost-effective retrofit technologies.

DISTRICT RESPONSE

Proposed Rule 69.4.1 does not specify engine replacement as the only option to achieve compliance. The emission standards specified in the rule for diesel engines have been achieved in practice. There are some stationary diesel engines presently installed in San Diego County that already comply with the proposed rule limits. Some other engines can be modified to comply. Some older engines can achieve these standards by retrofitting with technically feasible and cost effective, add-on control technology. An operator may also elect to replace an existing engine with a new, cleaner engine or an electric motor. Engines are, or will shortly be, available which will comply with the proposed rule.

29. WRITTEN COMMENT

Rule 69.4.1 as proposed appears to interpret state law requirements, for the implementation of all feasible measures, to require the replacement of existing pollution emitting equipment. The workshop report should state whether this is truly the District's interpretation of this requirement.

DISTRICT RESPONSE

The California Clean Air Act requires the District to adopt rules reflecting BARCT and all feasible control measures. Rule 69.4.1 is intended to fulfill both requirements as they would apply to internal combustion engines. Proposed Rule 69.4.1 does not specify replacement as the only means to achieve compliance. It is one of several options that can be selected by engine operators. (See also the District response to Comment #28.)

30. WRITTEN COMMENT

The workshop report should clearly state which standards in proposed Rule 69.4.1 are based on BARCT, rather than on "all feasible measures" determination.

DISTRICT RESPONSE

The standards in proposed Rule 69.4.1 are intended to fulfill both BARCT and "all feasible measures" requirements. Therefore, the standards in proposed Rule 69.4.1 cannot be categorized as based on either BARCT or "all feasible measures." The California Clean Air Act requires that the District 's program to achieve state standards satisfy both the requirements for "all feasible measures" and for BARCT.

31. WRITTEN COMMENT

The Air Resources Board has not issued any final guidance identifying replacement-based standards as "feasible measures" for the diesel engines that would be affected by Rule 69.4.1. The District has provided no data or analysis to show that work done in support of the standards in 13 CCR Subsection 2423 for new, off-road diesel engines also supports the standards proposed in Rule 69.4.1 for existing stationary source engines.

DISTRICT RESPONSE

While ARB has not yet issued its final RACT/BARCT determination for reciprocating internal combustion engines, the draft determination contains significantly lower emission standards for diesel engines than both the proposed District rule and the state regulation for off-road diesel engines.

The District's calculations show that replacement of existing diesel engines with new ones certified by ARB or EPA, if chosen as an option for complying with Rule 69.4.1, is cost-effective for diesel engines operating at a capacity factor of 15% or higher. Engine modifications or retrofitting with add-on control equipment are also cost-effective options. This information will be provided in more detail in the Socioeconomic Impact Assessment for Rule 69.4.1.

32. WRITTEN COMMENT

Any interpretation of the all feasible measures requirement that encompassed replacement equipment would be a radical change in the application of this state law, with potentially huge implications for San Diego. Until now, "feasible measures" rules have been about additional controls on existing equipment, or about lower VOC coatings, not about the mandated replacement of existing

equipment. Any change in this approach should be carefully thought through, particularly since this appears to be a local rather than a state-mandated approach to implementing state law.

DISTRICT RESPONSE

Please see the District responses to Comment Nos. 25, 28, 29, and 31. Again, Rule 69.4.1 does not mandate engine replacement. This is just one option available to comply with the proposed rule.

33. WRITTEN COMMENT

The 1998 Regional Air Quality Strategy (RAQS) described proposed Rule 69.4.1 as a BARCT rule, not as an all feasible measures rule. The more stringent requirements of Rule 69.4.1 were not part of the 1998 RAQS.

DISTRICT RESPONSE

State law requires the District to adopt rules for sources emitting ozone precursors that reflect BARCT and provide annual 5% emission reductions. If this last goal is not achievable, the District must also expeditiously adopt "every feasible control measure." The RAQS update addresses all feasible control measures that are included in the District's attainment plan. Adoption of Rule 69.4.1, which also reflects BARCT requirements for IC engines, is one of the "feasible measures" contained in the RAQS. The District also committed to adopt Rule 69.4.1 as an "all feasible measure" when it requested ARB approval to repeal state emission offset requirements from the New Source Review (NSR) rules.

34. WRITTEN COMMENT

Rule 69.4.1 would require replacement for IC engines that are otherwise exempt to meet the standards set out in the rule. Until now, control issues related to equipment replacement have been addressed under NSR Regulation, which typically results in the installation of BACT controls. Because BACT is presumably as or more stringent than BARCT, it seems to be an excessive measure to require replacement of these engines on an accelerated schedule.

DISTRICT RESPONSE

The proposed rule does not require replacement of engines, including those that are otherwise exempt from the emission standards. Compliance with the proposed emission standards is only required if an engine currently exempt under the proposed rule is replaced.

35. WRITTEN COMMENT

The proposed rule requires an engine's operational characteristics be monitored, in some cases on a continuous basis. This requirement is burdensome and unnecessary.

DISTRICT RESPONSE

Rule 69.4.1 monitoring requirements only apply to those operational characteristics which are necessary to demonstrate compliance. In many cases, permit conditions or manufacturers' specifications already require monitoring of these parameters. For example, for a rich-burn engine

that has a catalyst installed, a typical permit requires the operator to inspect the air-to-fuel ratio controller periodically, monitor the air-to-fuel ratio, and record the inspection and sensor replacement dates. For a lean-burn engine, permit conditions typically already specify that combustion air temperature should be monitored (through a computer control panel). For some engines, the inlet manifold temperature and pressure are specified in the District permit and should already be monitored.

Rule 69.4.1 rule does not require continuous monitoring of all operating parameters. This requirement will only apply if an add-on emission control device is installed. Manufacturers' specifications for add-on control equipment such as SCR would require operators to continuously monitor the ammonia to NOx ratio.

36. WRITTEN COMMENT

The recordkeeping requirements of the rule are burdensome and should be reduced to the extent feasible.

DISTRICT RESPONSE

The recordkeeping requirements specified in the rule are necessary to ensure on-going compliance with the emission standards. Subsections (g)(4), (5), and (6) provide examples of the necessary records. Depending on the type of engine and the emission control system, these records may vary. Similar to the monitoring requirements, permit conditions for many existing engines already specify similar recordkeeping requirements (e.g., records of inspection of catalytic converters, records of engine manifold temperature and pressure). The owners of these engines are complying with these permit conditions.

37. WRITTEN COMMENT

Subsection (b)(2)(i) should be revised to include any existing engine with an annual fuel usage less than the maximum fuel usage, in gallons per hour, multiplied by 200, provided that the fuel usage is verified by a non-resettable, totalizing fuel meter.

DISTRICT RESPONSE

Allowing the exemption based on the maximum hourly engine fuel usage multiplied by 200 may result in a NOx emission increase compared to the proposed exemption for engines operating less than 200 hours at actual fuel use. In addition, the proposed ARB RACT/BARCT Guidance only exempts engines operating less than 100 hours. The District is currently evaluating the NOx emission impact of the exemption suggested in this comment and is consulting with ARB regarding their comment on the 200 hours exemption. Please, see also ARB comment #74.

38. WRITTEN COMMENT

The proposed rule should specify that if an engine is exempt from the rule emission standards based on its annual fuel usage in accordance with Subsection (b)(2), the engine annual fuel usage must be monitored and recorded.

DISTRICT RESPONSE

Please refer to the District response to the previous Comment #37. If a suggested exemption based on annual fuel use is included in Rule 69.4.1, Subsection (g)(2)(ii) will be revised to require a meter to measure fuel use and a record of annual fuel use.

39. WRITTEN COMMENT

It is requested that the proposed rule provide an exemption for engine test cells or any engine that is being operated within a permitted test cell. This exemption shall be in effect during the period the engine is operated within the test cell. The time the engine is operated within this test cell shall not count toward the 200 hour limit of Subsection (b)(2)(i).

DISTRICT RESPONSE

The District agrees. Subsection (b)(2) has been revised to include an exemption for engines operating exclusively within permitted test cells for research, development, or testing reciprocating engines or their components. This exemption has no restriction on operating hours.

40. WRITTEN COMMENT

Documentation of the combustion method pursuant to Subsection (g)(1)(iii) is unnecessary because existing emergency standby engines are not subject to the standards based on combustion method. This recordkeeping requirement exposes emergency generator operators to needless enforcement risk.

DISTRICT RESPONSE

Replacement emergency standby, low-use, and cyclic engines will be subject to the emission standards of the rule based on their combustion method. Therefore, a record of the combustion method is needed to facilitate compliance determinations. However, if this information is accurately provided in a District permit or registration certificate, a separate facility record would seem unnecessary. Subsection (g)(1) has been revised to reflect this.

41. WRITTEN COMMENT

What documents are required to demonstrate that a specific fuel is "California Diesel Fuel," pursuant to Subsection (g)(1)(iv)? For diesel fuel purchased from multiple suppliers, there has not been any consistency in the documentation provided to certify that the fuel meets the ARB specifications.

DISTRICT RESPONSE

According to current information, fuel specification sheets which indicate whether the fuel is a California Diesel Fuel are readily available from the fuel suppliers.

42. WRITTEN COMMENT

The proposed rule would require emergency generator operators to monitor operating parameters and keep records not otherwise required under Rule 12. The language of Subsection (g)(1)(v) appears to give the District approval authority over the frequency and extent of the maintenance program, disguised as additional recordkeeping requirements.

DISTRICT RESPONSE

Subsection (b)(2), in the last paragraph, specifies the requirement for annual maintenance of exempt engines. A record of the maintenance must be kept. Maintenance must follow manufacturer's recommendations, or an alternative procedure must be approved by the District. The records required by Subsection (g)(1) and (g)(2) are necessary to ensure on-going compliance.

43. WRITTEN COMMENT

The records of cumulative annual hours of operation pursuant to (g)(2)(ii) are redundant and exposes emergency standby engine operators to needless enforcement risk. This information should not be required.

DISTRICT RESPONSE

The District disagrees. These records are necessary to enforce the rule exemption in Subsection (b)(2)(ii) which limits emergency standby engines to not more than 52 hours of operation per year for non-emergency purposes.

44. WRITTEN COMMENT

For rich-burn engines, the only feasible control option is Non-Selective Catalytic Reduction (NSCR). It is doubtful that any rich-burn engine, even with NSCR-type controls, could achieve compliance with a limit of 25 ppmv at 15% oxygen. These requirements will result in the shutdown of rich-burn engines.

DISTRICT RESPONSE

The NOx emission profiles of rich-burn engines already operating in San Diego County indicate that about two-thirds of these engines are able to meet the 25 ppmv NOx emission limit at 15% oxygen. Proper maintenance of the NSCR system, including frequent catalyst washing and replacement, proper maintenance of the air-to-fuel ratio controller and the exhaust oxygen sensor, and proper maintenance of the engine would help maintain low NOx emissions. The draft ARB RACT/BARCT Guidance for internal combustion engines also proposes a 25 ppmv NOx emission standard for rich-burn engines. In addition, many California air districts already have rules specifying this NOx emission limit for rich-burn engines.

45. WRITTEN COMMENT

The emission reduction requirement of 96% for rich-burn, gas engines from the uncontrolled level is too stringent, based upon reviews of available literature. A more reasonable and achievable limit should be in the range of 80% to 90%.

DISTRICT RESPONSE

The ARB draft RACT/BARCT Guidance for internal combustion engines proposes 96% reduction of NOx emission from rich-burn, gas engines. EPA's Alternative Control Techniques Document on NOx Emissions from Stationary Reciprocating Internal Combustion Engines indicates NOx emission reduction efficiencies of up to 98% with NSCR. Manufacturers of NSCR guarantee that properly sized catalysts with proper engine air-to-fuel ratio will achieve 98% NOx emission reduction.

46. WRITTEN COMMENT

The NOx limits for rich-burn engines in proposed Rule 69.4.1 represent a level better defined as BACT, not BARCT.

DISTRICT RESPONSE

There are many cases where the emission control levels for BACT and BARCT are the same. For example, the BACT control level for small commercial and industrial boilers is the same as the BARCT level for these boilers. The NOx limit proposed for Rule 69.4.1 is achievable and cost-effective, is consistent with ARB's draft RACT/BARCT Guidance, and is consistent with the BARCT rules of other California air districts.

47. WRITTEN COMMENT

It is believed that the District has discretion in setting the BARCT emission standards and is not mandated by state law to adopt the standards presently specified in Rule 69.4.1 for rich-burn engines.

DISTRICT RESPONSE

State law allows each air district to establish BARCT emission control levels based on available control options (i.e. technological feasibility) and cost-effectiveness. Accordingly, in setting Rule 69.4.1 standards, the District has considered potential control options for rich-burn engines, evaluated the associated technical feasibility and costs, and determined that the proposed emission limit is technically feasible and cost-effective.

48. WRITTEN COMMENT

Internal combustion engines used for research, development, and testing of turbine engines and their components should be exempt from the requirements of Rule 69.4 and 69.4.1. Turbine start engines are usually new Caterpillar engines and are used for less than 30 minutes for each start sequence for a total run time of two to 10 hours prior to shipment.

DISTRICT RESPONSE

The District agrees. Rule 69.4.1 has been revised to exempt reciprocating internal combustion engines used for research, development, and testing of turbine engines and their components.

49. WRITTEN COMMENT

Emergency standby engines operated less than 52 hours per year should have streamlined recordkeeping requirements. These engines should be allowed to demonstrate compliance with the exemption using the hour meter that automatically records engine run times. Any operations of less than 52 hours per year should be considered as routine for maintenance, insurance verification runs, and typically intermittent emergencies. Accordingly, subsection (g)(2)(i) should be required only when the engine's operation time exceeds 52 hours per year.

DISTRICT RESPONSE

Rule 69.4.1 only limits non-emergency operations, not emergency operations. Therefore, the District needs to know whether operations were for emergency or non-emergency purposes. The District has the flexibility to consider alternative recordkeeping on a case-by-case basis, if the alternative will ensure compliance with Rule 69.4.1. For example, a permit or registration certificate could be issued with a condition that requires only that total operating hours (emergency and non-emergency) be recorded and that limits total operating hours to 52 per year. However, the District would be concerned that an operator could not always predict future emergency operation of the engine and might risk a situation where emergency operation of the engine would cause a violation of the more stringent permit or registration operating limits.

50. WRITTEN COMMENT

For engines operated by contractors at a stationary source, the rule should specify if the contractors are responsible for compliance with the rule requirements.

DISTRICT RESPONSE

Generally, both the contractor and the host stationary source are responsible for compliance. Either or both could be cited for non-compliance. The same is true for other types of equipment/activities subject to other District rules being operated by a contractor. Singling out Rule 69.4.1 to specify responsibility would be inappropriate.

51. WRITTEN COMMENT

It is believed that new and existing emergency standby engines should be exempt from Rule 69.4.1 based on their minimal hours of operation plus the presence of other conflicting regulations. ARB's RACT/BARCT Guidelines suggests such engines be exempt from BARCT. Moreover, District Rule 12 exempts them as well. The exemption from proposed Rule 69.4.1 should apply to both emission standards and expanded recordkeeping, testing, and monitoring procedures.

DISTRICT RESPONSE

Existing emergency standby engines operating less than 52 hours per year for maintenance or other purposes are presently exempt from all the rule requirements except limited recordkeeping. These records are similar to those required under Rule 12 or existing permits, and are needed to ensure rule enforceability. The proposed draft of ARB RACT/BARCT Guidance has similar requirements for standby engines.

For new or replacement engines operating less than 200 hours per year or as emergency standby engines, the District is proposing to exempt these engines from all monitoring, recordkeeping, and testing requirements, except for the requirement of Subsection (e)(3) to install a non-resettable, totalizing fuel meter or elapsed operating time meter. The District will accept EPA or ARB certification data as a surrogate for a field compliance test for these engines.

52. WRITTEN COMMENT

It is the District's intent to harmonize the proposed Rule 69.4.1 emission standards for new, high-use diesel engines with the ARB standards for new diesel, off-road engines, as published in the California Code of Regulations. However, those standards will not be implemented, as ARB will replace them with the ones that match the EPA's standards for off-road engines. It is suggested that the District harmonize Rule 69.4.1 emission standards with the ARB and EPA standards, which will provide greater air quality benefits because EPA's Tier 2 off-road emission standards are more stringent than those proposed in Rule 69.4.1.

DISTRICT RESPONSE

The District agrees. However, the District has analyzed the emission reduction profile, over a 10-year compliance period, of Tier 1 versus Tier 2 engines. Although Tier 2 engines will have lower NOx emission rates, the Tier 2 implementation schedule stretches over a number of years. Tier 1 engines can produce greater aggregate emission reductions sooner. In order to achieve emission reductions expeditiously, the rule has been revised to incorporate emission standards for stationary diesel engines that are the same as the EPA Tier 1 off-road diesel engine emission standards. Engines complying with these standards are presently available in many models and sizes. In the future, the District will evaluate developing NOx control technologies that may be technologically feasible and cost-effective to further retrofit engines and achieve additional emission reductions. If appropriate, the District will propose revisions to Rule 69.4.1 at that time. Please see also the response to Comment #1.

53. WRITTEN COMMENT

For high-use diesel engines, the 450 ppmv NOx standard (equivalent to 5.8 g/bhp-hr), if effective January 1, 2001, represents a greater degree of stringency than its EPA off-road engine counterpart, since manufacturers are developing off-road engines to meet the EPA Tier 2 standards (4.9 and 4.8 g/bhp-hr combined NOx and HC, respectively) by January 1, 2003, and January 1, 2002, respectively.

DISTRICT RESPONSE

Please see the response to the previous Comment #52.

54. WORKSHOP COMMENT

How would the District review maintenance records for engines that are exempt by Subsection (b)(2) but are required to conduct annual maintenance and maintain records in accordance with Subsections (g)(1) and (g)(2)? How would the cost of the review be recovered?

DISTRICT RESPONSE

The District will review the maintenance records using the same program as is used now to enforce permit or registration certificate requirements for stationary IC engines. Many engines rated at 50 bhp or larger and all engines rated above 200 bhp, including emergency generators and other engines that will be exempt from the emission control requirements of Rule 69.4.1, are subject to District permit or registration requirements. Currently, permit conditions for these engines require operators to keep certain records, such as cumulative hours of operation or the amount of fuel usage, sulfur content of fuels, etc. All permitted (or registered) engines are periodically inspected and their permit conditions are reviewed periodically to verify compliance. The cost of these inspections is recovered through the annual permit or registration renewal fees.

55. WORKSHOP COMMENT

How would the District review an engine maintenance procedure that is not available from the manufacturer?

DISTRICT RESPONSE

If the operator does not have the manufacturer's recommended maintenance procedure, an alternative maintenance procedure should be proposed and provided to the District for review and approval. The District would review the procedure for reasonableness and similarities with manufacturers' recommendations for similar engine types.

56. WORKSHOP COMMENT

Rule 69.4.1 proposed NOx emission standards are expressed as NOx emission concentration calculated at 15% oxygen. How do you convert NOx emission concentration calculated at 3% oxygen to its equivalent standard calculated at 15% oxygen?

DISTRICT RESPONSE

To arrive at the NOx emission concentration calculated at 15% oxygen, the NOx emission concentration calculated at 3% oxygen should be multiplied by a conversion factor of 0.3315.

57. WORKSHOP COMMENT

Why does the rule allow up to 12 months after the date of adoption to comply with the requirement of using California Diesel Fuel?

DISTRICT RESPONSE

The 12-month grace period was provided to allow sources to use their existing supply of diesel fuel which may not comply with California Diesel Fuel specifications. Based on information supplied by fuel distributors, diesel fuel shelf life is between 6 and 12 months, depending on storage conditions. However, current information shows that the majority of sources are already using California Diesel Fuel. Therefore, the rule has been revised to reduce the grace period to six months, allowing those sources that still do not use California diesel to exhaust their fuel supplies.

58. WORKSHOP COMMENT

Could the District provide a few examples of permitted engines with requirements to monitor air-to-fuel ratio?

DISTRICT RESPONSE

There are engines, both rich- and lean-burn, that have a condition of their permits requiring the operator to maintain the air-to-fuel ratio controller in proper order. Essentially, this condition requires to monitor the air-to-fuel ratio controller to assure that the catalytic converter is operating properly.

For example, a permit was issued by the District in 1994 for a Caterpillar rich-burn, natural-gas engine rated at 290 bhp and equipped with a catalytic converter and air-to-fuel ratio controller (Permit No. 900544). The permit states that the engine operator must comply with the following condition: "To maintain the 750 millivolt operating range of the oxygen sensor, the dip switch in the air-to-fuel controller shall be set as follows: FOOFOFOO, where O = on and F = off." In order to assure compliance with this condition, the engine operator must periodically monitor the air-to-fuel ratio controller setting, which is a surrogate for the air-to-fuel ratio.

59. WORKSHOP COMMENT

Based on annual test results, engines having good compliance records should be allowed to be tested on a less frequent schedule.

DISTRICT RESPONSE

Subsection (i)(1) of the proposed rule provides that an alternative source test schedule for engines subject to the emission control standards is allowable with the prior written approval of the District. The District, together with interested parties, is presently working on a policy allowing reduced source test frequency depending on emissions and history of compliance.

60. WORKSHOP COMMENT

How much emission reductions does the District expect to obtain from replacing emergency generators?

DISTRICT RESPONSE

There are approximately 900 emergency generators that either have permits or are registered in the District. The estimated NOx emissions from these generators based on their potential to emit, and assuming that each generator operates for 52 hours a year for non-emergency purposes as allowed by the proposed rule, are approximately 300 tons per year. This amount may be overestimated if all engines are operated at low- or no-load levels and emissions are correspondingly lower. However, some facilities such as telephone companies, prisons, etc., test their emergency generators at full load. In addition, the estimated emissions from emergency generators do not include emissions during emergency operations, and from those engines which still do not have District permits or registration.

The District has no data to predict when these existing engines might be replaced or the rate of turnover to new engines. However, assuming that one third of these engines are replaced during the next 10 years with EPA certified Tier 1 engines (i.e. the NOx emissions at 6.9 g/bhp-hr), NOx emission reductions will be approximately 50 tons per year.

61. WORKSHOP COMMENT

The District contends that NOx emissions from emergency generators operating for non-emergency purposes, i.e. 52 hours per year for testing and maintenance, as allowed by the proposed rule, are significant. However, it seems that in calculating these emissions the District assumed that the engines are operating at full load during the testing and maintenance. In reality, emergency generators never operate at full load during testing. Usually, they idle half the time, and then are brought to a full load for a short period of time. Therefore, the actual emissions may be only 10 or 15% of the District estimates.

DISTRICT RESPONSE

The District is planning to conduct several informational source tests on emergency generators of various sizes and age in order to obtain emission data for a typical test or maintenance operation. Emission estimates may be revised as a result.

62. WORKSHOP COMMENT

The proposed rule requires the NOx emission concentration for low-use and cyclic engines be no higher than 700 ppm at 15% of oxygen. However, the District source test provides for an averaging period of one hour. This must be reflected in the rule.

DISTRICT RESPONSE

The District agrees. Subsection (i)(3) of the proposed rule has been revised to address this comment.

63. WORKSHOP COMMENT

The Tier 1 EPA emission limits for engines rated at more than 750 bhp that are scheduled to be in effect on January 1, 2000, may be postponed.

DISTRICT RESPONSE

According to EPA and a representative of the Engine Manufacturers Association, these limits will be in effect on January 1, 2000. In addition, some off-road engines larger than 750 bhp have already been certified by either ARB or EPA and are presently available.

64. WORKSHOP COMMENT

The proposed rule provides an implementation schedule with the final compliance date several years after the date of adoption. If a person needs to buy an emergency generator now, and buys the engine not complying with the rule limits because it is not yet in effect, would this person need to replace the engine in a few years?

DISTRICT RESPONSE

No. Diesel engines that comply with proposed Rule 69.4.1 emission limits are already commercially available in most sizes. Complying engines larger than 750 bhp will be available after January 1, 2000.

65. WORKSHOP COMMENT

Since EPA certified engines are not available in all sizes, the rule should contain different implementation dates for newly purchased and replacement engines.

DISTRICT RESPONSE

Currently, EPA Tier 1 certified engines are available in sizes up to 750 bhp. Complying engines larger than 750 bhp will be available after January 1, 2000. Based on District information, the majority of newly installed engines are already in compliance with the Tier 1 emission standards.

66. WORKSHOP COMMENT

What would be the requirement for an engine installed today that complies with the EPA Tier 1 standards? If the rule has Tier 2 standards that will be in effect starting in 2004, would the rule require this engine's replacement?

DISTRICT RESPONSE

The revised proposed Rule 69.4.1 would allow EPA certified Tier 1 engines as an option to comply with the rule emission standards. These engines would not have to be replaced in future years with Tier 2 engines. However, if future technically feasible and cost-effective control technology becomes available that is applicable to Tier 1 engines on a retrofit basis, the District may propose to amend Rule 69.4.1 to require this.

67. WORKSHOP COMMENT

If an existing diesel engine is taken out of service and replaced by an electric motor, would the entire amount of emission reductions be eligible for banking?

DISTRICT RESPONSE

The Emission Reduction Credits (ERCs) would be discounted to account for compliance with RACT and BARCT (Rule 69.4.1) requirements. Also, the ERCs may be reduced to account for the emissions occurring at the electrical generation source.

68. WORKSHOP COMMENT

Why are the emergency generators operating at the nuclear power station allowed the exemption limit of 500 hours? These diesel engines at the nuclear power station are very large and will emit a significant amount of pollutants if they operate 500 hours per year, each.

DISTRICT RESPONSE

There are only four such engines in San Diego County, each rated at 8,000 bhp. They are emergency generators and are required by the Nuclear Regulatory Commission (NRC) to follow special operational testing procedures that may exceed 52 hours per year. Historical records show that they do not operate more than 65 hours per year each. Their total actual emissions do not exceed nine tons per year. The proposed 500 hour limit, although not expected to be needed, is to cover additional NRC required performance testing should there be problems during the regular operational testing. The District is continuing to evaluate whether these engines may be controlled or whether the exemption can be limited to a lower number of hours per year.

69. WORKSHOP COMMENT

It is suggested the District organize a workgroup with industry participation to discuss the issues which were raised today at the workshop. Several people may volunteer to participate in this workgroup.

DISTRICT RESPONSE

The District agrees. The District will contact people who volunteered to participate in the workgroup as well as others who might be interested.

70. WORKSHOP COMMENT

It is requested that the District establish a list of engines that will be affected by the proposed rule and provide information related to the cost and cost-effectiveness calculations of the rule as applied to these engines.

DISTRICT RESPONSE

The District has information available indicating the number of known engines in each category, i.e. rich-burn, lean-burn, low- and high-use diesel engines, and preliminary data for the costs and cost-effectiveness of various control strategies that can be used to comply with the proposed rule standards. This information is available upon request.

71. WORKSHOP COMMENT

The rule may be easier to use if it were reformatted to keep requirements for the same engine category (e.g., lean-burn engines) in one section and include there both standards and administrative requirements, i.e. recordkeeping and monitoring.

DISTRICT RESPONSE

Rule 69.4.1 format follows the format of Rule 69.4, which regulates IC engines at major sources of NOx emissions, and most other District rules. However, the District will consider this proposal and will present it to the working group for discussion.

72. WORKSHOP COMMENT

Subsection (d)(2) of the proposed rule requires engine operators to keep records of engine maintenance even for engines exempt from the rule's emission standards. How does the District envision getting these records reviewed and how will the costs of these reviews be recovered?

DISTRICT RESPONSE

These engines are presently either permitted or registered with the District. They are inspected periodically to verify hours of operation or fuel usage. The cost of these inspections is recovered through permit or registration renewal fees. When this equipment is inspected by the District, there would be a review of the maintenance records. The cost for the District will also be recovered through renewal fees.

However, if the source does not currently have a manufacturer's recommended maintenance procedure, they should either obtain it from the manufacturer or propose to the District a maintenance plan for review. The cost of this review may also be covered by renewal fees. However, if these fees are not sufficient, the source may be asked to apply to modify its permit or registration and pay fees to cover District costs.

73. WORKSHOP COMMENT

Does the District believe that the lack of maintenance results in an emission increase and therefore the records will help to reduce pollution? This requirement will certainly be costly for affected sources.

DISTRICT RESPONSE

Yes. Some engines can be a significant source of air pollution if their owners do not adhere to a recommended maintenance schedule and procedures. The requirement to conduct engine maintenance is one of the strategies to reduce air pollution from IC engines and can be expected to preserve engine performance. The requirement to keep records of the maintenance provides the District a tool to better ensure compliance with the maintenance requirement.

74. ARB COMMENT

It is recommended that the District reduce the hours of operation for exempt engines from 200 to 100 hours to get additional NOx reductions. This is consistent with the provision in the draft RACT/BARCT determination for the internal combustion engines.

DISTRICT RESPONSE

The District will further evaluate whether controlling emissions from existing engines with such low use is cost-effective and technologically feasible. Proposed Rule 69.4.1 requires that at the time these engines are replaced they must comply with the rule emission limits for non exempt engines. This provision will ensure future emission reductions for engines that are presently exempt from the rule emission limits.

75. ARB COMMENT

It is suggested that the District consider setting the NOx limit for high-use diesel engines at 80 ppmv at 15% oxygen, or 90% reduction in order to obtain additional NOx reduction. This limit is based upon the use of SCR as emission control technology. Evaluation indicates that SCR could be a cost-effective control technology for diesel engines.

DISTRICT RESPONSE

The District agrees that for some high-use diesel engines, SCR is a cost-effective control technology. Therefore, proposed Rule 69.4.1 has an option of using add-on control on diesel engines provided that uncontrolled NOx emissions are reduced by not less than 90%. SCR technology can be used by sources electing this option. However, current information also shows that SCR installations incur high operation and maintenance costs. Therefore, mandating this level of control may result in significant overall costs to industry and have adverse socioeconomic impacts. Moreover, the District has been unable to identify any existing diesel fueled engines in the United States that have been retrofitted, and are operating with, SCR controls.

The District will further consider all technically feasible control options for Rule 69.4.1 in the Socioeconomic Impact Assessment. State law requires the District to determine the overall cost of a proposed regulation to industry including costs to small businesses, to consider socioeconomic impacts of the proposed rule and to minimize adverse socioeconomic economic impacts.

76. ARB COMMENT

Section (i) states that source testing shall be performed at no less than 80 percent of the brake horsepower rating. As an alternative, it is recommended that the District consider changing the wording so that testing is conducted at the engine's peak actual load and under the engine's typical duty cycle or operational mode.

DISTRICT RESPONSE

The District agrees. Section (i) has been revised to specify testing at 80 percent or greater of the brake horsepower rating or, with District approval, the highest achievable continuous horsepower rating or under the typical duty cycle or operational mode of the engine. These requirements will likely need to be further clarified depending on the field testing procedure ARB is developing for verifying on-going compliance of certified diesel engines.

AIR POLLUTION CONTROL DISTRICT
SAN DIEGO COUNTY

PROPOSED NEW RULE 69.4.1 - STATIONARY RECIPROCATING INTERNAL COMBUSTION ENGINES - BEST AVAILABLE RETROFIT CONTROL TECHNOLOGY

WORKSHOP REPORT

A notice for a second workshop for proposed Rule 69.4.1 was mailed to all known owners and operators of stationary reciprocating internal combustion (IC) engines in San Diego County. Notices were also mailed to all Economic Development Corporations and Chambers of Commerce in San Diego County, the U.S Environmental Protection Agency (EPA), the California Air Resources Board (ARB), and other interested parties. The workshop was held on February 17, 2000. Oral and written comments were received during and after the workshop from affected businesses and ARB. The comments and District responses are as follows:

1. WRITTEN COMMENT

The proposed rule specifies that emergency standby engines and engines operated less than 200 hours per year are subject to source test requirements. Given the stringent annual operating restrictions placed upon emergency units, the additional requirement to source test every 24 months is excessive and unproductive. The District should exclude emergency standby engines and engines operated less than 200 hours per year from source test requirements by deleting Subsection (j)(5)(v).

DISTRICT RESPONSE

The District agrees. Based on the limited annual use of these engines, Subsection (b)(3) has been added to exempt these engines from the biennial Subsection (i)(1) source test requirements.

2. WRITTEN COMMENT

The District should revise paragraphs (h)(1)(iv) and (i)(5)(ii), which implement source testing requirements for EPA/ARB certified engines that participate in the federal Averaging, Banking and Trading (ABT) program. The ABT program includes not only engine families exceeding the certified emission level, but also engine families below the certified emission level. Therefore, source testing should not be required for engines participating in the ABT program.

DISTRICT RESPONSE

See the District response to Written Comment No. 3.

3. **WRITTEN COMMENT**

The District seems concerned that units participating in the ABT program may be "credit users" and therefore higher emitters than engines that are not ABT participants. However, there is no reason to assume that the net effect of these engines would outweigh the emission effect of the credit-generating units sold in the District. Since there is no basis to assume that the presence of the ABT engines will have an adverse environmental impact, source testing should not be required to demonstrate compliance.

DISTRICT RESPONSE

While some engines participating in the ABT program may have emission rates that comply with the Rule 69.4.1 requirements, all engines subject to Rule 69.4.1 must comply with the Section (d) emission limits. The rule initially proposed source testing (once an acceptable test method is developed) for any engine participating in the ABT program to ensure the engine operated at or below allowable emission levels. However, the rule has been revised to only require initial and ongoing source testing (once an acceptable test method is developed) for engines belonging to engine families participating in the ABT program whose certified emissions are greater than 6.9 grams per brake horsepower (g/bhp). Engines belonging to such families must be able to demonstrate individual compliance with the Section (d) emission limits.

4. **WRITTEN COMMENT**

How did the District determine that some engines are no longer considered 'portable' for the purpose of Rule 69.4.1?

DISTRICT RESPONSE

Permits for portable engines typically contain a requirement to notify the District upon relocation to another stationary source. If a relocation notification was not submitted to the District, or a notification showed the equipment resided at one location for more than 12 consecutive months, the equipment was no longer considered 'portable' for the purposes of evaluating the impacts of proposed Rule 69.4.1.

5. **WRITTEN COMMENT**

The Rule 20.1 definition for Portable Emission Unit states that the days portable emission units are stored in a designated holding or storage area shall not be counted toward the 12-month residence limit, provided the emission unit was not operated on that calendar day except for maintenance and was in the designated holding or storage area the entire calendar day. Does there have to be a central designated holding area or can the engine's normal work site, where greater than 50 percent of the engine operation occurs, be designated as the holding or storage area?

DISTRICT RESPONSE

For storage time to not count toward the 12-month residence limit, the engine must be stored in a designated storage area. The engine's normal work site does not qualify as a designated storage area.

6. WRITTEN COMMENT

What types of records are necessary to sustain a claim that an engine was in a designated holding or storage area?

DISTRICT RESPONSE

The owner or operator of a portable engine must maintain records which indicate the date and time of the engine's entrance and exit from the designated storage area.

7. WRITTEN COMMENT

Subsection (g)(2) states that the records specified in Subsection (g)(2)(i) are not required if total engine operations for any purpose do not exceed 52 hours per calendar year. If an engine operator maintains the records specified by (g)(2)(i), to ensure records would be available if annual operations exceeded 52 hours, could these records be used to justify issuance of a Notice of Violation?

DISTRICT RESPONSE

The engine operator must be able to demonstrate that calendar year operations have been less than 52 hours. If the operator can show this using the required calendar year records and the current clock hour reading, then individual operation records are not required to be maintained, and it would not be necessary to provide such records for inspection. However, if the records or engine hour meter show annual, non-emergency operating hours greater than 52 hours, they could be used to determine compliance.

8. WRITTEN COMMENT

Subsection (b)(1)(v) provides an exemption for any engine used exclusively in conjunction with military tactical support equipment 'operated at military sites.' This is not consistent with the State-Wide Portable Equipment Registration Program, which does not limit the operation of military tactical support equipment to military sites. The term 'operated at military sites' should be deleted.

DISTRICT RESPONSE

The District agrees. Subsection (b)(1)(v) has been revised to remove the term 'operated at military sites.'

9. WRITTEN COMMENT

The term 'after manufacturer' should be added to the definition of Add-on Control Equipment in Subsection (c)(1).

DISTRICT RESPONSE

The District disagrees. The function and installation location of the control equipment are the identifying characteristics of add-on control equipment.

10. WRITTEN COMMENT

The definition of Emergency Standby Engine in Subsection (c)(9) should be revised to include 'back-up to solar' as an allowable reason to operate the standby engine.

DISTRICT RESPONSE

The District disagrees. Emergency Standby Engines are to be used exclusively in 'emergency situations.' Subsection (c)(10) defines Emergency Situation as an unforeseen electrical power failure from the serving utility or of on-site electrical transmission equipment. The use of standby engine to supplement foreseeable interruptions to solar power (i.e. when the solar system does not generate enough power) is not an emergency situation.

11. WRITTEN COMMENT

The definition of High-use Engine would be more descriptive if it were revised to read "an engine operating at a capacity factor of greater than 15%," rather than "an engine that is not a low-use engine."

DISTRICT RESPONSE

The District agrees. The definition of High-use Engine has been revised as suggested.

12. WRITTEN COMMENT

The definition of Lean-burn Engine should clarify that compression ignition diesel engines are lean-burn engines.

DISTRICT RESPONSE

The District does not believe the suggested clarification is necessary. The fact that all compression ignition engines are lean-burn engines is common knowledge. For clarification, the District will revise the lean-burn engine definition to remove the term 'operating on gaseous fuel.'

13. WRITTEN COMMENT

Can JP5 jet fuel be used in place of California Diesel Fuel if it is recommended by the engine manufacturer to prevent carbon buildup in the engine exhaust stack?

DISTRICT RESPONSE

JP5 jet fuel can only be used if it meets the sulfur and aromatic hydrocarbon content limits specified for California Diesel Fuel. The District will review the technical basis for the engine manufacturer's recommendation to determine if an exemption should be provided for this specific engine.

14. WRITTEN COMMENT

Subsection (g)(2)(i) requires records be maintained of emergency engine operations, indicating, 'if available,' the nature of any emergency. Many of our engines are activated automatically whenever there is a slight power disruption. Occasionally, the engines will cycle on and back off before the actual cause of the power disruption is known. Would documenting engine operation activated automatically due to unknown power disruption as 'unknown nature' be acceptable?

DISTRICT RESPONSE

The nature of the emergency that triggered automatic operation of the standby engine must be recorded only if the cause is known. For interruptions of more than one hour, the District expects the cause can be determined and will be recorded.

15. WRITTEN COMMENT

Subsection (g)(2) exempts an emergency standby engine from the recordkeeping requirement of Subsection (g)(2)(i) if total engine operations for any purpose, including emergency situations, do not exceed 52 hours in a calendar year. How would this exemption apply to an emergency standby engine that is not expected to exceed 52 hours in a calendar year, except for occurrences of a periodic flood or fire?

DISTRICT RESPONSE

The exemption provided in Subsection (g)(2) only applies if total engine operating hours remain below 52 hours for the entire calendar year. Subsection (g)(2)(ii) requires that total cumulative hours of operation be recorded for each calendar year. If there is any chance that engine operating hours will exceed 52 hours in a calendar year, records of all engine operations should be maintained, since they will be required for the entire calendar year, pursuant to the requirements of Subsection (g)(2)(i).

16. WRITTEN COMMENT

Emergency standby engines are regularly "exercised" for short durations as part of a maintenance cycle. Are these exercises to be included in the maintenance records to be kept in accordance with Sections (h) and (g) requirements?

DISTRICT RESPONSE

Any practice included in the maintenance procedure recommended by the manufacturer, or specified by a maintenance procedure approved in writing by the District, must be recorded as part of the maintenance records.

17. WRITTEN COMMENT

Subsection (h)(1)(iii) requires NOx, volatile organic compound (VOC), and carbon monoxide (CO) emission concentrations to be calculated as an average based on the results of three subtests. Subsection (i)(4) states that the averaging period to calculate such emissions shall be one hour. Some engine tests have been performed in the past with an averaging period of 15 minutes. Will these provisions now require three one-hour subtests?

DISTRICT RESPONSE

Subsection (h)(1)(iii) has been revised. The averaging period for each of three subtests to calculate NOx, CO, and VOC emission concentrations must be at least thirty minutes and not more than 60 minutes, unless otherwise specified in writing by the Air Pollution Control Officer. The averaging period for each subtest can be shortened if deemed appropriate by the District.

18. WRITTEN COMMENT

Subsection (j)(2)(ii) requires submittal of an application to modify Permit to Operate conditions as necessary to comply with the applicable requirements of proposed Rule 69.4.1. Does this requirement also apply to registered equipment such as emergency standby engines?

DISTRICT RESPONSE

Section (j) only applies to engines subject to the emission limits of Section (d). Some currently registered engines will need to comply with the Section (j) requirements. However, since Subsection (b)(2)(ii) exempts existing emergency standby engines from the Section (d) emission standards, applications will not be required for existing emergency standby engines.

19. WRITTEN COMMENT

Non-emergency operation for the existing emergency standby engine located at the nuclear power generating station should be limited to 200 hours per calendar year rather than 100

hours as proposed. In addition, any testing mandated by the Nuclear Regulatory Committee (NRC) should not be counted against the 200 hour annual limit, provided the District is notified prior to such testing.

DISTRICT RESPONSE

Based on existing maintenance and preparedness requirements, the District agrees that it is more appropriate to allow up to 200 hours per year of non-emergency operation of the specified engine. However, the District does not believe it necessary to exclude any NRC mandated testing from the 200-hour annual limit. Subsection (b)(2)(iii) has been revised accordingly.

20. WRITTEN COMMENT

The District should establish an exemption for low-use diesel engines rated below 250 bhp. Such engines should be exempted from all emission standards and other rule requirements, except documenting annual fuel consumption.

DISTRICT RESPONSE

The District has reviewed the emissions related to the proposed exemption. If all known low-use diesel engines rated below 250 bhp were exempted from the proposed 9 g/bhp hour NOx standard, forgone emission reductions of 9.8 tons per year of NOx could result. Additional NOx emission reductions would also be lost from any newly installed low-use engines, existing high-use engines converted to low-use, and engines currently exempted from permits.

The majority of existing low-use engines are uncontrolled or turbocharged. The cost-effectiveness of retrofitting uncontrolled engines with turbocharging and aftercooling ranges from $0.70 to $2.10/lb of NOx controlled. The cost-effectiveness of retrofitting turbocharged engines with aftercooling and timing retard ranges from $0.70 to $2.80/lb. These indicate that it is very cost-effective to control NOx emissions from these engines. Therefore, it is not appropriate to include the recommended exemption in Rule 69.4.1.

21. WRITTEN COMMENT

The District should exempt all low-use diesel engines which are already turbocharged and aftercooled from additional controls, all emission standards, and monitoring and recordkeeping requirements.

DISTRICT RESPONSE

The District has been conducting source tests to study the NOx emissions from low-use turbocharged and aftercooled engines to determine if the proposed exemption is appropriate. However, it has been difficult to schedule tests and obtain the necessary information. The District will not be able to propose such an exemption if there is insufficient data to support it.

22. WORKSHOP COMMENT

Subsection (g)(2) exempts emergency standby engines from the recordkeeping requirements of Subsection (g)(2)(i) if the engine's total calendar year operation does not exceed 52 hours. The District should allow a margin of error, such as thirty minutes to one hour, to avoid unnecessary violations.

DISTRICT RESPONSE

The District disagrees. The effect of allowing a margin of error would be to simply increase the exemption limit. The 52-hour exemption limit was chosen to be consistent with other District rules which already limit annual non-emergency use to 52 hours per year.

23. WORKSHOP COMMENT

Does the source testing requirement for certified engines participating in the ABT program apply only to Tier 1 certified engines? In the future, ABT engines under Tier 2 and Tier 3 engines may have NOx emissions lower than 6.9 g/bhp hour. Will these engines still be subject to testing requirements because they are ABT engines?

DISTRICT RESPONSE

The decision to require testing of Tier 2 and Tier 3 ABT engines will depend on the maximum allowable emission limits for averaging emissions from engine families of these two Tiers. The District has revised Rule 69.4.1 to exempt any ABT engine family with certified NOx emissions below 6.9 g/bhp hour from the source test requirements, consistent with Subsection (i)(5).

24. WORKSHOP COMMENT

Many companies have identical engines located at a single stationary source. Rather than test each individual engine, the test results of representative engines for each group of identical engines should be accepted.

DISTRICT RESPONSE

The proposed rule does not provide a testing exemption for similar or identical engines at the same stationary source. However, if testing demonstrates that identical engines perform similarly, the District may rely on a portable NOx analyzer to screen emissions and reduce the amount of additional source testing required.

25. WORKSHOP COMMENT

What type of documentation is required to demonstrate compliance with Subsection (d)(5) regarding the use of California Diesel Fuel?

DISTRICT RESPONSE

Fuel specification data sheets typically provided by fuel suppliers are adequate if they clearly indicate the fuel is "California Diesel Fuel."

26. WORKSHOP COMMENT

What type of documentation is required to demonstrate compliance with the emission standards of Section (d)? Will source testing be required for each engine to demonstrate compliance?

DISTRICT RESPONSE

For the initial compliance determination, source test data, portable analyzer data, manufacturer's emission data, or EPA approved emission factors may be used. For ongoing compliance determinations, a source test is required at least once every 24 months, unless the Air Pollution Control Officer specifies otherwise in writing. The District intends to use a portable NOx analyzer to determine if less frequent source testing is permissible on a case by case basis.

27. WORKSHOP COMMENT

Implementation of the proposed rule will cause a higher demand for source testing. This may cause delays in scheduling source tests due to a shortage of testing contractors, including the District.

DISTRICT RESPONSE

The District does not expect the testing requirements to create a shortage of contractors available to perform source tests. The District will make every effort to ensure adequate staffing to handle the increased source test demand. If this should become a problem in the future, it will be addressed at that time.

28. WORKSHOP COMMENT

According to Sections (h) and (j), all new or replacement engines operating less than 200 hours per year, or emergency standby engines, are subject to source test requirements, unless the engines are certified engines not participating in the ABT program. This requirement will impose unnecessarily high testing costs on such low-use engines.

DISTRICT RESPONSE

Please see the District response to Written Comment No.1.

29. ARB COMMENT

Subsection (g)(6) requires records be maintained for at least three years. While this may be appropriate for District requirements, its falls short of the five year record retention requirements for Title V sources. To improve stringency and to ensure compliance with Title V record retention requirements, it is suggested that Subsection (g)(6) be modified to include a five-year record retention requirement for Title V sources.

DISTRICT RESPONSE

The requirement for Title V sources to retain records for five years is a requirement of the Title V program specified in District Rule 1421(b)(iii). Therefore, it is not necessary to include this requirement in Rule 69.4.1 which applies to many non-Title V sites and only a few Title V sites.

30. ARB COMMENT

For high-use diesel engines, the NOx concentration limit should be 80 parts per million by volume at 15% oxygen, based upon the use of selective catalytic reduction (SCR) as an after-treatment emission control that has been evaluated as cost-effective for diesel engines.

DISTRICT RESPONSE

For some new high-use diesel engine installations, SCR is a cost-effective control technology. Proposed Rule 69.4.1 has the option of using add-on controls such as SCR on diesel engines provided that uncontrolled NOx emissions are reduced by not less than 90%. However, current information shows that SCR installations incur high operation and maintenance costs. Therefore, mandating this level of control may result in significant overall costs to facilities and have adverse socioeconomic impacts. Moreover, the District has been unable to identify any existing, operating diesel fueled engines in the United States that have been successfully retrofitted with SCR controls.

31. ARB COMMENT

An alternate approach to controlling NOx emissions from high-use engines would be to allow re-powering with certified on-road diesel engines instead of off-road engines. A review of test data for 1999 certified on-road diesel engines revealed that the majority meet NOx emissions of less than or equal to 4.0 grams p/bhp hour. This would be an additional NOx reduction of up to 40% below the emissions from certified off-road engines.

DISTRICT RESPONSE

On-road diesel engines are designed mainly to power highway heavy-duty vehicles, which undergo continuous changes in engine speeds. Off-road engines are designed for use in both constant speed, steady load applications such as generators, compressors, pumps or varying speed applications such as tractors, cranes. Off-road engines have design and control technologies similar to stationary engines. For stationary applications like generators, compressors, pumps, which most of the engines subject to the rule fall under, using an off-

road engine is the more feasible choice. In addition on-road engines are mostly available in small range sizes of 250 bhp to 600 bhp, while off-road engines are available in a wider range of bhp.

32. ARB COMMENT

As the rule allows compliance with diesel NOx concentration limits by re-powering with off-road diesel fueled engines certified to Tier 1, Tier 2, and Tier 3 standards, would the District lower the emission limits as lower emitting engines become available?

DISTRICT RESPONSE

As the non-road engines of Tier 2 and Tier 3 become available, the District will review the associated data to determine if the emission limits of Rule 69.4.1 should be revised.

33. ARB COMMENT

The development of an in-field test method applicable to stationary engines and capable of verifying a certified off-road engine's compliance with specified emission standards may not occur for some time. Foregoing the periodic monitoring of a source's emission for compliance and the associated air quality impacts is an unsatisfactory situation. Until another test method is developed, it is recommended that the District use the methods mentioned in Subsection (h)(1). However, it should be noted that a certified engine's NOx value is the average of NOx concentrations measured under multiple operation conditions of the certification test cycle. Therefore, it is possible that the NOx concentration of an installed certified engine running at its typical load and duty cycle could exceed the 6.9 g/bhp hour emission standard.

DISTRICT RESPONSE

It is not reasonable to apply the testing requirements of Subsection (h)(1) to certified engines, since certified engines are tested by their manufacturers using the multiple mode test, with the final certified emission level being the average of emissions at multiple engine speeds and loads. Given the assurance that this average emission always complies with the certified emission level, the best alternative is to waive the testing requirements until an appropriate field test method is available. Such engines are required to perform periodic maintenance to assure proper operation. In addition, the District is considering using a portable NOx analyzer to survey actual emissions from certified engines. If these emissions are consistently or significantly higher than the certified levels, the District will report the results to ARB and EPA for evaluation and consideration of appropriate enforcement and mitigation actions.

34. ARB COMMENT

What is the District's approach to controlling diesel exhaust particulate matter (PM)?

DISTRICT RESPONSE

The District will likely apply ARB's forthcoming Risk Management for Permitting Stationary Diesel-Fueled Engines guidance, expected in September of this year, for permitting (or registering) new diesel engines and regulating diesel particulate emissions. The District may also apply this guidance to existing diesel engines requesting increases in fuel use or operating hours. The District will further regulate particulate emissions from existing diesel fueled engines by implementing the Air Toxic Control Measure that ARB plans to promulgate in the next few years.

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