



Air Pollution Control Board  
Brian P. Bilbray District 1  
Dianne Jacob District 2  
Pamela Slater District 3  
Leon L. Williams District 4  
John MacDonald District 5

Air Pollution Control Officer  
R. J. Sommerville

**DATE:** September 27, 1994  
**TO:** Air Pollution Control Board  
**SUBJECT:** Adoption of New Rule 69.4 (Stationary Reciprocating Internal Combustion Engines)

### **SUMMARY:**

Rule 69.4 is a new rule to control oxides of nitrogen (NO<sub>x</sub>) emissions from stationary reciprocating internal combustion engines. Oxides of nitrogen (NO<sub>x</sub>) are ozone precursors. The rule applies to piston engines located at major industrial sources of NO<sub>x</sub> emissions (currently those emitting 25 tons per year of NO<sub>x</sub> or more). The rule was developed to comply with the Reasonably Available Control Technology (RACT) requirements of the federal Clean Air Act. Failure to adopt Rule 69.4 for major industrial sources before October 21, 1994, will result in EPA imposing federal sanctions on San Diego County, including a 2.0 to 1.0 emission offset ratio for major new and modified industrial sources and withholding of up to \$75 million in federal transportation funds.

The rule applies to engines operated on both gaseous and liquid fuels. Affected sources can comply by meeting either concentration-based emissions standards or reducing uncontrolled NO<sub>x</sub> emissions by a specified percentage based on combustion conditions and type of fuel used.

The rule will affect a total of about 520 engines at seven major sources and will reduce NO<sub>x</sub> emissions by approximately 300 tons per year. All permitted engines operating on gaseous fuel or gasoline are already in compliance with the rule requirements. The majority of diesel engines will only be subject to recordkeeping requirements. Three engines currently exempt from permit requirements and operating on natural gas must install add-on control equipment, and approximately 50 diesel engines will need combustion modifications to comply with the emission standards.

The pending reclassification of San Diego County from a severe to serious ozone non-attainment area will have no effect on these requirements because all affected engines are located at facilities which are also major sources under the serious ozone classification.

Adopting this rule is consistent with the Board's direction of February 2, 1993, regarding implementing new or revised rules because the Federal Clean Air Act mandates adopting RACT requirements for major NO<sub>x</sub> sources. An assessment of the socioeconomic impacts of the proposed rule was prepared. Adverse impacts were minimized within the constraints of federal requirements.

### **Issue**

Should the Board adopt new Rule 69.4 (Stationary Reciprocating Internal Combustion Engines) to reduce oxides of nitrogen emissions in San Diego County?

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## **Recommendation**

### **AIR POLLUTION CONTROL OFFICER**

Adopt the resolution adopting Rule 69.4 and make appropriate findings:

- (1) of necessity, authority, clarity, consistency, non-duplication and reference as required by Section 40727 of the State Health and Safety Code.
- (2) that new Rule 69.4 will alleviate a problem and promote attainment of ambient air quality standards (Section 40001 of the State Health and Safety Code);
- (3) that an assessment of the socioeconomic impact of new Rule 69.4 has been prepared and has been made available for public review and comment, and that the socioeconomic impacts of the proposed rule have been actively considered and the District has made a good faith effort to minimize adverse socioeconomic impacts; and
- (4) that there is no reasonable possibility that the new rule may have a significant effect on the environment, and that the adoption of new Rule 69.4 is categorically exempt from the provisions of the California Environmental Quality Act pursuant to California Code of Regulations, Title 14, Sections 15300 and 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.

## **Advisory Statement**

The Air Pollution Control Advisory Committee recommended adopting proposed new Rule 69.4 at its August 17, 1994, meeting.

## **Fiscal Impact**

Adopting the proposed rule will have no fiscal impact on the District.

## **Alternatives**

Not adopt new Rule 69.4. The federal Clean Air Act requirements to adopt rules reflecting RACT for NOx major sources would not be met under this alternative. Failure to adopt this rule by October 21, 1994, will result in EPA imposing sanctions (2.0 to 1.0 emission offset ratio for new and expanding major industrial sources and withholding of up to \$75 million in federal transportation funds) on San Diego County. Accordingly, this alternative is not recommended.

## **BACKGROUND:**

Rule 69.4 will control nitrogen oxides (NOx) emissions from stationary piston engines with a brake horsepower (bhp) output rating of 50 bhp or more and located at major sources of NOx emissions (currently those emitting 25 tons per year of NOx or more). It affects engines using fossil or waste derived gaseous fuel, gasoline, diesel fuel and kerosene, and specifies limits based on the combustion method and type of fuel used. The rule allows affected facilities to comply by meeting either concentration-based emissions standards or reducing uncontrolled emissions by a

SUBJECT: Adoption of New Rule 69.4

specified percentage. Carbon monoxide (CO) emissions from engines subject to the NOx standards are also limited to ensure that combustion modifications necessary to meet these standards do not increase CO emissions.

Engines located at residential dwellings with not more than four families and engines used in agricultural operations are 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 maintenance purposes does not exceed a specified time. In addition, engines used in conjunction with military tactical deployable equipment operated at military sites are not subject to the emission standards if engine operation does not exceed 1,000 hours per calendar year.

Records must be kept for affected engines of brake horse power output rating, combustion method, fuel type, manufacturer's name and model number, and annual engine maintenance. There are other monitoring and recordkeeping requirements depending on the engine's operations, combustion conditions and fuel type.

The rule also specifies test methods for determining compliance and a time schedule for existing engines located at major industrial sources to comply with the rule to meet EPA requirements. New engines must comply with all applicable provisions upon initial startup.

Section 40001 of the State Health and Safety Code requires the District to determine, prior to adopting any rule to reduce emissions of criteria pollutants, that the rule will alleviate a problem and promote the attainment or maintenance of state or federal air quality standards. San Diego County does not attain the federal ambient air quality standard for ozone. The proposed rule will reduce emissions of NOx (ozone precursors) by approximately 300 tons per year. Therefore, it will help alleviate San Diego County's ozone non-attainment problem by promoting attainment of state and federal ozone standards.

On February 2, 1993, the Air Pollution Control Board directed that, with the exception of a regulation requested by business or a regulation for which a socioeconomic impact assessment (SIA) is not required, no new or revised regulation shall be implemented unless specifically required by federal or state law. Rule 69.4 is mandated by the federal Clean Air Act requiring all major NOx sources be controlled by RACT. Failure to submit the rule amendments to EPA before October 21, 1994, will result in the imposition of federal sanctions on San Diego County. Accordingly, adopting Rule 69.4 is consistent with the February 2, 1993 Board direction.

### **Socioeconomic Impact Assessment**

Section 40728.5 of the State Health and Safety Code requires the District to perform a socioeconomic impact assessment (SIA) for new and revised rules and regulations significantly affecting air quality or emission limitations. Proposed Rule 69.4 imposes new emission limitations on internal combustion reciprocating engines. Accordingly, an SIA was prepared with the assistance of Applied Development Economics of Berkeley, California, and made available for public comment.

The majority of engines affected by the rule are owned by local government services (including military installations), health care facilities, power generating companies, a shipbuilding company and an entertainment concern. These facilities are major federal sources. Most engines operating on gaseous fuel or gasoline are currently equipped with NOx emission controls and are in compliance with all requirements of Rule 69.4. Three engines at a health care institution will be required to install control equipment.

SUBJECT: Adoption of New Rule 69.4

There are also approximately 517 diesel engines in San Diego County located at major sources. The majority are exempt from the emission standards and will only be required to keep records.

The total annualized cost for all affected sources to comply is approximately \$550,000 and the overall cost-effectiveness is about \$1 per pound of NOx reduced. This cost-effectiveness is considerably more favorable than the cost-effectiveness of NOx control measures for utility and industrial boilers (\$7 per pound) adopted by the District.

The annual compliance cost was compared to the total revenues for the affected industries and public agencies. It was concluded that the annual compliance costs are less than one percent of individual industry or public agency revenues.

The District made its best efforts, within the boundaries of federal requirements, to minimize possible adverse impacts on businesses and government agencies by exempting engines with the limited annual usage, engines used in conjunction with military tactical deployable equipment, and emergency power generators from the NOx emission standards.

The SIA concluded that the rule will not have an adverse effect on small businesses and will not have a significant impact on the region's economy or employment.

### **California Environmental Quality Act**

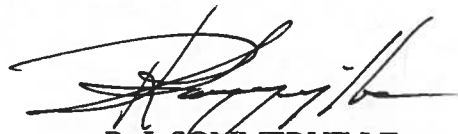
The California Environmental Quality Act requires an environmental review for certain actions. No significant adverse impacts on the environment have been suggested; no such impacts are reasonably possible. The adoption of new Rule 69.4 will not have a significant effect on the environment and is categorically exempt from the provisions of the California Environmental Quality Act pursuant to California Code of Regulations, Title 14, Sections 15300 and 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.

Public workshop on proposed Rule 69.4 was held on July 25, 1994. The workshop report and Socioeconomic Impact Assessment are attached.

Concurrence:

Respectfully submitted,

DAVID E. JANSSEN  
Chief Administrative Officer



R. J. SOMMERVILLE  
Air Pollution Control Officer

**AIR POLLUTION CONTROL BOARD  
AGENDA ITEM  
INFORMATION SHEET**

**SUBJECT:** Adoption of New Rule 69.4 (Stationary Reciprocating Internal Combustion Engines)

**SUPV DIST.:** All

**COUNTY COUNSEL APPROVAL:** Form and Legality  Yes  N/A  
 Standard Form  Ordinance  Resolution

**AUDITOR APPROVAL:**  N/A  Yes **4 VOTES:**  Yes  No

**FINANCIAL MANAGEMENT REVIEW:**  Yes  No

**CONTRACT REVIEW PANEL:**  Approved \_\_\_\_\_  N/A

**CONTRACT NUMBER(S):** N/A

**PREVIOUS RELEVANT BOARD ACTION:**

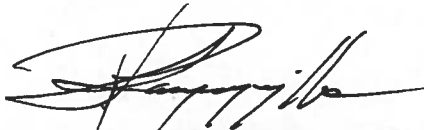
**BOARD POLICIES APPLICABLE:**

**CITIZEN COMMITTEE STATEMENT:** The Air Pollution Control District Advisory Committee recommended adoption of proposed new Rule 69.4 at its August 17, 1994, meeting.

**CONCURRENCES:** N/A

**ORIGINATING DEPARTMENT:** Air Pollution Control District County of San Diego

**CONTACT PERSON:** Richard J. Smith, Deputy Director      750-3303      MS: 0-176



\_\_\_\_\_  
R.J. SOMMERVILLE  
DEPARTMENT AUTHORIZED REPRESENTATIVE

\_\_\_\_\_  
SEPTEMBER 27, 1994  
MEETING DATE

FINDINGS OF THE SAN DIEGO COUNTY AIR POLLUTION CONTROL BOARD IN RESPECT TO ADOPTION OF NEW RULE 69.4 (STATIONARY RECIPROCATING INTERNAL COMBUSTION ENGINES)

- A. Pursuant to section 40727 of the Health and Safety Code, the Air Pollution Control Board of the San Diego County Air Pollution Control District makes the following findings:
1. (Necessity) The adoption of the proposed new District Rule 69.4 is necessary for the District to satisfy the requirements of subsection (f)(1) of section 182 of the federal Clean Air Act which mandates rules requiring reasonably available control technology for major stationary sources of oxides of nitrogen emissions.
  2. (Authority) The adoption of the new proposed rule is authorized by Health and Safety Code sections 40001 and 40702.
  3. (Clarity) The proposed new rule is written so that its meaning can be easily understood by persons directly affected by the rule.
  4. (Consistency) The proposed rule is in harmony with, and not in conflict with or contrary to, existing statutes, court decisions, and State law and Federal regulations.
  5. (Nonduplication) The proposed rule does not impose the same requirements as an existing state or federal regulation.
  6. (Reference) The adoption of the proposed new rule implements subsection (f)(1) of section 182 of the federal Clean Air Act [42 U.S.C. section 7511a, subsection (f)(1)].
- B. The Air Pollution Control Board further finds that an assessment of socioeconomic impacts of the proposed rule was performed and made available for public comment and review pursuant to Health and Safety Code section 40728.5, and that the socioeconomic impacts of the proposed rule have been actively considered and the District has made a good faith effort to minimize adverse socioeconomic impacts.
- C. The Air Pollution Control Board further finds that there is no reasonable possibility that the proposed rule may have a significant effect on the environment, and that the adoption of the proposed rule is categorically exempt from the provisions of the California Environmental Quality Act pursuant to California Code of Regulations, title 14, sections 15300 and 15308, as an action taken to assure the protection of the environment which will not have a significant effect on the environment and where the regulatory process involves procedures for protection of the environment.
- D. The Air Pollution Control Board further finds in accordance with Health and Safety Code section 40001 that the adoption of the proposed rule is necessary to satisfy federal and state law, and that the proposed rule will promote the attainment of state and federal ambient air quality standards.

APCD Meeting 9/27/94  
Agenda Item #4

Approved and/or authorized by the Board of Supervisors of the County of San Diego  
Date: 9-27-94 Minute Order No. APCB-41  
THOMAS J. PASTUSZKA  
Clerk of the Board of Supervisors  
By: [Signature]  
Deputy Clerk

OFFICIAL RECORD

Clerk of the Board of Supervisors  
Exhibit No. \_\_\_\_\_ Agenda No. 4  
Meeting Date 9-27-94 ( )  
Presented by: \_\_\_\_\_  
Document No. 761027  
THOMAS J. PASTUSZKA  
Clerk of the Board of Supervisors

**NEW ADDED RULE**

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

**RESOLUTION ADDING RULE 69.4 - STATIONARY  
RECIPROCATING INTERNAL COMBUSTION ENGINES  
TO REGULATION IV  
OF THE RULES AND REGULATIONS OF THE  
SAN DIEGO COUNTY AIR POLLUTION CONTROL DISTRICT**

On motion of Member Bilbray, seconded by Member MacDonald  
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 new Rule 69.4 is to read as follows:

**RULE 69.4 STATIONARY RECIPROCATING INTERNAL  
COMBUSTION ENGINES**

**(a) APPLICABILITY**

Except as provided in Section (b), this rule shall apply to stationary internal combustion engines with a brake horsepower output rating of 50 bhp or greater located at a major stationary source of oxides of nitrogen (NOx). An engine subject to this rule shall not be subject to Rule 68.

**(b) EXEMPTIONS**

(1) The provisions of 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.

(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 purposes does not exceed 52 hours per calendar year.

(iii) Any emergency standby engine at a nuclear 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 purposes does not exceed 500 hours per calendar year.

(iv) Any engine used in conjunction with military tactical deployable 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 exemption pursuant to Subsection (b)(2) shall maintain records in accordance with Subsections (e)(1) and (e)(2).

(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 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 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 (*date of adoption*).

(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 excluding waste derived gaseous fuel.



(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.

(8) **"Major Stationary Source of NOx"** means a stationary source that emits or has the potential to emit 25 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.

(9) **"Military Tactical Deployable Equipment"** means 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 (*date of adoption*).

(11) **"Portable Emissions Unit"** means 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.

(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.

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

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

(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.

(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.

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

(d) **STANDARDS**

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

(i) The emissions of oxides of nitrogen (NO<sub>x</sub>), calculated in parts per million by volume (ppmv) as nitrogen dioxide at 15% oxygen on a dry basis, are not greater than the following:

<u>Engine Category</u>	<u>Concentration of NO<sub>x</sub> (ppmv)</u>
Rich-burn engines using exclusively fossil derived gaseous fuel or gasoline	50
Lean-burn engines using exclusively fossil derived gaseous fuel	125
Engines using waste derived gaseous fuel	125
Engines using diesel or kerosene fuel	700

or

(ii) Uncontrolled NO<sub>x</sub> emissions from such engine are reduced by not less than the following:

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

(2) For all engines subject to this rule, emissions of carbon monoxide, 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. 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 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 performed.

(2) In addition to the records required by Subsection (e)(1), an owner or operator of an engine exempt 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, whether the operation was during emergency situations or for maintenance purposes; and

(ii) total cumulative annual hours of operation.

(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 monthly records:

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

(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 monthly records:

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

(ii) engine exhaust 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:

(i) engine air-to-fuel ratio;

(ii) engine exhaust temperature; and

(iii) engine inlet manifold temperature and pressure.

(6) Except as otherwise specified in this rule, all records required by Section (e) 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, carbon monoxide, and stack gas oxygen content shall be conducted in accordance with the Air Resources Board (ARB) Test Method 100 as approved by the U.S. Environmental Protection Agency (EPA) and a source test protocol approved in writing by the Air Pollution Control Officer.

(2) The averaging period to calculate NOx and carbon monoxide emissions concentrations and to determine compliance shall be at least thirty minutes and not more than 60 minutes.

(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 horsepower rating.

**(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 *(four months after date of adoption)*, 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.

**IT IS FURTHER RESOLVED AND ORDERED** that the subject addition of Rule 69.4 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 27th day of September, 1994 by the following votes:

**AYES:** Bilbray, Slater, MacDonald  
**NOES:** None  
**ABSENT:** Jacob, Williams

This is a true certified copy of the original document on file or of record in my office. It bears the seal of the County of San Diego and signature of the Clerk of the Board of Supervisors, imprinted in purple ink.

*Thomas J. Pastuszek*  
Clerk of the Board, San Diego County, California

Date: 9/27/94 By Deputy: [Signature]

Rule 69.4/94

Resolution No. 94-417  
9/27/94 (APCB 4)



APPROVED AS TO FORM AND LEGALITY  
COUNTY COUNSEL

BY [Signature]  
DEPUTY

PASSED AND ADOPTED by the Air Pollution Control District of the County of San Deigo, State of California, this 17th day of May, 1994, Minute Order No. APCB1, by the following vote:

AYES: Members Bilbray, Jacob, Slater, Williams, MacDonald  
NOES: Members None  
ABSENT: Members None

STATE OF CALIFORNIA)ss  
County of San Diego)

I, THOMAS J. PASTUSZKA, Clerk of the Air Pollution Control District, County of San Diego, State of California, hereby certify that I have compared the foregoing copy with the original resolution passed and adopted by said Board at a regular meeting thereof, at the time and by the vote therein stated, which original resolution is now on file in my office; that the same contains a full, true and correct transcript therefrom and of the whole thereof.

Witness my hand and the seal of the Air Pollution Control District, County of San Diego, State of California, this 17th day of May, 1994.

THOMAS J. PASTUSZKA  
Clerk of the Air Pollution Control District

This is a true certified copy of the original document on file or of record in my office. It bears the seal of the County of San Diego and signature of the Clerk of the Board of Supervisors, imprinted in purple ink.



By *Susan Morgan*  
Susan Morgan, Deputy

*Thomas J. Pastuszka*  
Clerk of the Board, San Diego County, California

Date: 5/17/94 By Deputy: *J. Morgan*

**AIR POLLUTION CONTROL DISTRICT  
SAN DIEGO COUNTY**

**WORKSHOP REPORT**

**RULE 69.4 - STATIONARY RECIPROCATING INTERNAL  
COMBUSTION ENGINES**

A workshop notice was mailed to all known owners and/or operators of stationary reciprocating internal combustion 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 July 25, 1994 and was attended by 40 people. Oral and written comments were received during and after the workshop from the affected industry and EPA. The comments and District responses are as follows:

**1. WORKSHOP COMMENT:**

Military tactical and deployable equipment should be exempt from the proposed rule. This equipment must conform to configurations of national military standards and cannot be modified unless all equipment interchangeable with it is also modified throughout the armed forces. Such modifications would also involve revising the technical manuals for all engines, retraining all engine maintenance personnel, and restocking all the spare parts stores and inventories throughout the armed services. All this would take considerable time, effort and money. In addition, a certain definable population of deployable equipment is used within San Diego County only for maintenance and training purposes, and otherwise operates fully outside the United States. If engines connected with such equipment are modified, they would be unusable in other parts of the country or abroad. Such practice would be contrary and detrimental to military readiness. More importantly, when this equipment is deployed, very often the equipment that is returned comes from a military base elsewhere, or is a new piece of equipment from a national warehouse.

**DISTRICT RESPONSE:**

The District agrees that equipment used solely for training and maintenance purposes in San Diego County and operated outside the county otherwise should not be subject to the requirements of Rule 69.4, particularly when such equipment is not necessary returned to San Diego County after deployment. Accordingly, the rule has been revised to provide an exemption for military tactical and deployable equipment provided that it operates less than 1,000 hours per year in San Diego County. A definition for such equipment has also been added to the rule.

**2. WORKSHOP COMMENT:**

Is the number of hours for exemptions in Subsection (b)(2) based on actual or permitted hours of engine operation?

**DISTRICT RESPONSE:**

The exemptions are based on actual hours of engine operation. In order to qualify for this exemption, a facility has to keep records as required by Subsections (e)(1) and (e)(2). Permits for engines that qualify for exemptions under Subsection (b)(2) will contain conditions that limit operations to not more than the hours specified in (b)(2).

**3. WORKSHOP COMMENT:**

What is the definition of a major stationary source of NOx emission?

**DISTRICT RESPONSE:**

A major source of NOx emissions is defined in the Federal Clean Air Act, and Subsection (c)(8) of the proposed rule. A major source of NOx emissions for a "severe" ozone non-attainment area (present classification of San Diego County) is a stationary source that emits or has a potential to emit 25 tons or more of NOx per year. If San Diego County is reclassified to a "serious" ozone non-attainment area by EPA, a major stationary source of NOx will be a source that emits or has the potential to emit 50 tons or more of NOx per year.

**4. WORKSHOP COMMENT:**

Would a designation of major source of NOx emissions be based on its potential to emit or its actual emissions?

**DISTRICT RESPONSE:**

The District will consider a facility to be a major source of NOx if its actual cumulative emissions from all emission units such as boilers, turbines and engines, in 1990 and in any year thereafter are equal to or greater than 25 tons (or 50 tons if the County is reclassified by EPA).

**5. WORKSHOP COMMENT:**

If a facility emitted more than 25 tons of NOx per year in 1990, but later reduced its emissions below the major source level threshold, would it be considered a non-major source?

**DISTRICT RESPONSE:**

No, it will still be considered a major source. EPA has determined that for the purposes of determination of RACT applicability, a source will be considered non-major if its potential to emit (actual or allowable) is less than 25 tons per year provided that all of the following conditions are met:

- a) The source has a federally enforceable permit conditions to permanently restrict its allowable emissions below the major source level; and
- b) The actual emissions have never exceeded the major source threshold since the 1990 emission inventory incorporated in the State Implementation Plan; and
- c) The emissions allowed under the permit or other enforceable document are not greater than emissions accounted for in the District's attainment demonstration.

However, the District is evaluating ways in which sources that have permanent, demonstrable and enforceable reductions in emissions can limit their potential to emit below major source levels. The mechanisms for doing this must be acceptable to EPA in order for the limits on potential to emit to be federally enforceable.

6. **WORKSHOP COMMENT:**

What is the status of the District's efforts for reclassification of San Diego County from "severe" to "serious" ozone non-attainment area?

**DISTRICT RESPONSE:**

The District has applied to EPA for the reclassification. It is expected that the decision will be made by October, 1994.

7. **WORKSHOP COMMENT:**

EPA recommends in its comments on the proposed draft of Rule 69.4 that the NOx emission limit for diesel engines should be 8.4 gm/bhp-hr. Where does this limit come from?

**DISTRICT RESPONSE:**

EPA comments refer to the average emission limits achieved for diesel engines in the South Coast and Ventura air districts where rules for such engines have existed since 1984. This emission standard was also proposed as a RACT limit by the Combustion Committee of the state Technical Review Group.

8. **WORKSHOP COMMENT:**

Some high performance diesel engines equipped with aftercooling and turbocharging have higher emission factors, between 9 and 9.5 gm/bhp-hr. A 4° ignition retard does not result in significant NOx emission reduction for these engines and sometimes even increases visible emissions.

**DISTRICT RESPONSE:**

For newer engines equipped with turbocharging and aftercooling, the proposed rule now provides an option to comply by reducing NOx emissions from an uncontrolled level by 25% instead of meeting a specified emission concentration limit.

9. **WORKSHOP COMMENT:**

What determines the uncontrolled NOx emission level of an engine?

**DISTRICT RESPONSE:**

The uncontrolled emission level for an engine is determined as the concentration of oxides of nitrogen (NOx), expressed in parts per million (volume) as nitrogen dioxide (NO<sub>2</sub>) at 15% of oxygen, or in grams of NOx per brake horsepower-hour, before the application of any NOx control technology. For rich-burn engines controlled by non-selective catalytic reduction (NSCR), the uncontrolled NOx emission level would be the one measured before the catalytic control device. For diesel engines, NOx emissions before any combustion modifications would be considered uncontrolled emissions. For lean-burn engines, the uncontrolled NOx emission level will have to be determined on a case-by-case basis.



**10. WORKSHOP COMMENT:**

The proposed revised standards present an engine owner or operator with a choice to comply either with the required NOx concentration (ppmv) or with a specified percent of NOx emission reduction. Would the most stringent standard be used for compliance purposes?

**DISTRICT RESPONSE:**

No. The engine would be in compliance with the rule if it meets either the NOx emission concentration standard or the NOx emission reduction percentage standard.

**11. WORKSHOP COMMENT:**

South Coast AQMD allows the catalyst emission reduction efficiency for rich-burn engines to decrease from 90% to 80% over time to allow for degradation of the catalyst. Will the District give a similar allowance for the catalyst to degrade over time?

**DISTRICT RESPONSE:**

No. The District's data show that fresh catalysts provide about 98% reduction efficiency and stabilize at about 90%. This will provide compliance with at least the NOx emission concentration limit of 50 ppmv. Currently, all permitted rich-burn engines in the District can meet this limit.

**12. WORKSHOP COMMENT:**

The proposed rule has NOx emission limits calculated at 15% excess oxygen. The permit conditions issued by the District specify NOx concentration at 3% excess oxygen. Would these permit conditions be revised?

**DISTRICT RESPONSE:**

Yes. After Rule 69.4 is adopted, permit conditions related to the operations of affected engines will be revised to reflect the rule's requirements.

**13. WORKSHOP COMMENT:**

Some military facilities have many identical diesel engines on site. Would the rule require an operator to demonstrate compliance for each engine separately?

**DISTRICT RESPONSE:**

The District expects that many of these engines will be exempt from the rule based on their usage (i.e., tactical and deployable). For such engines, only records required by Subsections (e)(1) and (e)(2) would be needed. For the remaining engines subject to the rule standards, initial compliance with the rule needs to be demonstrated separately for each engine.

**14. WORKSHOP COMMENT:**

Does the District have a standard recordkeeping form that lists all the information necessary to comply with the requirements of Section (e)?

**DISTRICT RESPONSE:**

Not at this time. However, the District will develop a standard form and provide it to affected facilities.

**15. WORKSHOP COMMENT:**

What standards are applicable to equipment operating on kerosene, or JP-5 fuel?

**DISTRICT RESPONSE:**

This equipment must comply with the same NOx emission standards as engines using diesel fuel. The proposed rule has been revised to reflect this.

**16. WORKSHOP COMMENT:**

It is impractical to keep monthly records for military equipment which may be in storage and inactive for nine months of the year. The wording "if operational" should be added to the recordkeeping requirement in Subsection (e) (5) so the engine parameters would not be measured while it is in storage.

**DISTRICT RESPONSE:**

Subsection (e)(5) requires operators to record only "operating parameters". If an engine is not operating for a calendar month, the words "not operated" will be sufficient for the record.

**17. WORKSHOP COMMENT:**

The monitoring requirements in the proposed rule will force industry to buy new equipment to measure the required parameters.

**DISTRICT RESPONSE:**

All rich-burn and lean-burn stationary engines which have District Permits to Operate are already required to record the information specified by the rule. The operating parameters for diesel engines can be measured with temperature and/or pressure gauges which should be readily available and not very expensive.

**18. WORKSHOP COMMENT:**

Subsection (f)(1) requires that District Test Method 20 be used to determine compliance with the rule standards. It is preferable to use EPA Test Method 20 since it costs less and more people are qualified to perform it.

**DISTRICT RESPONSE:**

Rule 69.4 has standards for both NO<sub>x</sub> and CO emissions. District Test Method 20 provides for the simultaneous determination of NO<sub>x</sub> and CO emissions from all combustion sources, including internal combustion engines. EPA Test Method 20 is designed to determine nitrogen oxides, sulfur dioxides, and diluent emissions only from stationary gas turbines. It does not measure CO emissions. Subsection (f)(1) has been revised to provide an option for using EPA Test Methods 7E and 10 for determining NO<sub>x</sub> and CO emissions, respectively.

**19. WORKSHOP COMMENT:**

It is difficult to measure the air to fuel ratio directly. However, the engine air to fuel ratio controller has a feedback control signal in millivolts. Would this signal voltage be an acceptable measure of the air to fuel ratio?

**DISTRICT RESPONSE:**

Yes. The feedback signal voltage can be the appropriate parameter to measure rich-burn and lean-burn air to fuel ratio.

**20. WORKSHOP COMMENT:**

Section(e)(5) requires measurement of several diesel engine operating parameters. Would all specified parameters need to be measured?

**DISTRICT RESPONSE:**

No. If a diesel engine is subject to the emission standards requirements of the proposed rule, only parameters necessary to demonstrate compliance with the rule and to ensure that the operating conditions of an engine have not changed need to be measured. The rule language provides flexibility to an engine operator. For example, for a 50 HP engine that does not have a turbocharger and is naturally aspirated, the inlet manifold temperature would be ambient air temperature and would not have to be recorded.

**21. WORKSHOP COMMENT:**

Subsection (e)(5) requires an operator to demonstrate continuous compliance. Does it require installing continuous emission monitors (CEM's)?

**DISTRICT RESPONSE:**

No. CEM's are not required by this rule. To demonstrate continuous compliance, an engine operator has to keep records required by the applicable provisions of Section (e).

**22. WRITTEN COMMENT:**

Subsections (e)(1)(v) and (e)(1)(vi) require an engine owner to keep a maintenance manual provided by the manufacturer and to keep records of annual engine maintenance. Requiring these records seems burdensome in view of the fact that there are no requirements for the facility to

perform maintenance in accordance with the manual. In addition, some facilities may not have the manufacturer's manual since some engines are very old.

**DISTRICT RESPONSE:**

The rule has been revised to require an engine owner perform maintenance according to the manufacturer's recommendation or another maintenance procedure, as approved by the Air Pollution Control Officer.

**23. WRITTEN COMMENT:**

Subsection (e)(5) is ambiguous because it does not list all required operating parameters to be recorded. It refers only to operating parameters such as exhaust temperature, engine-to-fuel ratio and inlet manifold temperature and pressure.

**DISTRICT RESPONSE:**

Operating parameters of diesel engines which affect their emissions and need to be recorded may vary on a case-by-case basis, depending on the type of combustion modifications a particular engine needs to comply with the rule. The parameters necessary to ensure compliance of each affected engine will be specified as conditions on the District permits to operate for those engines.

**24. WRITTEN COMMENT:**

Engines operating on digester gas are required by the rule to comply with the standards in Section (d). However, the heat content and production rate of the digester gas may vary with time which requires continual adjustment of the engine which will not always be tuned for minimum emissions. The rule should have a provision to specify that the emission limit is applicable at a specific design condition.

**DISTRICT RESPONSE:**

This suggestion cannot be incorporated into the proposed rule because it would require the District to specify design conditions for every such engine subject to the rule. However, the standards have been revised to provide the option to comply with the specified NOx emission concentration standard, or to reduce NOx emissions by 80% from an uncontrolled level. This will allow for the variability of the digester gas quality.

**25. EPA COMMENT:**

The emissions limits for Section (d) should be consistent with the RACT levels informally recommended by the Combustion Committee of the Technical Review Group (TRG). They are 50 ppmv or 90% reduction for rich-burn gaseous fueled engines, 125 ppmv or 80% reduction for lean-burn gaseous fueled engines, and 700 ppmv or 25% reduction for diesel engines .

**DISTRICT RESPONSE:**

The rule has been revised as suggested.

**26. EPA COMMENT:**

The definition for "brake horsepower output rating" in Section (c)(2) should include a reference to brake horse power rating as listed on the nameplate of the unit, regardless of any derating.

**DISTRICT RESPONSE:**

The District agrees. The rule has been revised as suggested. However, some diesel engines are very old and may not have a nameplate, or the nameplate may be unreadable. The rule, therefore, provides that this requirement is applicable only if the nameplate is available.

**27. EPA COMMENT**

The San Diego Air Pollution Control District Test Method 20 referenced in Section (f)(1) has not been approved by the EPA and must be submitted for approval.

**DISTRICT RESPONSE:**

The rule has been revised to include the option of using EPA Test Methods 7E and 10 instead of District Method 20. In addition, District Method 20 has already been submitted and verbally approved by EPA. The language referring to District Method 20 has been revised to include, "as approved by the EPA."

**28. EPA COMMENT:**

The compliance schedule in Section (g) should require all engines to be in compliance with the standards of Section (d) by May 31, 1995.

**DISTRICT RESPONSE:**

The rule has been revised as suggested.

# **SOCIOECONOMIC IMPACT ASSESSMENT**

## **PROPOSED RULE 69.4 - STATIONARY RECIPROCATING INTERNAL COMBUSTION ENGINES**

**AUGUST 1994**

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## INTRODUCTION

Section 40728.5 of the State Health and Safety Code requires the Air Pollution Control District (District) to perform a Socioeconomic Impact Assessment (SIA) for any new or amended rules and regulations that will significantly affect air quality or emission limitations. This report contains the District's assessment of the socioeconomic impacts of proposed District Rule 69.4 -- Stationary Reciprocating Internal Combustion Engines.

Rule 69.4 is a new rule developed to control the emissions of nitrogen oxides from stationary reciprocating internal combustion engines, hence referred to as 'engines'. It reflects Reasonably Available Control Technology (RACT) as mandated by the Federal Clean Air Act (FCAA). The rule applies to any new or existing engine with a brake horsepower (bhp) output rating of 50 bhp or greater and located at a major federal source of NO<sub>x</sub> emissions.

A major stationary source of NO<sub>x</sub>, according to the current federal classification of San Diego County as a 'Severe' ozone non-attainment area, is defined as a source which emits, or has a potential to emit, 25 tons per year or more of NO<sub>x</sub>. The District has applied to the Environmental Protection Agency (EPA) for reclassification of its ozone non-attainment status from 'Severe' to 'Serious' which would increase the NO<sub>x</sub> emissions threshold for major sources from 25 tons to 50 tons per year. However, the pending reclassification of San Diego County from a 'Severe' to a 'Serious' ozone non-attainment area will have no effect on the requirements of Rule 69.4. All affected engines are located at facilities which are also major sources under the 'Serious' ozone classification and would continue to be subject to federal RACT requirements.

Rule 69.4 affects three basic types of internal combustion reciprocating engines: rich-burn engines operating on gaseous fuels or gasoline, lean-burn engines operating on gaseous fuels, and diesel engines. A rich-burn engine is defined as a spark-ignited engine designed to operate at close to a stoichiometric air to fuel ratio. A lean-burn engine is a spark-ignited engine that is designed to operate at a higher than stoichiometric air to fuel ratio. A diesel engine is a compression ignited engine which operates on liquid fuels such as diesel fuel or kerosene.

Rule 69.4 provides all affected sources an option to comply either with the concentration-based emissions standards or by reducing their uncontrolled NO<sub>x</sub> emissions by a specified percentage based on the combustion conditions and type of fuel used.

The rule requirements are as follows:

- The concentration of NO<sub>x</sub> in the exhaust stream of rich-burn engines operating on a gaseous fuel or gasoline must not exceed 50 parts per million by volume (ppmv), or the uncontrolled NO<sub>x</sub> emissions must be reduced by at least 90%.
- The concentration of NO<sub>x</sub> in the exhaust stream of lean-burn engines operating on fossil derived or waste derived gaseous fuel must not exceed 125 ppmv, or the uncontrolled NO<sub>x</sub> emissions must be reduced by at least 80%.
- The concentration of NO<sub>x</sub> in the exhaust stream of engines operating on diesel fuel or kerosene must not exceed 700 ppmv, or the uncontrolled NO<sub>x</sub> emissions must be reduced by at least 25%.

- The concentration of carbon monoxide (CO) in the exhaust stream of all affected engines must not exceed 4500 ppmv.
- Engines located at residences for not more than four families, and engines used exclusively in agricultural operations, are exempt from the entire rule.
- Engines operating less than 200 hours per year and emergency standby engines operating during emergency situations are exempt from the rule's emission standards. Yearly operations of each emergency standby engine for maintenance purposes are restricted to 52 hours, and those at nuclear generating stations are restricted to 500 hours.
- Engines used in conjunction with military tactical deployable equipment operated at military sites are also exempt from the rule's standards provided that each engine does not operate more than 1000 hours per calendar year.
- All engines subject to the rule must have records of brake horse power output rating, combustion method, fuel type, a manufacturer's name and model number, manual of recommended maintenance, and records of annual engine maintenance. In addition, there are other monitoring and recordkeeping requirements depending on the engine's operations, combustion conditions and fuel type.
- All existing engines subject to the emission standards requirements must be in compliance with the rule by May 31, 1995. New engines must comply with the rule at the time of installation and startup.

For rich-burn engines, the rule's standards can be met with catalytic add-on control devices similar to those installed on automobile engines. For lean-burn engines the proposed NOx emission standards can be met by adjusting the air to fuel ratio and modifying engine design. For diesel engines, combustion modifications such as turbocharging, aftercooling and ignition retardation can be sufficient to comply with the proposed standards.

There are 11 facilities in San Diego County emitting more than 25 tons per year of NOx. Four of these facilities (with 13 engines) have either lean-burn or rich-burn engines. These facilities were subject to the District's New Source Review rules and are in compliance with all requirements of Rule 69.4.

The seven remaining facilities have approximately 520 existing engines which will be affected by the proposed rule. The majority of these are diesel engines and many of them will be exempt from the rule's emission standards because they are either emergency generators, low usage equipment or are used in conjunction with military tactical and deployable equipment. There will be approximately 50 diesel engines that may have to be retrofitted with combustion modifications to meet the emission standards of Rule 69.4. In addition, there are three rich-burn engines operating on natural gas which will be required to install control equipment.

There are also some engines in San Diego County, mostly diesel engines, that are currently exempt from the permit requirements. The District does not presently have adequate information on the population or operating profiles of most of these engines. Therefore the estimated costs and emission reductions of the proposed rule may change in the future when more information will become available due to Rule 69.4 adoption and the corresponding amendments to Rule 11 (Exemption from Permit Requirements).



At present, the District estimates that proposed Rule 69.4 will reduce annual NOx emissions from engines by approximately 300 tons with an overall cost-effectiveness about \$1 per pound of NOx reduced. Total cost to the affected industry is estimated to be approximately \$550,000 per year.

### **THE NECESSITY OF ADOPTING RULE 69.4**

The Federal Clean Air Act (FCAA) requires the District to adopt rules reflecting Reasonably Available Control Technology (RACT) for major stationary sources of ozone precursors, i.e. volatile organic compounds and nitrogen oxides.

RACT is defined as the lowest emission limit that a particular emission source is capable of meeting by the application of air pollution control technology that is reasonably available considering technological and economic feasibility. EPA has established RACT limits only for electrical utility boilers<sup>1</sup> and has stated that NOx emission standards for other categories of combustion equipment must be equivalent to those for boilers. Therefore, in determining RACT for engines, the District used information contained in EPA's Alternative Control Technology document (ACT) and considered NOx regulations for internal combustion reciprocating engines in other air districts in California and other states. In addition, the District examined the NOx emission limitations required from engines installed in San Diego County which were either subject to the existing RACT requirements of Rule 68, or to the Best Available Control Technology provision of the New Source Review rules. It was concluded that the control technologies available to comply with the proposed rule requirements are technically and economically feasible, and have been used successfully on engines in San Diego County, in other California air districts and other parts of the country. Therefore, the requirements of Rule 69.4 can be considered RACT for engines.

NOx control measures for stationary reciprocating internal combustion engines were also included in the District's 1991 Regional Air Quality Strategy (RAQS) developed to comply with the California Clean Air Act. The Act requires the District to adopt the RAQS control measures as expeditiously as possible in order to attain the state and national ambient air quality standards for ozone.

Therefore, both federal and state laws necessitate the adoption of Rule 69.4.

### **IMPACT ASSESSMENT**

As specified in the Health and Safety Code, "socioeconomic impact" means the following:

- (1) The type of industries or business, including small business, affected by the rule or regulation.
- (2) The range of probable costs, including costs to industry or business, including small business, of the rule or regulation.
- (3) The impact of the rule or regulation on employment and the economy of the region affected by the adoption of the rule or regulation.
- (4) The availability and cost-effectiveness of alternatives to the rule or regulation being proposed or amended.
- (5) The emission reduction potential of the rule or regulation.

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

Item 6 was discussed in the preceding section. The remaining items are discussed below.

### **Types of Industries Affected by Rule 69.4**

The adoption of proposed Rule 69.4 will affect two private concerns (Companies A and B) and several military bases in San Diego County which are major federal sources of NOx emissions (currently those emitting 25 tons per year of NOx or more).

Company A, which is in the shipbuilding and repair industry (SIC 3731) employs about 4,000 workers and posted sales of about \$350 million for last year. Business has been flat or slightly declining over the past several years. The ship building and repair industry has historically been very important in San Diego County, but it will need to shift its focus from the military to the civilian marketplace as reduced defense spending on the national level leads to a declining volume of Navy business.

Company B is a hospital which employs 1,750 people in San Diego and has estimated revenues of \$136 million. In general, service sector industries should benefit from the strong population growth in the San Diego area.<sup>2</sup> However, the health care industry is experiencing strong cost cutting pressures from consumers and the insurance industry as a result of the national health care debate.

The proposed rule also directly affects five military facilities in the region. While specific employment data for all of these facilities are not available, there are an estimated 111,000 uniformed military personnel in San Diego County, representing 9% of total jobs. The civilian workforce directly and indirectly associated with these bases is substantial as well.

There are four additional major sources of NOx in San Diego County that have engines subject to Rule 69.4. These facilities include municipal water pollution control plants, landfill gas extraction operations and a major amusement park in the area. The 13 lean-burn and rich-burn engines located at these facilities are currently meeting all requirements of the proposed rule under the provisions of Rule 68 or New Source Review rules. Therefore, these facilities would not be affected by the rule's adoption.

Proposed Rule 69.4 primarily affects large businesses and government establishments and does not disproportionately affect small business in the San Diego area.

### **Range of Probable Costs of Proposed Rule 69.4**

As mentioned above, the majority of affected rich-burn and lean-burn engines located at major federal sources would not be affected by the rule and will experience no additional cost as a result of the rule's adoption. However, the three rich-burn engines operated by Company B (hospital) are expected to have add-on control equipment installed with a total capital outlay of approximately \$176,000.

There are also about 50 diesel engines which will be subject to the rule's standards. These engines need to be retrofitted with combustion modifications. The capital cost for this retrofit is estimated

as \$1,000 per engine. In addition, approximately 470 engines, mostly located at military installations and exempted from the proposed rule's emission standards will be affected by recordkeeping requirements.

Compilation of monthly records for affected engines, as required by the proposed rule, is estimated to require about 12 staff-hours per year per engine. Assuming \$15 per hour labor cost<sup>3</sup>, and an equal amount for overhead, annual recordkeeping costs are estimated to be \$360 per engine.

In order to evaluate the total costs to affected facilities, annualized costs have been calculated. For this calculation, the capital costs are annualized assuming a ten year effective life of the equipment and a 10% interest rate. The total annualized compliance costs for all affected facilities is estimated at \$551,000 (Table 1).

SIC	Establishment	Estimated Employment [a]	Estimated Revenues [a] (\$000's)	No. of Engines	Annualized Compliance Costs [b]	Costs as % of Revenues	Total Jobs Impact [c]
3731	Company A Shipbuilding & Repair Industry	4,000	\$350,000	17	\$99,500	0.03%	2
8069	Company B Hospital	1,750	136,000	3	115,000	0.08%	2
9711	Military Facilities 5 Facilities	N/A	N/A	30 470	168,000 169,000	N/A N/A	
<b>Total</b>				<b>520</b>	<b>\$551,500</b>		<b>4</b>

[a] These figures are estimated by Applied Development Economics and have not been verified in every case by the companies.  
 [b] One-time costs are annualized assuming a 10 year useful life for the equipment and a 10% interest rate. Where engine usage is unknown, maximum values are assumed.  
 [c] Assumes worst-case scenario that employer will attempt to reduce payrolls in proportion to compliance costs.

**Economic Impacts of Proposed Rule 69.4**

Table 1 presents the compliance costs as a percent of total revenues for each establishment where available. The compliance costs are all below one-tenth of one percent (0.1%) and would not be considered significant economic impacts for any of these facilities. The overall cost effectiveness of the rule is estimated at \$1 per pound of NOx reduced.

The regulatory costs may stimulate minor price inflation for the goods and services provided at these facilities although the net effect on prices would not be noticeable for most consumers. The costs at the military installations may require budget increases that would affect U.S. taxpayers.

### **Employment Impacts of Proposed Rule 69.4**

Given the relatively low significance of the economic impacts on the affected facilities, it is unlikely the proposed rule would have any adverse impacts on employment in the region. However, under a worst-case scenario, if the affected facilities attempted to reduce normal operating costs to offset the increase in regulatory costs, then some employment may be affected. Table 1 indicates where potential job losses may occur. It is estimated that even under worst-case assumptions, at most four full time equivalent jobs could be lost at the affected facilities or through multiplier effects at establishments affected indirectly. It is likely that any job loss would be experienced through attrition or by delaying planned expansions, rather than the termination of any existing jobs.

If emission control equipment is installed and local contractors are hired for the design and installation, there may be a temporary increase in local employment resulting from Rule 69.4.

### **Availability and Cost-Effectiveness of Alternatives to Rule 69.4**

There are three basic alternatives to Rule 69.4: not adopt the rule, adopt a less stringent rule, and adopt a more stringent rule.

The first two alternatives are not viable options. A less stringent rule, or no rule at all, would not be consistent with the FCAA which requires Reasonably Available Control Technology for major NO<sub>x</sub> sources. San Diego County is currently a non-attainment area for ozone, for which NO<sub>x</sub> is a precursor. On February 26, 1993, EPA notified the District that it must submit RACT rules for major sources of NO<sub>x</sub> by April 15, 1993. EPA stated that the imposition of federal sanctions, such as withholding of federal highway and transportation funds to the region and severe restrictions on industrial expansion, would occur unless the required rules are adopted within 18 months of the original date, i.e., by October 15, 1994. Failure to adopt RACT rules within two years of the original date could also result in promulgation of a Federal Implementation Plan. Rule 69.4 should be adopted as expeditiously as possible to fulfill the requirements of the FCAA.

Additionally, tactics containing the emissions control measures required by proposed Rule 69.4 are included in the 1991 Regional Air Quality Strategy which was adopted by the Air Pollution Control Board on June 30, 1992. Therefore, not adopting Rule 69.4 would be inconsistent with the RAQS and with the California Clean Air Act which requires the District to adopt all feasible VOC and NO<sub>x</sub> control strategies.

There are several options in adopting a more stringent rule. The first option would be to propose NO<sub>x</sub> emission standards more stringent than federal RACT levels. However, imposing more stringent NO<sub>x</sub> emission standards may require many sources to install expensive add-on control equipment such as selective catalytic reduction which may be technologically or economically infeasible. This is not recommended at this time without further study.

The rule could also be made more stringent by extending its applicability to engines which are located at non-major federal sources of NO<sub>x</sub>. However, the many additional facilities which would be affected by such rule are currently exempt from the District's permit requirements. The District intends to amend Rule 11 (Exemption from Permit Requirements) to obtain better information on the County's engine population and their usage patterns. This option is not recommended at this time until more information is available. It should be noted that amending Rule 11 and requiring all engines with a higher output rating than 50 bhp to obtain District operating permits would provide the necessary mechanism for bringing these engines into compliance with the requirements of Rule 69.4 at a later date.

The rule could be made more stringent in other ways, e.g., by extending the applicability to engines under 50 bhp, or by eliminating the low usage exemptions. The high cost effectiveness of any of these options, however, does not justify the relatively small amount of additional emission reductions that could be achieved.

### **Benefits and Emission Reduction Potential in Adopting Rule 69.4**

The annual NOx emissions from stationary reciprocating internal combustion engines at major sources in San Diego County were approximately 800 tons in 1990. Implementation of Rule 69.4 would result in an annual NOx emission reduction of about 300 tons per year, or 37% and will contribute to the attainment of the ambient air quality standards for ozone in San Diego County.

### **CONCLUSION**

Based on the above analysis, Rule 69.4 is expected to have minimal impacts on employment and the economy in San Diego County. The rule is not expected to cause undue financial hardship on any of the affected businesses or public agencies. Rule 69.4 will reduce NOx emissions from existing stationary combustion engines by 300 tons per year at an overall cost-effectiveness of \$1 per pound of NOx reduced and will significantly reduce the potential for emissions from new engines.

## REFERENCES

1. U.S. Environmental Protection Agency, Nitrogen Oxides Supplement to the General Preamble of Title I of the Clean Air Act, 57 FR 55620, November 25, 1992.
2. SANDAG projects a 2.1 annual average growth rate for population over the next 20 years. Series 8 Regional Growth Forecast, 1990-2015, February 3, 1994.
3. EPA, Office of Air Quality Planning and Standards, Control Cost Manual.