AIR POLLUTION CONTROL DISTRICT
COUNTY OF SAN DIEGO

DATE: December 16, 1998

TO: Air Pollution Control Board

SUBJECT: Adoption of New Rule 69.3.1 (Stationary Gas Turbine Engines - Best Available Retrofit Control Technology) and Amendments to Rule 69.3 (Stationary Gas Turbine Engines)
(District: All)

SUMMARY

Overview

State law requires the District to implement all feasible control measures limiting emissions of ozone precursors [oxides of nitrogen (NOx) and volatile organic compounds (VOCs)] including Best Available Retrofit Control Technology (BARCT). Federal law requires implementing Reasonably Available Control Technology (RACT). Accordingly, District rules must reflect RACT, BARCT and all feasible control measure mandates. Currently, Rule 69.3 satisfies RACT requirements for NOx emissions from stationary gas turbines. Proposed new Rule 69.3.1 will implement state BARCT requirements and has been identified by the state Air Resources Board (ARB) as a feasible control measure. Implementing all feasible control measures is also required if the state-mandated no-net-increase (emission offset) program is rescinded. On November 4, 1998 (Board Item #3), the Board rescinded the no-net-increase program subject to ARB concurrence. The ARB is now evaluating this action. Finally, adopting proposed new Rule 69.3.1 implements the corresponding control measure in the Board's Regional Air Quality Strategy adopted on June 17, 1998 (Board Item #4).

Rule 69.3 was adopted on September 27, 1994 (Board Item #1), to control NOx emissions from stationary gas turbines to meet federal RACT requirements. It applies to 31 turbines at major (50 or more tons per year) sources for NOx required to meet federal RACT requirements and non-major (less than 50 tons per year) sources of NOx not subject to federal requirements. To separate state and federal requirements, proposed new Rule 69.3.1 containing state BARCT requirements is proposed for adoption and Rule 69.3 containing federal RACT requirements is proposed for amendment. This separation will only allow the Environmental Protection Agency (EPA) to enforce Rule 69.3. EPA will not be able to enforce Rule 69.3.1 because it will not be submitted for approval into the federal State Implementation Plan (FSIP).

The title of existing Rule 69.3 is being revised to "Stationary Gas Turbine Engines - Reasonably Available Control Technology" to clarify it represents federal RACT. Other amendments revise out-of-date provisions and provide clarifications to ensure consistency with new Rule 69.3.1. Upon amendment, Rule 69.3 will be submitted to EPA as a FSIP revision. Once approved by EPA, the rule will also become the federally-enforceable requirement for six turbines at four major (50 or more tons per year) NOx sources.

New Rule 69.3.1 further reduces NOx emissions from stationary gas turbine engines to meet state BARCT and implementing all feasible measures requirements. It establishes lower NOx

emission concentration limits for gas turbines based on how they are used, date of installation, power rating, and thermal efficiency. The rule also specifies monitoring, recordkeeping, emission testing requirements and test methods, and provides a compliance schedule. Turbines used exclusively for research, development and testing, portable turbines and small turbines used in conjunction with military tactical support equipment are completely exempt from the rule. Turbines used in emergency situations and during startup, shutdown, or fuel change are exempt from the emission standards but are subject to other applicable rule requirements such as recordkeeping and reporting. Gas turbines in compliance with the more restrictive Rule 69.3.1 will also be in compliance with Rule 69.3.

Rule 69.3.1 will apply to 31 turbines in San Diego County; 26 turbines are already in compliance with all requirements. Two turbines needing modifications to comply are nearing the end of their useful life and are expected to be taken out of service for other reasons. The remaining three turbines are at one facility (Monsanto Nutrasweet Kelco) and are being replaced by new, larger turbines. These are the only turbines affected by the emission limitations of the rule. Several potential options for complying with the rule were considered for these turbines. The option the company has proposed will provide NOx emission reductions in the range of 22 to 56 tons per year at a maximum cost-effectiveness of $2.2 per pound of NOx reduced. This is well below the cost-effectiveness of other District rules reflecting BARCT for NOx emission sources ($7 per pound).

An assessment of the socioeconomic impacts of new Rule 69.3.1 was prepared. It concludes the rule will not have a significant economic impact on the one affected company, Monsanto Nutrasweet Kelco.

A workshop was held on March 18, 1998. The workshop report is provided in Attachment VI.

Recommendations

AIR POLLUTION CONTROL OFFICER:

Adopt the resolutions adding Rule 69.3.1 to the District Rules and Regulations and amending Rule 69.3 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 adding Rule 69.3.1 and amending Rule 69.3 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 proposed new Rule 69.3.1 has been prepared, the socioeconomic impacts of the proposed rule have been actively considered, and the District has made good faith effort to minimize adverse socioeconomic impacts;

(iv) that an assessment of the socioeconomic impact of proposed amendments to Rule 69.3 is not required by Section 40728.5 of the State Health and Safety Code because amending Rule 69.3 will not significantly affect air quality or emission limitations;

(v) that an incremental cost-effectiveness analysis of proposed new Rule 69.3.1 has been prepared and the proposed rule represents the most cost-effective control option; and

(vi) that there is no reasonable possibility that new Rule 69.3.1 and amended Rule 69.3 may have a significant adverse effect on the environment, and that adoption of new Rule 69.3.1 and amendments to Rule 69.3 are categorically exempt from the provisions of the California Environmental Quality Act 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

Adopting new Rule 69.3.1 and amending Rule 69.3. will have no fiscal impact on the District.

Business Impact Statement

This proposal will not have a significant impact on the local business community. Two turbines needing modification to comply with Rule 69.3.1 are expected to be taken out of service for other reasons. Monsanto Nutrasweet Kelco, the only other company needing modifications to comply, is already planning to replace its three turbines with larger ones. The District met with this company a number of times and they advised they expect they will have to make very minor, if any, modifications to the replacement turbines. Accordingly, compliance costs are expected to be minimal. Amended Rule 69.3 will have no additional impact on businesses because it only provides clarifications and updates.

Alternatives

There is no viable alternative to the proposed action because adopting Rule 69.3.1 is required by state law. Amending Rule 69.3 is necessary to separately specify federal RACT requirements for federal major sources and for consistency with new Rule 69.3.1.

Advisory Statement

The Air Pollution Control Advisory Committee recommended adopting proposed new Rule 69.3.1 and proposed amendments to Rule 69.3 at its October 28, 1998, meeting.

BACKGROUND

Attachment I contains background information, information on compliance with Board policy on adopting new rules, additional information on Socioeconomic Impact Assessment requirements, information on compliance with the California Environmental Quality Act, information on the incremental cost-effectiveness of other control options, and a comparison with existing requirements.

Additional Information

Attachment II contains the Resolution adding Rule 69.3.1 to the District's Rules and Regulations, the Resolution amending Rule 69.3, and the Change Copy for Rule 69.3.

SUBJECT: Adoption of New Rule 69.3.1 (Stationary Gas Turbine Engines - Best Available Retrofit Control Technology) and Amendments to Rule 69.3 (Stationary Gas Turbine Engines)

Attachment III contains the Socioeconomic Impact Assessment of Rule 69.3.1 pursuant to the Health and Safety Code Section 40728.5.

Attachment IV contains the Comparative Analysis of Rule 69.3.1 pursuant to the Health and Safety Code Section 40727.2.

Attachment V contains identification of other control options and their absolute and incremental cost-effectiveness pursuant to the Health and Safety Code Section 40920.6.

Attachment VI contains the report for the workshop held on March 18, 1998.

Concurrence:

LAWRENCE B. PRIOR III
Chief Administrative Officer

Respectfully submitted,

BY: ALEX MARTINEZ
Acting Deputy Chief Administrative Officer

R. J. SOMMERVILLE
Air Pollution Control Officer

AIR POLLUTION CONTROL BOARD
AGENDA ITEM INFORMATION SHEET

SUBJECT: Adoption of New Rule 69.3.1 (Stationary Gas Turbine Engines - Best Available Retrofit Control Technology) and Amendments to Rule 69.3 (Stationary Gas Turbine Engines)

CONCURRENCES

12/1/98

COUNTY COUNSEL APPROVAL: Approval of Form [x] Yes [ ] N/A

Type of Form: [ ] Standard Form [ ] Ordinance [x] Resolution [ ] Contract

Review Board Letter Only [ ] Yes [x] No

CHIEF FINANCIAL OFFICER/AUDITOR REVIEW: [ ] Yes [x] N/A

Requires Four Votes: [ ] Yes [x] No

CHIEF INFORMATION OFFICER: [ ] Yes [x] N/A

DEPARTMENT OF HUMAN RESOURCES: [ ] Yes [x] N/A

CONTRACT REVIEW PANEL: [ ] Yes [x] N/A

Other Concurrences: _____ N/A

BUSINESS IMPACT STATEMENT: [x] Yes [ ] N/A

PREVIOUS RELEVANT BOARD ACTION: Rule 69.3 - September 27, 1994 (APCB #1)

BOARD POLICIES APPLICABLE: N/A

ORIGINATING DEPARTMENT: Air Pollution Control District County of San Diego

CONTACT PERSON: Richard J. Smith, Assistant Director (S50) 694-3303 MS: 0-176

R. J. SOMMERVILLE
DEPARTMENT AUTHORIZED REPRESENTATIVE

DECEMBER 16, 1998
MEETING DATE

ATTACHMENT I

ADOPTION OF NEW RULE 69.3.1 AND AMENDMENTS TO RULE 69.3.

BACKGROUND INFORMATION

Overview

State law requires the District to implement all feasible control measures limiting emissions of ozone precursors [oxides of nitrogen (NOx) and volatile organic compounds (VOCs)] including Best Available Retrofit Control Technology (BARCT). Federal law requires implementing Reasonably Available Control Technology (RACT). Accordingly, District rules must reflect RACT, BARCT and all feasible control measure mandates. Currently, Rule 69.3 satisfies RACT requirements for NOx emissions from stationary gas turbines. Proposed new Rule 69.3.1 will implement state BARCT requirements and has been identified by the state Air Resources Board (ARB) as a feasible control measure. Implementing all feasible control measures is also required if the state-mandated no-net-increase (emission offset) program is rescinded. On November 4, 1998 (Board Item #3), the Board rescinded the no-net-increase program subject to ARB concurrence. The ARB is now evaluating this action. Finally, adopting proposed new Rule 69.3.1 implements the corresponding control measure in the Board's Regional Air Quality Strategy adopted on June 17, 1998 (Board Item #4).

California's air pollution control program generally applies to more pollution sources and reflects more stringent control requirements than the federal program. Any rule included in the federal State Implementation Plan (FSIP) is enforced by the Environmental Protection Agency (EPA). Any amendment to a rule in the FSIP must be approved by EPA. To prevent EPA from becoming inappropriately involved in the California program, state law prohibits including rules in the FSIP unless such rules are necessary to meet federal requirements. To separate state and federal requirements, proposed new Rule 69.3.1 containing state BARCT requirements for NOx from gas turbines is proposed for adoption and Rule 69.3 containing federal RACT requirements is proposed for amendment. This separation will satisfy federal requirements and limit EPA involvement only to Rule 69.3. Rule 69.3.1 is not necessary to meet federal requirements and, therefore, will not be submitted to EPA for inclusion in the FSIP. EPA will have no compliance authority related to Rule 69.3.1.

Rule 69.3

Requirements

Rule 69.3 was adopted on September 27, 1994 (Board Item #1), to control NOx emissions from stationary gas turbines to meet federal RACT requirements. It applies to turbines at major (50 or more tons per year) sources of NOx required to meet federal RACT requirements and non-major (less than 50 tons per year) NOx sources not subject to federal requirements. It affects 31 turbines currently in compliance with the rule.

The title of existing Rule 69.3 is being revised to "Stationary Gas Turbine Engines - Reasonably Available Control Technology" to clarify it represents federal RACT. Other amendments revise out-of-date provisions and provide clarifications to ensure consistency with new Rule 69.3.1. No control technology requirements are being amended. Upon amendment, Rule 69.3 will be submitted to EPA as a FSIP revision. Once the rule is approved by EPA, EPA can enforce it and it will become the federally-enforceable requirement for six turbines at four major NOx sources.

Rule 69.3.1

Requirements

New Rule 69.3.1 further reduces NOx emissions from stationary gas turbine engines to meet state BARCT and all feasible measures requirements. It applies to stationary gas turbines with power ratings of 1.0 megawatt (MW) or greater and any new gas turbine with a power rating of 0.3 MW or greater. The rule closely follows BARCT Guidance for gas turbines published by ARB. It specifies NOx emission concentration limits for turbines based on their use, date of installation, power rating, and thermal efficiency. Gas turbines in compliance with the more restrictive Rule 69.3.1 will also comply with Rule 69.3.

Small turbines (less than 4 MW output) and electrical peaking turbines must meet a NOx emission limit of 42 parts per million (ppm), medium output turbines (4 to 6 MW) must meet a 25 ppm limit, and large turbines (10 MW and larger) must meet a 15 ppm limit if equipped with fuel combustion controls or 9 ppm limits if equipped with add-on emission controls. These limits apply to burning gaseous fuels, somewhat higher limits apply when firing liquid fuel. Somewhat higher limits are also allowed for gas turbines with a power rating of 2.9 MW or more, provided such turbines use heat generated from fuel combusion at an efficiency of greater than 25 percent. This encourages using more fuel efficient equipment and results in lower fuel consumption and less NOx generated.

Rule 69.3.1 requires installing, calibrating, and maintaining continuous emission monitoring (CEM) systems on turbines with power rating of 10 MW or more if operating more than 4,000 hours per year, and continuous monitors to measure and record the operational parameters of turbines and NOx emission reduction systems.

The rule also specifies recordkeeping requirements and emission test methods for determining compliance. It provides a two-year compliance schedule for existing turbines requiring modification, replacement, or new emission controls. New turbines with a power rating of 0.3 MW or greater must comply with all applicable provisions upon initial installation and startup.

The rule exempts portable gas turbines and turbines used exclusively for research, development, and testing. Turbine engines with a power rating 0.4 MW or less used in conjunction with military tactical support equipment are also exempt if they operate not more than 1,000 hours per year. There are currently no such turbines subject to the rule. In addition, the rule's emission concentration standards will not apply to turbines during startup, shutdown, or fuel change and turbines used in emergency situations.

Impacts

There are 45 existing stationary gas turbines in San Diego County emitting approximately 630 tons of NOx per year. Rule 69.3 has achieved no emission reductions because all affected turbines complied with the rule's emission limits upon adoption. The proposed amendments do not modify Rule 69.3 emission limits.

Fourteen turbines are rated less than 1 MW and are exempt from Rule 69.3.1. Of the remaining 31 turbines, 26 already comply with all requirements. Two turbines needing modifications to comply are nearing the end of their useful life and are expected to be taken out of service for other reasons. The remaining three are at one facility (Monsanto Nutrasweet Kelco) and are being replaced by new, larger turbines. These turbines are the only ones affected by the emission limitations of the rule. Several potential options for complying were considered for these

turbines. The option proposed by the company will require minor, if any, modifications to the replacement turbines. It will provide NOx emission reductions in the range of 22 to 56 tons per year depending upon actual field performance. This will provide a maximum cost-effectiveness of $2.2 per pound of NOx reduced. This is well below the cost-effectiveness of other District rules reflecting BARCT for NOx emission sources ($7 per pound).

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 Rule 69.3.1 is required by state law. Rule 69.3 amendments do not require a socioeconomic impact assessment. Rules 69.3 and 69.3.1 are consistent with this policy.

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.

Amending Rule 69.3 will not affect air quality or emissions limitations, therefore, a socioeconomic impact assessment is not required.

A socioeconomic impact assessment was prepared for new Rule 69.3.1. It indicates the rule will not have a significant socioeconomic impact on local businesses.

Rule 69.3.1 applies to 31 turbines in San Diego County located at seven businesses and public institutions. There will be no impact on 28 turbines because they comply with all new rule standards. Two turbines are expected to be taken out of service. The rule will affect only one cogeneration facility with three turbines rated 7.9 MW each belonging to Monsanto Nutrasweet Kelco. These turbines will be subject to new emission control standards stricter than currently applicable requirements of Rule 69.3.

The company proposes to replace these turbines with new 10.3 MW units. Three control options available to meet the rule requirements have been evaluated. None are expected to cause significant economic impacts. The option chosen by the company will result in 22 to 56 tons per year of NOx emission reductions at a maximum cost-effectiveness of $2.2 per pound of NOx reduced. This is well below the cost-effectiveness of other District rules reflecting BARCT ($7 per pound of NOx reduced).

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. Adopting new Rule 69.3.1 and amending Rule 69.3 will not have a significant effect on the environment, and these actions are categorically exempt from the provisions of the California Environmental Quality Act pursuant to California Code of Regulations, Title 14, Section 15308, as actions taken to assure the maintenance, restoration, enhancement, or protection of the environment where the regulatory process involves procedures for protection of the environment.

Comparison with 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 (a) requires the District to perform a written analysis identifying and comparing the air pollution control standards and other provisions of proposed new Rule 69.3.1 with existing or proposed District rules and guidelines and existing federal rules, requirements, and guidelines applying to the same source category.

The District concludes that because amendments to Rule 69.3 only clarify and update an existing rule and do not impose any new emission limit or standard, no additional analysis is required. However, Rule 69.3.1 does impose new emission limits, and a Comparative Analysis of new Rule 69.3.1 with current Rule 69.3, federal New Source Performance Standards (NSPS) Subpart GG for stationary gas turbines, and the most recent Best Available Control Technology (BACT) determination for stationary gas turbines was prepared. New Rule 69.3.1 is the same as or more stringent than amended Rule 69.3 and NSPS Subpart GG. New Rule 69.3.1 is the same or less stringent than BACT for gas turbines. There are no conflicting requirements between new Rule 69.3.1 and amended Rule 69.3, NSPS Subpart GG, or BACT for gas turbines. The analysis is presented in Attachment IV.

Incremental Cost-Effectiveness Analysis

To ensure that alternative methods of complying with emission control, monitoring, and record-keeping requirements of the proposed rule and associated costs were considered by the District, Health and Safety Code Section 40920.6 requires the District to identify one or more options achieving the emission reduction objectives for the regulation, calculate the incremental cost-effectiveness for the options, and consider and review in a public meeting the cost-effectiveness of each potential control option and the incremental cost-effectiveness between the potential control options.

Rule 69.3.1 implements BARCT requirements of the Health and Safety Code. All but five existing affected gas turbines in the county already comply with the proposed rule requirement. Two will likely be taken out of service for other reasons. The remaining gas turbines are located at a cogeneration plant belonging to Monsanto Nutrasweet Kelco. The District identified three potential control options for this company to achieve BARCT-level emission reductions and evaluated the cost-effectiveness of each option. These options and their cost-effectiveness have been discussed with the affected company on several occasions. The absolute cost-effectiveness calculations of each identified control option and the incremental cost-effectiveness between the options showed the proposed rule is the most cost-effective option. The results of the incremental cost-effectiveness analysis are presented in Attachment V.

Issue

As Rule 69.3.1 was being noticed for public hearing, San Diego Gas and Electric Company (SDG&E) informed the District that the 877 hours per year limit for gas turbines used to meet peak electrical demand (peaking turbines) may be too restrictive in the future and requested the District consider increasing the limit. Although historic peaking turbine operating hours have been well below this limit, SDG&E indicated that recent trends showed increasing use of these turbines and future usage under utility de-regulation are very uncertain. The District advised SDG&E that Rule 69.3.1 was necessary to satisfy state BARCT requirements and the 877 hours

per year limit was taken from the state ARB's BARCT Guidance document for gas turbines. Any consideration of increasing this limit would require SDG&E to provide substantial documentation and data, thorough District analysis, consultation and coordination with the ARB, and resolution of possible California Environmental Quality Act issues. This will take time. SDG&E agreed the proposed Rule 69.3.1 should be adopted at the December 16 public hearing. SDG&E and the District will work together in the first half of 1999 to address this issue. If appropriate, the District will propose amending Rule 69.3.1 at that time.

98-362 Wednesday, December 16, 1998

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

RESOLUTION AMENDING RULE 69.3 OF REGULATION IV OF THE RULES AND REGULATIONS OF THE SAN DIEGO COUNTY AIR POLLUTION CONTROL DISTRICT

On motion of Member Slater, seconded by Member Jacob 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:

Amendments to Rule 69.3 are to read as follows:

RULE 69.3 STATIONARY GAS TURBINE ENGINES - REASONABLY AVAILABLE CONTROL TECHNOLOGY

(a) APPLICABILITY

This rule shall apply to any stationary gas turbine engine with a power rating of 0.3 megawatt (MW) or greater. Any unit 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) Any gas turbine engine when operated exclusively for the research, development or testing of gas turbine engines or their components.

(ii) Any portable gas turbine engine. It is the responsibility of any person claiming this exemption to maintain records indicating the dates that such gas turbine engine was located at a stationary source. These records shall be maintained for a minimum of two calendar years by the owner or operator of such gas turbine engine and made available to the District upon request.

(iii) Any stationary gas turbine engine with a power rating less than or equal to 0.4 MW used in conjunction with military tactical support equipment operated at military sites, provided that operations do not exceed 1000 hours per calendar year. It is the responsibility of any person claiming this exemption to maintain records indicating the hours that such gas turbine engine was operated. These records shall be maintained for a minimum of two calendar years by the owner or operator of such gas turbine engine and made available to the District upon request.

(iv) Any stationary gas turbine engine with a power rating less than 1 MW which was installed and operated in San Diego County on or before September 27, 1994.

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

(i) Any emergency unit provided that operation for non-emergency purposes to ensure operability in the event of an emergency situation does not exceed 80 hours per calendar year. It is the responsibility of any person claiming this exemption to maintain records in accordance with Subsections (e)(4) and (e)(5) of this rule.

(ii) Any unit during startup, shutdown or a fuel change for a period not to exceed 120 continuous minutes. It is the responsibility of any person claiming this exemption to maintain records in accordance with Subsections (e)(3) and (e)(5) of this rule. Nothing in this rule shall be construed to limit the actual time needed to conduct a startup, shutdown or fuel change.

(c) DEFINITIONS

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

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

(i) an unforeseen electrical power failure of the serving utility or of onsite electrical transmission equipment; or

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

Emergency situation shall not include operation of any unit for training purposes or other foreseeable event, or operation of any peaking unit for the purpose of supplying power for distribution to an electrical grid.

(2) **"Emergency Unit"** means a stationary gas turbine engine used only in the event of an emergency situation. A peaking unit shall not be considered an emergency unit.

(3) **"Fuel Change"** means the transitory operating period when a switch occurs between liquid or gaseous fuels, or any combination thereof.

(4) **"Gaseous Fuel"** means natural gas, digester gas, landfill gas, methane, ethane, propane, butane, or any gas stored as a liquid at high pressure such as liquefied petroleum gas.

(5) **"Liquid Fuel"** means any fuel which is a liquid at standard conditions including but not limited to distillate oils, kerosene and jet fuel. Liquefied gaseous fuels are not liquid fuels.

(6) **"Military Tactical Support Equipment"** means any equipment owned by the U.S. Department of Defense or the National Guard and used in combat, combat support, combat service support, tactical or relief operations, or training for such operations.

(7) **"Peaking Unit"** means a stationary gas turbine engine that is operated intermittently for generation of electric power during periods of high energy demand.

(8) **"Portable Gas Turbine Engine"** means a gas turbine engine which meets the definition of a portable emission unit in Rule 20.1.

(9) **"Power Augmentation"** means an increase in the gas turbine engine shaft output, or a decrease in turbine fuel consumption, by the addition of energy recovered from exhaust heat.

(10) **"Power Rating"** means the maximum, continuous power output of a unit, in megawatts (MW) or equivalent, as certified by the manufacturer unless limited by a condition in a District Authority to Construct or a Permit to Operate. Power augmentation shall not be included in power rating.

(11) **"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.

(12) **"Shutdown"** means an action necessary to cease operation of a unit and includes the amount of time needed to safely do so.

(13) **"Stationary Gas Turbine Engine"** means any gas turbine engine system, with or without power augmentation, which is permanently attached to a foundation, or is not a portable gas turbine. Two or more gas turbines powering a common shaft shall be treated as one gas turbine.

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

(15) **"Startup"** means an action necessary to begin operation of a unit and includes the amount of time needed for a unit and ancillary equipment to achieve stable operation.

(16) **"Unit"** means any stationary gas turbine engine.

(d) STANDARDS

(1) Except as provided in Section (b), the emissions concentration of oxides of nitrogen (NOx) from any unit subject to this rule, calculated as nitrogen dioxide at 15% oxygen on a dry basis, shall not exceed the following:

(i) 42 parts per million by volume (ppmv) when operated on a gaseous fuel.

(ii) 65 parts per million by volume (ppmv) when operated on a liquid fuel.

(e) MONITORING AND RECORDKEEPING REQUIREMENTS

(1) An owner or operator of a unit which is subject to the requirements of Section (d) shall install continuous monitors to allow for monitoring of the operational characteristics of the unit and of any NOx emissions reduction system, as applicable, to demonstrate continuous compliance, such as:

(i) exhaust gas flow rate;

(ii) exhaust gas temperature;

(iii) ammonia injection rate;

(iv) water injection rate; and

(v) stack-gas oxygen content.

(2) An owner or operator of any unit with a continuous emission monitoring system (CEMS) which has been installed to measure NOx emissions pursuant to any federal regulation shall certify, calibrate and maintain the CEMS in accordance with applicable federal regulations including the reporting requirements of Sections 60.7(c), 60.7(d), and 60.13 of Title 40, Code of Federal Regulations Part 60 (40 CFR 60), performance specifications of Appendix B of 40 CFR 60, quality assurance procedures of Appendix F of 40 CFR 60, and a protocol approved in writing by the Air Pollution Control Officer.

(3) An owner or operator of any unit subject to this rule shall maintain an operating log and record actual times and duration of all startups, shutdowns and fuel changes, and the type and quantity of each fuel used.

(4) An owner or operator of an emergency unit shall maintain an operating log and record the hours of operation for non-emergency purposes and during each emergency situation. At a minimum, these records shall include the dates and actual times and duration of all startups and shutdowns, total cumulative annual hours of operation for non-emergency purposes, and a description of each emergency situation.

(5) An owner or operator of any unit subject to this rule shall maintain all records required by Section (e) for a minimum of two calendar years. These records shall be maintained on the premises and made available to the District upon request.

(f) TEST METHODS

To determine compliance with Section (d), measurement of NOx and stack-gas oxygen content shall be conducted in accordance with the District Source Test Method 100, or the Air Resources Board (ARB) Test Method 100, as approved by the U.S. Environmental Protection Agency (EPA).

(g) SOURCE TEST REQUIREMENTS AND COMPLIANCE DETERMINATION

(1) Any required source testing shall be performed at no less than 80% of the power rating. If an owner or operator of a turbine demonstrates to the satisfaction of the Air Pollution Control Officer that the turbine cannot operate at these conditions, then emissions sources testing shall be performed at the highest achievable continuous power rating.

(2) A unit subject to the requirements of Section (d) shall be tested for compliance at least annually before the Permit to Operate renewal date, unless otherwise specified in writing by the Air Pollution Control Officer. Testing shall be conducted in accordance with Section (f) and a source test protocol approved in writing by the Air Pollution Control Officer.

(3) Test reports shall include the operational characteristics, as described in Subsection (e)(1), of the unit and of all add-on NOx control systems.

(4) For the purposes of a compliance determination based on source testing, the NOx emissions concentration shall be calculated as an average of three subtests.

(5) For the purposes of a compliance determination based on CEMS data, the averaging period to calculate NOx emissions concentration shall be one clock hour.

IT IS FURTHER RESOLVED AND ORDERED that the subject amendment to Rule 69.3 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 16th day of December, 1998 by the following votes:

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

APPROVED AS TO FORM AND LEGALITY
COUNTY COUNSEL
BY _____ 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 Frank V. Galang
Frank V. Galang, Deputy

BOARD OF SUPERVISORS
COUNTY OF SAN DIEGO
SAN DIEGO COUNTY, CALIFORNIA

Resolution No. 98-362
12/16/98 (APCD 4)

NEW ADDED RULE

98-361 Wednesday, December 16, 1998

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

RESOLUTION ADDING RULE 69.3.1 TO REGULATION IV OF THE RULES AND REGULATIONS OF THE SAN DIEGO COUNTY AIR POLLUTION CONTROL DISTRICT

On motion of Member Slater, seconded by Member Jacob 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:

New Rule 69.3.1 is to read as follows:

RULE 69.3.1. STATIONARY GAS TURBINE ENGINES - BEST AVAILABLE RETROFIT CONTROL TECHNOLOGY

(a) APPLICABILITY

This rule shall apply to any existing stationary gas turbine engine with a power rating of 1.0 megawatt (MW) or greater, or to any new stationary gas turbine engine with a power rating of 0.3 MW or greater. Any unit subject to Section (d) of this rule shall not be subject to Rule 68.

(b) EXEMPTIONS

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

(i) Any gas turbine engine when operated exclusively for the research, development or testing of gas turbine engines or their components.

(ii) Any portable gas turbine engine. It is the responsibility of any person claiming this exemption to maintain records indicating the dates that such gas turbine engine was located at each stationary source. These records shall be maintained for a minimum of two calendar years by the owner or operator of such gas turbine engine and made available to the District upon request.

(iii) Any stationary gas turbine engine with a power rating less than or equal to 0.4 MW used in conjunction with military tactical support equipment operated at military sites, provided that operations do not exceed 1,000 hours per calendar year. It is the responsibility of any person claiming this exemption to maintain records indicating the hours that such gas turbine engine was operated. These records shall be maintained for a minimum of two calendar years by the owner or operator of such gas turbine engine and made available to the District upon request.

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

(i) Any emergency unit provided that operation for non-emergency purposes to ensure operability in the event of an emergency situation does not exceed 80 hours per calendar year. It is the responsibility of any person claiming this exemption to maintain records in accordance with Subsections (e)(5) and (e)(8) of this rule.

(ii) Any unit during startup, shutdown or a fuel change for a period not to exceed 120 continuous minutes. It is the responsibility of any person claiming this exemption to maintain records in accordance with Subsections (e)(4) and (e)(8) of this rule. Nothing in this rule shall be construed to limit the actual time needed to conduct a startup, shutdown or fuel change.

(c) DEFINITIONS

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

(1) **"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.

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

(i) an unforeseen electrical power failure of the serving utility or of onsite electrical transmission equipment; or

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

Emergency situation shall not include operation of any unit for training purposes or other foreseeable event, or operation of any peaking unit for the purpose of supplying power for distribution to an electrical grid.

(3) **"Emergency Unit"** means a stationary gas turbine engine used only in the event of an emergency situation. A peaking unit shall not be considered an emergency unit.

(4) **"Existing" or "Existing Unit"** means any stationary gas turbine engine which was installed and operating in San Diego County on or before (*date of adoption*).

(5) **"Fuel Change"** means the transitory operating period when a switch occurs between liquid or gaseous fuels, or any combination thereof.

(6) **"Gaseous Fuel"** means natural gas, digester gas, landfill gas, methane, ethane, propane, butane, or any gas stored as a liquid at high pressure such as liquefied petroleum gas.

(7) **"Higher Heating Value (HHV)"** means the total heat liberated, including the heat of condensation of water, per mass of fuel burned (Btu per pound) when fuel and dry air at standard conditions undergo complete combustion and all resultant products are brought to standard conditions.

(8) **"Liquid Fuel"** means any fuel which is a liquid at standard conditions including but not limited to distillate oils, kerosene and jet fuel. Liquefied gaseous fuels are not liquid fuels.

(9) **"Lower Heating Value (LHV)"** means the total heat liberated, excluding the heat of condensation of water, per mass of fuel burned (Btu per pound) when fuel and dry air at standard conditions undergo complete combustion and all resultant products are brought to standard conditions.

(10) **"Manufacturer's Rated Thermal Efficiency (MRTE)"** means the manufacturer's continuous rated percent thermal efficiency of the gas turbine engine equipped with air pollution control equipment, at peak load, after correction to lower heating value.

(11) **"Military Tactical Support Equipment"** means any equipment owned by the U.S. Department of Defense or the National Guard and used in combat, combat support, combat service support, tactical or relief operations, or training for such operations.

(12) **"New" or "New Unit"** means a stationary gas turbine engine installed in San Diego County after *(date of adoption)*.

(13) **"Peaking Unit"** means a stationary gas turbine engine that is operated intermittently for generation of electric power during periods of high energy demand.

(14) **"Portable Gas Turbine Engine"** means a gas turbine engine which meets the definition of a portable emission unit in Rule 20.1.

(15) **"Power Augmentation"** means an increase in the gas turbine engine shaft output, or a decrease in turbine fuel consumption, by the addition of energy recovered from exhaust heat.

(16) **"Power Rating"** means the maximum, continuous power output of a unit, in megawatts (MW) or equivalent, as certified by the manufacturer unless limited by a condition in a District Authority to Construct or a Permit to Operate. Power augmentation shall not be included in power rating.

(17) **"Selective Catalytic Reduction (SCR)"** means a post-combustion control technology that utilizes a reducing agent, such as ammonia, injected into the exhaust gas stream where it converts oxides of nitrogen (NOx) to molecular nitrogen in the presence of a catalyst.

(18) **"Shutdown"** means an action necessary to cease operation of a unit and includes the amount of time needed to safely do so.

(19) **"Stationary Gas Turbine Engine"** means any gas turbine engine system, with or without power augmentation, which is permanently attached to a foundation, or is not a portable gas turbine. Two or more gas turbines powering a common shaft shall be treated as one gas turbine.

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

(21) **"Startup"** means an action necessary to begin operation of a unit and includes the amount of time needed for a unit and ancillary equipment to achieve stable operation.

(22) **"Unit"** means any stationary gas turbine engine.

(23) **"Unit Thermal Efficiency (E)"** means the percent thermal efficiency of the gas turbine engine and is calculated as follows:

$$E = \frac{(MRTE)\ (LHV)}{(HHV)}$$

A gas turbine engine with an efficiency lower than 25 percent shall be assigned a unit efficiency of 25 percent.

(d) STANDARDS

(1) Except as provided for in Section (b) and Subsection (d)(2), the emissions concentration in parts per million by volume (ppmv) of nitrogen oxides (NOx) from any unit subject to this rule, calculated as nitrogen dioxide at 15% oxygen on a dry basis, shall not exceed the following:

Power Rating (Megawatts)	NOx Emissions Concentration (ppmv)	
	Gaseous Fuel	Liquid Fuel
≥0.3 and <2.9 (new units)	42	65
≥1.0 and <2.9 (existing units)	42	65
≥2.9 and <10.0	25 x E/25	65
≥10.0 without post-combustion control	15 x E/25	42 x E/25
≥10.0 with post-combustion control	9 x E/25	25 x E/25

(2) The emissions concentration in parts per million by volume (ppmv) of nitrogen oxides (NOx) from any unit subject to this rule and described below, calculated as nitrogen dioxide at 15% oxygen on a dry basis, shall not exceed the following:

Unit Description	NOx Emissions Concentration (ppmv)	
	Gaseous Fuel	Liquid Fuel
Peaking units ≥4 MW and operating less than 877 hours per calendar year	42	65
Units <4 MW and operating less than 877 hours per calendar year	42	65

(e) MONITORING AND RECORDKEEPING REQUIREMENTS

(1) An owner or operator of a unit which is subject to the requirements of Section (d) shall install, calibrate and maintain continuous monitors in accordance with the manufacturer's recommended procedures to monitor the operational characteristics of the unit and of any NOx emissions reduction system, as applicable, to demonstrate continuous compliance, such as:

(i) exhaust gas flow rate;

(ii) exhaust gas temperature;

(iii) ammonia injection rate;

(iv) water injection rate; and

(v) stack-gas oxygen content

The Air Pollution Control Officer may require recording of one or more of the above parameters as necessary to ensure compliance.

(2) An owner or operator of any unit with a power rating of 10 MW or more that operates more than 4,000 hours per calendar year shall install and operate a continuous emission monitoring system (CEMS) to measure and record NOx emissions. The CEMS shall be certified, calibrated and maintained in accordance with all applicable federal regulations including the requirements of Sections 60.7(c), 60.7(d), and 60.13 of Title 40, Code of Federal Regulations, Part 60 (40 CFR 60), performance specifications of Appendix B of 40 CFR 60, quality assurance procedures of Appendix F of 40 CFR 60, and a protocol approved by the Air Pollution Control Officer.

(3) An owner or operator of any unit with a continuous emission monitoring system which has been installed to measure NOx emissions pursuant to any federal regulation shall certify, calibrate and maintain the CEMS in accordance with applicable federal regulations including the requirements of Sections 60.7(c), 60.7(d), and 60.13 of Title 40, Code of Federal Regulations Part 60 (40 CFR 60), performance specifications of Appendix B of 40 CFR 60, quality assurance procedures of Appendix F of 40 CFR 60, and a protocol approved in writing by the Air Pollution Control Officer.

(4) An owner or operator of any unit subject to this rule shall maintain an operating log and record actual times and duration of all startups, shutdowns and fuel changes, and the type and quantity of each fuel used.

(5) An owner or operator of an emergency unit shall maintain an operating log and record the hours of operation for non-emergency purposes and during each emergency situation. At a minimum, these records shall include the dates and actual times and duration of all startups and shutdowns, total cumulative annual hours of operation for non-emergency purposes, and a description of each emergency situation.

(6) An owner or operator of a peaking unit shall maintain an operating log and record the hours of operation during periods of high energy demand, and the total cumulative hours of operation during each calendar year.

(7) An owner or operator of any unit with a power rating less than 4 MW and operating less than 877 hours per calendar year and subject to Subsection (d)(2) shall maintain an operating log and record total cumulative hours of operation during each calendar year.

(8) An owner or operator of any unit subject to this rule shall maintain all records required by Section (e) for a minimum of two calendar years. These records shall be maintained on the premises and made available to the District upon request.

(f) TEST METHODS

(1) To determine compliance with Section (d), measurement of oxides of nitrogen and stack-gas oxygen content shall be conducted in accordance with the District Source Test Method 100, or the Air Resources Board (ARB) Test Method 100 as approved by the U.S. Environmental Protection Agency (EPA).

(2) The higher heating value and lower heating value of a fuel shall be determined by the following methods or their most current versions and can be provided by a fuel supplier:

(i) ASTM Test Method D240-92 or D2382-88 for liquid fuels, and

(ii) ASTM Test Method D1826-94, or D1945-96, in conjunction with ASTM Test Method D3588-91 for gaseous fuels.

(g) SOURCE TEST REQUIREMENTS AND COMPLIANCE DETERMINATION

(1) Any required source testing shall be performed at no less than 80% of the power rating. If an owner or operator of a gas turbine engine demonstrates to the satisfaction of the Air Pollution Control Officer that the turbine cannot operate at these conditions, then emissions source testing shall be performed at the highest achievable continuous power rating.

(2) A unit subject to the requirements of Section (d) shall be tested for compliance at least annually before the Permit to Operate renewal date, unless otherwise specified in writing by the Air Pollution Control Officer. Testing shall be conducted in accordance with Section (f) and a source test protocol approved in writing by the Air Pollution Control Officer.

(3) Test reports shall include the operational characteristics, as described in Subsection (e)(1), of the unit and of all add-on NOx control systems.

(4) For the purposes of a compliance determination based on source testing, the NOx emissions concentration shall be calculated as an average of three subtests.

(5) For the purposes of a compliance determination based on CEMS data, the averaging period to calculate NOx emissions concentration shall be one clock hour.

(h) COMPLIANCE SCHEDULE

(1) An owner or operator of an existing unit requiring modification, replacement or installation of air pollution control equipment pursuant to Section (d) requirements shall meet the following increments of progress:

(i) By (*twelve months after date of adoption)* submit an application to the Air Pollution Control Officer for an Authority to Construct and Permit to Operate the modified or replacement air pollution control equipment necessary to meet the emission standards of Section (d) of this rule.

(ii) By (*twenty-four months after date of adoption*) demonstrate compliance with the emission standards specified in Section (d) and all other applicable provisions of this rule.

(2) By (*six months after date of adoption)* , an owner or operator of an existing unit not requiring modification, replacement or installation of additional air pollution control equipment pursuant to Section (d) shall submit an application to modify conditions on the Permit to Operate as necessary to comply with the applicable requirements of Sections (d) and (e).

(3) An owner or operator of a new or replacement unit shall comply with all applicable provisions of this rule upon initial installation and commencement of operation.

IT IS FURTHER RESOLVED AND ORDERED that the subject addition of Rule 69.3.1 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 16th day of December, 1998 by the following votes:

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

APPROVED AS TO FORM AND LEGALITY
COUNTY COUNSEL
BY _____ 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 _____
Frank V. Galang, Deputy

BOARD OF SUPERVISORS
COUNTY OF SAN DIEGO
SAN DIEGO COUNTY, CALIFORNIA

Resolution No. 98-361
12/16/98 (APCD 4)

Resolution/Rule 69.3.1

AIR POLLUTION CONTROL DISTRICT
COUNTY OF SAN DIEGO

CHANGE COPY
PROPOSED AMENDMENTS TO RULE 69.3

Proposed amendments to Rule 69.3 are to read as follows:

RULE 69.3 STATIONARY GAS TURBINE ENGINES - REASONABLY AVAILABLE CONTROL TECHNOLOGY

(a) APPLICABILITY

This rule shall apply ~~to any existing stationary gas turbine engine with a power rating of 1.0 megawatt (MW) or greater, or~~ to any ~~new~~ stationary gas turbine engine with a power rating of 0.3 megawatt (MW) or greater. Any unit subject to ~~Section (d) of~~ this rule shall not be subject to Rule 68.

(b) EXEMPTIONS

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

(i) Any gas turbine engine when operated exclusively for the research, development or testing of gas turbine engines or their components.

(ii) Any portable gas turbine engine. ~~located at a stationary source 180 days or less in a consecutive 12 month period~~. It is the responsibility of any person claiming this exemption to maintain records indicating the dates that such gas turbine engine was located at a stationary source. These records shall be maintained for a minimum of two calendar years by the owner or operator of such gas turbine engine and made available to the District upon request.

(iii) ~~New~~ Any stationary gas turbines engine with a power rating less than or equal to 0.4 MW used in conjunction with military tactical ~~deployable~~ support equipment operated at military sites, provided that operations do not exceed 1000 hours per calendar year. It is the responsibility of any person claiming this exemption to maintain records indicating the hours that such gas turbine engine was operated. These records shall be maintained for a minimum of two calendar years by the owner or operator of such gas turbine engine and made available to the District upon request.

(iv) Any stationary gas turbine engine with a power rating less than 1 MW which was installed and operated in San Diego County on or before September 27, 1994.

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

(i) Any emergency unit provided that operation for ~~maintenance~~ non-emergency purposes to ensure operability in the event of an emergency situation does not exceed 80 hours per calendar year. It is the responsibility of any person claiming this exemption to maintain records in accordance with Subsections (e)~~(2)~~(4) and (e)~~(6)~~(5) of this rule.

(ii) Any unit during startup, shutdown or a fuel change for a period not to exceed 120 continuous minutes. It is the responsibility of any person claiming this

exemption to maintain records in accordance with Subsections (e)(3) and (e)~~(6)~~ (5) of this rule. Nothing in this rule shall be construed to limit the actual time needed to conduct a startup, shutdown or fuel change.

(c) **DEFINITIONS**

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

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

(i) an unforeseen electrical power failure of the serving utility or of onsite electrical transmission equipment; or

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

Emergency situation shall not include operation of any unit for training purposes or other foreseeable event, or operation of any peaking unit for the purpose of supplying power for distribution to an electrical grid.

(2) **"Emergency Unit"** means a stationary gas turbine engine used only in the event of an emergency situation. A peaking unit shall not be considered an emergency unit.

~~(3) **"Existing" or "Existing Unit"** means any stationary gas turbine engine which was installed and operating in San Diego County on or before September 27, 1994.~~

~~(4)~~(3) **"Fuel Change"** means the transitory operating period when a switch occurs between liquid or gaseous fuels, or any combination thereof.

~~(5)~~(4) **"Gaseous Fuel"** means natural gas, digester gas, landfill gas, methane, ethane, propane, butane, or any gas stored as a liquids at high pressure such as liquefied petroleum gas.

~~(6)~~(5) **"Liquid Fuel"** means any fuel which is a liquid at standard conditions including but not limited to distillate oils, kerosene and jet fuel. Liquefied gaseous fuels are not liquid fuels.

~~(7)~~(6) **"Military Tactical ~~Deployable~~ Support Equipment"** means any equipment ~~operated by the United States armed forces or~~ owned by the U.S. Department of Defense or the National Guard and used in combat, combat support, combat service support, tactical or relief operations, or training for such operations ~~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 non-emergency which has been standardized throughout the United States military and/or NATO forces~~.

~~(8) **"New" or "New Unit"** means a stationary gas turbine engine installed in San Diego County after September 27, 1994.~~

~~(9)~~(7) **"Peaking Unit"** means a stationary gas turbine engine that is operated intermittently for generation of electric power during periods of high energy demand.

~~(10)~~(8) **"Portable Gas Turbine Engine"** means a gas turbine engine which meets the definition of a portable emission unit in Rule 20.1. ~~a gas turbine 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 gas turbine engines 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 gas turbine engines are stored in a designated holding or storage area shall not be counted towards the 180 day limit, provided the gas turbine engine was not operated on that calendar day except for non-emergency and was in the designed holding area the entire calendar day.~~

~~(11)~~(9) **"Power Augmentation"** means an increase in the gas turbine engine shaft output, or a decrease in turbine fuel consumption, by the addition of energy recovered from exhaust heat.

~~(12)~~(10) **"Power Rating"** means the maximum, continuous power output of a unit, in megawatts (MW) or equivalent, as certified by the manufacturer unless limited by a condition in a District Authority to Construct or a Permit to Operate. Power augmentation shall not be included in power rating.

(11) **"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.

~~(13)~~(12) **"Shutdown"** means an action necessary to cease operation of a unit and includes the amount of time needed to safely do so.

~~(14)~~(13) **"Stationary Gas Turbine Engine"** means any gas turbine engine system, with or without power augmentation, which is permanently attached to a foundation, or is not a portable gas turbine. Two or more gas turbines powering a common shaft shall be treated as one gas turbine.

~~(15)~~(14) **"Stationary Source"** means the same as defined in Rule ~~20.1~~ 2.

~~(16)~~(15) **"Startup"** means an action necessary to begin operation of a unit and includes the amount of time needed for a unit and ancillary equipment to achieve stable operation.

~~(17)~~(16) **"Unit"** means any stationary gas turbine engine.

(d) **STANDARDS**

(1) Except as provided in Section (b), ~~The~~ the emissions concentration of oxides of nitrogen (NOx) from any unit subject to this rule, calculated as nitrogen dioxide at 15% oxygen on a dry basis, shall not exceed the following:

(i) 42 parts per million by volume (ppmv) when operated on a gaseous fuel.

(ii) 65 parts per million by volume (ppmv) when operated on a liquid fuel.

(e) MONITORING AND RECORDKEEPING REQUIREMENTS

(1) An owner or operator of a unit which is subject to the requirements of Section (d) shall install continuous monitors to allow for monitoring of the operational characteristics of the unit and of any NOx emissions reduction system, as applicable, to demonstrate continuous compliance, such as:

(i) exhaust gas flow rate;

(ii) exhaust gas temperature;

(iii) ammonia injection rate;

(iv) water injection rate; and

(v) stack-gas oxygen content.

~~(5)~~(2) ~~For any existing unit,~~ An owner or operator of any unit with a continuous emissions ~~monitors~~ monitoring system (CEMS) which has ~~have~~ been installed to measure NOx emissions pursuant to any federal regulation shall ~~be certified, calibrated and maintained~~ certify, calibrate and maintain the CEMS in accordance with applicable federal regulations including the reporting requirements of Sections 60.7(c), 60.7(d), and 60.13 of Title 40, Code of Federal Regulations Part 60 (40 CFR 60), performance specifications of Appendix B of 40 CFR 60, quality assurance procedures of Appendix F of 40 CFR 60, and a protocol approved in writing by the Air Pollution Control Officer.

(3) An owner or operator of any unit subject to this rule shall maintain an operating log and record actual times and duration of all startups, shutdowns and fuel changes, and the type and quantity of each fuel used.

~~(4) Continuous monitors shall be installed, calibrated and maintained in accordance with applicable federal regulations and a protocol approved in writing by the Air Pollution Control Officer.~~

~~(2)~~(4) An owner or operator of an emergency unit shall maintain an operating log and record the hours of operation for ~~maintenance~~ non-emergency purposes and during ~~an~~ each emergency situation. At a minimum, these records shall include the dates and actual times and duration of all startups and shutdowns, total cumulative annual hours of operation for ~~maintenance~~ non-emergency purposes, and a description of ~~any~~ each emergency situation.

~~(6)~~(5) ~~The~~ An owner or operator of any unit subject to this rule shall maintain all records required by Section (e) for a minimum of ~~three~~ two calendar years. These records shall be maintained on the premises and made available to the District upon request.

(f) TEST METHODS

~~(1)~~ To determine compliance with Section (d), measurement of oxides of nitrogen and stack-gas oxygen content shall be conducted in accordance with the ~~ARB~~ District Source Test Method 100, or the Air Resources Board (ARB) Test Method 100, as approved by the U.S. Environmental Protection Agency (EPA).

~~(2) The averaging period to calculate NOx emissions concentration shall be any thirty consecutive minute period.~~

~~(3) Measurements of emissions concentrations shall not include calibration or span check measurements of the emissions testing equipment.~~

(g) SOURCE TEST REQUIREMENTS AND COMPLIANCE DETERMINATION

(1) Any required ~~S~~source testing shall be performed at no less than 80% of the power rating. If an owner or operator of a ~~an existing~~ turbine demonstrates to the satisfaction of the Air Pollution Control Officer that the turbine cannot operate at these conditions, then emissions sources testing shall be performed at the highest achievable continuous power rating.

(2) A unit subject to the requirements of Section (d) shall be tested for compliance at least annually before the Permit to Operate renewal date ~~once every 12 months~~, unless otherwise specified in writing by the Air Pollution Control Officer. Testing shall be conducted in accordance with Section (f) and a source test protocol approved in writing by the Air Pollution Control Officer.

(3) Test reports shall include the operational characteristics, as described in Subsection (e)(1), of the unit and of all add-on NOx control systems.

(4) For the purposes of a compliance determination based on source testing, the NOx emissions concentration shall be calculated as an average of three subtests.

(5) For the purposes of a compliance determination based on CEMS data, the averaging period to calculate NOx emissions concentration shall be one clock hour.

~~(h) COMPLIANCE SCHEDULE~~

~~(1) An owner or operator of an existing unit shall be in compliance with all applicable provisions of this rule no later than May 31, 1995.~~

~~(2) Any person installing a new unit subject to the provisions of this rule shall comply with the applicable provisions of Section (d) upon initial installation and commencement of operation.~~

SOCIOECONOMIC IMPACT ASSESSMENT

PROPOSED RULE 69.3.1-
STATIONARY GAS TURBINE ENGINES -
BEST AVAILABLE RETROFIT CONTROL TECHNOLOGY

OCTOBER 1998

San Diego County
Air Pollution Control District
9150 Chesapeake Drive
San Diego, CA 92123

SOCIOECONOMIC IMPACT ASSESSMENT

PROPOSED RULE 69.3.1-
STATIONARY GAS TURBINE ENGINES -
BEST AVAILABLE RETROFIT CONTROL TECHNOLOGY

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EXECUTIVE SUMMARY

This report presents the results of a Socioeconomic Impact Analysis (SIA) of the San Diego County Air Pollution Control District's proposed new Rule 69.3.1 (Stationary Gas Turbine Engines - Best Available Retrofit Control Technology). 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 gas turbines. It imposes limits on the NOx emission concentrations in the turbine exhaust depending on turbine power rating, type of fuel used, and the mode of operations and annual hours of turbine operation. If implemented, the rule will reduce NOx emissions in a range between 22.5 and 135 tons per year at an estimated overall cost-effectiveness between $2.2 and $5.9 per pound of NOx reduced.

Rule 69.3.1 applies to 31 turbines in San Diego County located at businesses and public institutions representing eight different industries. The majority of turbines (26) are already in compliance with all rule requirements. It is expected that two turbines at one facility will be taken out of service and will not be replaced. The other facility operating the three remaining turbines is expected to replace them with new, larger turbines. Several options for complying with the rule were considered for the existing and replacement turbines. None of them will result in significant economic impacts on the affected facility.

1. INTRODUCTION

Section 40728.5 of the State 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 and Safety Code specifies the following elements to 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 or regulation.

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

d. The emission reduction potential of the rule or regulation.

This report contains the assessment of the socioeconomic impacts of new proposed Rule 69.3.1 - Stationary Gas Turbine Engines - Best Available Retrofit Control Technology.

2. THE NECESSITY OF ADOPTING RULE 69.3.1

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

San Diego County attains both federal and state standards for nitrogen dioxide. However, it does not meet the federal and state ambient air quality standards for ozone. The county is classified by both 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 the 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 gas turbines as a feasible measure to reduce NOx emissions from combustion sources.

In addition, the California Clean Air Act requires that serious ozone nonattainment areas reduce emissions from existing stationary sources by installation of BARCT. BARCT is defined as achieving the maximum degree of emissions reduction considering energy, environmental, and economic impacts. A statewide BARCT determination for stationary gas turbines was published by ARB in 1992.

New proposed Rule 69.3.1 will reflect BARCT for stationary gas turbines as required by state law. Rules similar to proposed Rule 69.3.1 have already been adopted by other California air districts that do not attain state air quality standards for ozone.

3. RULE 69.3.1 REQUIREMENTS

Currently, NOx emissions from turbines in San Diego County are regulated by Rule 69.3 - Stationary Gas Turbine Engines. This rule was adopted in 1994 and subsequently approved into the State Implementation Plan (SIP) by EPA and meets the Reasonably Available Control Technology (RACT) requirements of the Federal Clean Air Act. It applies to any stationary turbine with a power rating of 0.3 megawatts (MW) or greater and requires the turbines to meet the NOx emission concentration limits specified for gaseous and liquid fuels. In addition, the rule specifies monitoring, record-keeping and testing requirements to ensure compliance. The rule also identifies turbines that are exempt from the emission standard requirements.

New Rule 69.3.1 will apply to all existing stationary gas turbines in San Diego County that have a power rating of 1.0 MW or greater and to any new stationary gas turbine that has a power rating of 0.3 MW or greater. Specifically, the proposed rule will:

- Establish NOx emission concentration limits for turbines based on their use, power rating, and thermal efficiency. Rule limits are presented in Table 1.
- Require installation of continuous monitors to measure and record appropriate operational parameters of turbines and NOx emissions reduction systems.
- Require installation of continuous emission monitoring systems (CEMS) on any turbine with a power rating of 10 MW or greater that operates more than 4,000 hours per calendar year.
- Specify that CEMS installed pursuant to any federal regulation must be certified, calibrated, and maintained in accordance with all applicable federal regulations.
- Specify records be kept for all turbines subject to or exempt from rule requirements.

- Specify source test requirements and require annual source testing for all turbines subject to the emission concentration standards unless otherwise specified by the Air Pollution Control Officer.
- Specify test methods for determining compliance with the rule.
- Specify separate procedures for determining compliance based on CEMS data and source test results.
- Provide a compliance schedule for turbines that will require modification, replacement or installation of air pollution control equipment to comply with the rule requirements. New turbines will be required to comply with all applicable provisions upon initial installation and startup.

Rule 69.3.1 will exempt portable gas turbines and turbines used exclusively for research, development, and testing of turbine engines or their components. Stationary turbine engines with a power rating 0.4 MW or less used in conjunction with military tactical support equipment will also be exempt if they do not operate more than 1,000 hours per year. In addition, the emission concentration limits of the rule will not apply to any turbines during startup, shutdown, or a fuel change, nor to turbines used in emergency situations.

Concurrently with adopting new Rule 69.3.1, the District will amend existing Rule 69.3 to provide necessary updates and clarifications. The title of Rule 69.3 will also be revised by adding "Reasonably Available Control Technology" to indicate that its requirements represent federal RACT. Following adoption, amended Rule 69.3 will be submitted to EPA as a SIP revision and applied only to federal major sources of NOx emissions (sources emitting 50 tons of NOx per year or more). Once approved by EPA, amended Rule 69.3 will be an applicable federal requirement for major sources of NOx emissions under the Federal Operating Permit Program (Title V). Until then, existing Rule 69.3. will apply to the Title V sources .

Proposed new Rule 69.3.1 will apply state BARCT requirements to turbines in San Diego County located at major and non-major sources. The District does not intend to submit Rule 69.3.1 for inclusion in the SIP . Thus, Rule 69.3.1 will not be a federally-applicable or enforceable requirement. Separating RACT (Rule 69.3) and BARCT (Rule 69.3.1) requirements will also allow the District to simplify and clarify implementation and enforcement procedures for local, state, and federal purposes.

The comparison between existing Rule 69.3 and proposed new Rule 69.3.1 shows that the rules have many similarities. Both have the same format, similar turbine size applicability limit, the same exemptions, and similar monitoring and recordkeeping requirements. Rule 69.3.1 does not introduce any other administrative requirements that will result in additional costs for the affected facilities. The NOx emission limits in both rules are the same for small turbines (less than 2.9 MW) and peaking turbines.

However, Rule 69.3.1 imposes more stringent emission limits on turbines 2.9 MW and larger and operating more than 877 hours per year. Rule 69.3.1 also requires installation of CEMS for units of 10 MW and larger. In addition, it establishes two different sets of NOx emission concentration limits for turbines with or without add-on control equipment. The higher limits for turbines without add-on controls follow the statewide RACT/ BARCT Guidance and are intended to encourage the application of combustion modifications such as dry low NOx technology as a pollution prevention technique.

The economic impact of the Rule 69.3.1 requirements that are more stringent than current Rule 69.3 will be discussed in this report. The economic impacts of Rule 69.3 were previously assessed at the time of its adoption (1994).

TABLE 1. PROPOSED RULE 69.3.1 - NOx EMISSION CONCENTRATION LIMITS FOR STATIONARY GAS TURBINE ENGINES

Power Rating (Megawatts)	NOx Emissions Concentration (ppmv)	
	Gaseous Fuel	Liquid Fuel
≥0.3 and <2.9 (new units)	42	65
≥1.0 and <2.9 (existing units)	42	65
≥2.9 and <10.0	25 x E/25	65
≥10.0 without post-combustion control	15 x E/25	42 x E/25
≥10.0 with post-combustion control	9 x E/25	25 x E/25

Unit Description	NOx Emissions Concentration (ppmv)	
	Gaseous Fuel	Liquid Fuel
Peaking units ≥4 MW and operating less than 877 hours per calendar year	42	65
Units less than 4 MW and operating less than 877 hours per calendar year	42	65

The emissions concentration in parts per million by volume (ppmv) of NOx is calculated as nitrogen dioxide at 15% oxygen on a dry basis.

E is a turbine unit thermal efficiency calculated according to a formula provided in the rule.

4. TYPE OF INDUSTRIES REGULATED BY RULE 69.3.1

The proposed rule will apply to 31 turbines owned by businesses and public institutions representing eight different industries as shown in Table 2. None of them can be characterized as a small business.

TABLE 2
INDUSTRIES REGULATED BY RULE 69.3.1

SIC Code	Industries	Affected Companies	Number of Turbines
2711	Newspaper	1	1
2833	Medicinals & Botanicals	1	3
3728	Aircraft Engines and Parts	1	2
4931	Electric & Other Services	1	19
7999	Amusement & Rec. Services	1	1
8221	Universities	1	1
9223	Correctional Institutions	1	1
9711	Military Installations	3	3
	Total	10	31

There are 12 cogeneration turbine units used for electricity and steam generation and 19 peaking turbine units owned by electric utility company that provide electricity in periods of high power demand.

5. STATUS OF TURBINES SUBJECT TO NEW EMISSION LIMITS OF RULE 69.3.1

All turbines subject to the emission standards of current Rule 69.3 must comply with a NOx emission concentration limit of 42 ppmv when operating on gaseous fuel and 65 ppmv when operating on liquid fuel.

New Rule 69.3.1 separates these turbines into several categories depending on a turbine size and usage and specifies the NOx emission limits for each category. The present status of turbines that will be the subject of new emission or operating time limitations is as follows.

A. Turbines rated 10 MW and larger.

There are four such turbines in San Diego County. They are all combined cycle cogeneration turbines larger than 20 MW equipped with water injection, followed by post-combustion NOx emission control - Selective Catalytic Reduction (SCR). The emission controls on these turbines were installed to satisfy the Best Available Control Technology (BACT) requirements of the District's New Source Review rules. These units will be able to comply with Rule 69.3.1 NOx emission concentration standards without additional modifications. These turbines also have CEMS installed and already meet the new monitoring requirements of Rule 69.3.1.

B. Turbines rated at 2.9 MW or higher but less than 10 MW.

This category of turbines consists of five small cogeneration units rated at 2.9 MW, or slightly above, and three 7.9 MW units.

These turbines will be subject to the more stringent limits of 25 ppm while operating on gaseous fuel. The limits for liquid fuel will remain the same. These turbines presently use water injection as an emission control technique. The results of source tests conducted in the past few years showed that three of the five turbines can comply with the Rule 69.3.1 NOx emission concentration limits without additional modifications.

The two remaining turbines in this group are rated at 3.5 MW and will require an increase in water injection rate in order to comply with Rule 69.3.1 emission limits. However, based on information provided by the facility, these turbines are already planned to be taken out of service in the near future because they are close to the end of their useful life. In addition, the facility stated that it is currently not cost-effective to use these turbines for power generation because it is cheaper to buy electricity from outside sources.

The three 7.9 MW turbines in this category are used for cogeneration and located at the same facility. These turbines will be subject to a more stringent NOx emission concentration limit of 25 ppmv (gaseous fuel) than the present Rule 69.3 limit of 42 ppm. Emission limits for liquid fuel operations will remain at the same level, 65 ppmv. These three turbines will require significant modification or add-on control equipment to comply with proposed Rule 69.3.1. The impacts on this facility are discussed in detail in Section 6 of this report.

C. Peaking Turbines

There are 19 peaking units in the District rated at 18 MW or higher. All currently use water injection to reduce NOx emissions and comply with emission limits of Rule 69.3. Rule 69.3.1 will require these units to comply with the same NOx emission standards as the current rule. Therefore, these units will not need to be modified to comply with Rule 69.3.1 limits for peaking turbines.

Rule 69.3.1 will limit peaking turbines operation time to less than 877 hours per year. Rule 69.3 has no operation time constraints. However, the proposed time limitation should not affect the operation of these units because historically they have been used for much shorter time than 877 hours per year. In the period between 1992 and 1997, the highest average annual operating time of any peaking unit was about 100 hours and none of the units operated more than 230 hours in any single year.

The data presented in this section show that, with the exception of three 7.9 MW units, all existing turbines in the District will be able to operate in compliance with the emission limits and monitoring requirements of proposed Rule 69.3.1. Therefore, the rule is expected to affect only these three turbines at one facility. A discussion of these turbines and the facility's control options is provided below.

6. COGENERATION FACILITY AFFECTED BY RULE 69.3.1 EMISSION LIMITS

The existing three 7.9 MW units (90-T-12000 Solar Mars turbines) are part of a cogeneration plant located at a facility (SIC Code 2833) that manufactures specialized additives (alginates and biogums) used in the pharmaceutical industry, in food processing, and other industries. The turbines are currently derated to an output of 7.9 MW each. They are equipped with water injection to reduce NOx emissions and are presently in compliance with all Rule 69.3 requirements including the NOx emission limits of 42 ppmv and 65 ppmv when firing on gas and oil, respectively.

Proposed new Rule 69.3.1 will impose stricter NOx emission limits (25 ppmv) on these turbines when operating on gaseous fuel, consistent with state BARCT requirements. The NOx emission limits for operating on liquid fuel will remain the same at 65 ppmv. To comply with the proposed emission limits, the facility will have to retrofit existing turbines either with combustion modifications (e.g., dry low NOx combustor) or with post-combustion controls (e.g., selective catalytic reduction). Information provided by the facility[1] and the manufacturer of the existing turbines indicates that a retrofit dry low NOx combustor that will comply with Rule 69.3.1 NOx emission concentration limits is not available for turbines of this size. The other option, the installation of post-combustion control, is technically feasible and is presently used on similar turbines in California. The expected NOx emission reductions, capital and annual costs, and cost-effectiveness of this option are provided in Table 3.

TABLE 3. EXISTING 7.9 MW TURBINES - NOx EMISSION REDUCTIONS AND COST OF COMPLIANCE WITH RULE 69.3.1

Turbine Description	Add-on control technology	NOx emission reductions, tons/year *	Total Capital Costs, $M	Total Annual Costs, $M/year	Cost-effectiveness/$/lb NOx reduced
7.9 MW with water injection	SCR	135	4.4	1.6	5.9

The table shows that Selective Catalytic Reduction (SCR) retrofit of these existing turbines will result in a capital expenditure of $4.4 million and annual operational costs of approximately $1.6 million. It will provide 135 tons per year NOx emission reductions at a cost-effectiveness of $5.9 per pound of NOx reduced. While capital and annual operating costs of turbines retrofit with SCR are significant, the cost-effectiveness of this technology is below the estimated cost-effectiveness of $7 per pound for District Rule 69.2 reflecting BARCT requirements for NOx emissions from industrial and commercial boilers, heaters, and steam generators.

The facility most significantly affected by proposed Rule 69.3.1 is a large company with annual sales of approximately $300 million in 1994[2]. The company was acquired by Monsanto in 1995 and is now a part of Monsanto's Nutrition and Consumer Products segment. Economic data, such as company's profitability or other financial indicators, necessary for the quantitative determination of probable economic impacts on this facility were not available to the District. However, the 1997 Monsanto annual report states that "biogum sales grew 14 percent because of record consumer demand" in 1997, and approximately 15% in the previous year[3]. It may be assumed that the annual sales of biogum and alginate products, manufactured by the facility subject to Rule 69.3.1, was at

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* Emission reductions were calculated using the District 1997 Emission Inventory as a baseline.

least $400 million in 1997. Therefore, the annual cost of compliance with Rule 69.3.1, if the option described above is chosen, would amount to less than 0.5% of the annual sales and is not expected to significantly impact the company's operations.

The facility has informed the District that the existing turbines are close to the end of their useful life, and it intends to replace them with three new 10.3 MW units within the next 18 months. These new units are proposed to be equipped with Dry Low NOx combustor (DLN) technology and operate exclusively on natural gas. The manufacturer guarantees NOx emission concentrations of 25 ppmv. The facility is planning to sell the excess power produced by these three turbines to outside customers.

As proposed, these turbines will not comply with Rule 69.3.1 emission standards. The rule requires the NOx emission concentration limits for turbines 10 MW and larger and operating on gaseous fuel to be not more than 9 ppmv with post-combustion control and not more than 15 ppmv without add-on control. Based on the expected 30% thermal efficiency of the turbines, the limits will be 12 ppmv and 18 ppmv, respectively (see Table 1). In addition, the replacement turbines will have to comply with the District New Source Review rules that require the installation of BACT. The District is presently evaluating BACT requirements that will apply to these turbines.

After extensive discussions with the affected facility, the District has evaluated several control options available for the proposed and alternative replacement turbines in order to comply with Rule 69.3.1 requirements. The cost information used in this evaluation was provided by the facility and equipment manufacturers[4]. These options are as follows:

1. Post-combustion NOx emission control for the proposed 10.3 MW turbines equipped with DLN combustors. This assumes that the facility will install SCR as add-on control technology.

2. Post-combustion control for alternative 10.3 MW replacement turbines with standard combustors and water injection. This assumes that the replacement turbines will have a conventional combustor equipped with water injection followed by SCR.

3. Derating the proposed 10.3 MW turbines equipped with DLN technology to 9.9 MW to comply with the 25 ppm NOx emission concentration limit for this turbine size. No additional control is needed for this option.

It should be noted that although the turbine manufacturer only guarantees NOx emission rates of 25 ppm, test cell data for these turbines indicate they may be able to meet an 18 ppm efficiency adjusted limit. It is also possible this performance level can be achieved in actual operating conditions. In this case, Option 3 may be needed only as a temporary measure until compliance with Rule 69.3.1 limits, at full-rated capacity, can be demonstrated.

Table 4 presents a summary of available control options and their costs for the proposed 10.3 MW replacement turbines. The fourth option represents the hypothetical case discussed above where the replacement turbines would comply with the applicable limit of Rule 69.3.1 without derating. The cost of installing and operating new turbines equipped with DLN combustors (or conventional combustors with water injection) was not included in the cost-effectiveness calculations because the proposed rule does not require the facility to install new, larger turbines. Replacing the existing turbines with more powerful ones is the company's business decision driven by the intent to sell a significant portion of the generated electrical power. This approach is also consistent with a company request that the working assumption in cost calculations for Rule 69.3.1 should be that 10.3 MW turbines with DLN are installed and operational[4]. Therefore, for the purpose of estimating the cost impact of the proposed rule, only the costs of add-on controls (or other turbine modifications) to comply with Rule 69.3.1 emission standards were considered. The cost of additional monitoring,

recordkeeping, and source testing requirements were included in the calculations of the operational costs of add-on controls. No such costs were considered for Options 3 or 4 (turbine replacement) because monitoring, recordkeeping, and source testing requirements of Rule 69.3.1 are identical to current Rule 69.3.

It was also assumed that the new 10.3 MW turbines will be in compliance with the New Source Review rule BACT requirements.

Table 4 shows that the application of add-on control technology would provide significantly higher emission reductions than the use of turbines with DLN derated below 10 MW. This is a result of the much higher emission control potential of SCR versus combustion modifications. The cost-effectiveness of SCR is also below the estimated cost-effectiveness of District Rule 69.2 ($7/lb) that established BARCT limits for NOx emissions from industrial and commercial boilers.

However, the application of add-on control technology to the replacement turbines will require a sizable capital investment and significant on-going annual operating costs. The additional cost of turbine derating resulting in the loss of power sales at times of peak power load demand and some heat rate penalty is comparatively low.

It is expected that this facility will choose to comply with Rule 69.3.1 limits by derating the 10.3 MW turbines to 9.9 MW because it is the most economically attractive option. The NOx emission reductions and the cost-effectiveness in this case as shown in Table 4 are 22.5 tons per year of NOx reduced and $2.2/lb, respectively.

It is also expected that during the two-year period before the rule's final implementation date, the facility will collect actual NOx emission concentration data. As discussed previously, the turbine manufacturer's test cell data show it is possible that the turbines will comply with the NOx emission limit (18 ppm on gaseous fuel) of Rule 69.3.1 for turbines rated at 10 MW and larger. If the limit (18 ppm) is achieved continuously during actual turbine operations, the derating will not be necessary. In this case, the expected NOx emission reductions will be approximately 56 tons per year without any additional costs to the facility beyond those associated with the turbine replacements.

In both cases, whether the 10.3 MW turbines equipped with the low NOx combustor are used with or without derating, compliance with Rule 69.3.1 emission control requirements will not have noticeable economic impacts on the affected facility.

7. CONCLUSIONS

Proposed Rule 69.3.1 will apply to 31 turbines in San Diego County. The majority of turbines (26) are already in compliance with all proposed rule requirements. Two turbines that would require modifications to comply with the rule are expected to be taken out of service and will not be replaced. The remaining three turbines at one facility that otherwise would require installation of add-on controls are planned to be replaced with larger turbines. Several control options available to these turbines to meet the rule requirements have been evaluated; none of them are likely to cause significant economic impacts. The cost-effectiveness of these control options is in a range between $2.2 and $5.9 per pound of NOx reduced, which is below the estimated cost-effectiveness of other currently adopted District rules regulating NOx emissions. Depending on the control option chosen by the facility, the expected NOx emission reduction from the one affected facility could range from 22.5 to 135 tons per year.

TABLE 4. SUMMARY OF THE CONTROL OPTIONS FOR PROPOSED REPLACEMENT TURBINES SUBJECT TO RULE 69.3.1

Turbine Description	Add-on Control Technology	Applicable Rule 69.3.1 limit, ppmv		NOx emission reductions, tons/year [1]	Total Capital Costs, $M	Total Annual Costs, $M/year	Cost-effectiveness, $/lb NOx reduced
		Gas	Oil				
New 10.3 MW with DLN and add-on control	SCR	10.8	30	130	4.4	1.6	6.1
New 10.3 MW with WI and add-on control	SCR	9	25	135	5.3	1.8	6.6
New 10.3 MW with DLN derated to 9.9 MW	none	25	65	22.5	no additional costs	0.1	2.2
New 10.3 MW with DLN[2]	none	18	42	56	no additional costs	no additional costs	n/a

1 Emission reductions are calculated compared to the District's 1997 Emission Inventory for this facility.

2 This option assumes that the turbines will be able to comply with 18 ppm limit when operating on gaseous fuel.

REFERENCES

1. Letter from Bill Powers, Powers Engineering, to Ralph Ordonez, May 21, 1998.

2. "Kelco Sails in New Seas," San Diego Union, April 26, 1994, San Diego, California.

3. Monsanto Annual Report, 1997, p. 38.

4. Letter from Bill Powers, Powers Engineering, to Mike Lake, San Diego Air Pollution Control District, August 3, 1998.

COMPARATIVE ANALYSIS

RULE 69.3.1 (STATIONARY GAS TURBINE ENGINES - BEST AVAILABLE RETROFIT CONTROL TECHNOLOGY)

STATUTORY 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 (a) requires the District to perform a written analysis identifying and comparing the air pollution control standards and other provisions of proposed new Rule 69.3.1 with existing or proposed District rules and guidelines and existing federal rules, requirements, and guidelines applying to the same source category.

ANALYSIS

Currently, stationary turbine engines are regulated by District Rule 69.3 reflecting federal Reasonably Control Technology (RACT) requirements. Proposed Rule 69.3.1 satisfies Best Available Retrofit Control Technology (BARCT) requirements of the Health and Safety Code. The District does not intend to submit Rule 69.3.1 to be included in the federal State Implementation Plan (FSIP). Thus, Rule 69.3.1 will not be a federally-applicable or enforceable requirement. Amended Rule 69.3 will be submitted for inclusion in the FSIP. Once approved, it will become the applicable and enforceable federal requirement for major (50 or more tons per year) sources of NOx emissions.

CONCLUSION

A comparative analysis between proposed new Rule 69.3.1 and amended Rule 69.3 - Stationary Gas Turbine Engines, federal New Source Performance Standards (NSPS) Subpart GG - Stationary Gas Turbines, and the District's most recent Best Available Control Technology (BACT) determination for a stationary gas turbine installed in 1994 was conducted regarding applicability, exemptions, emission limits, monitoring, and recordkeeping requirements. The analysis shows new Rule 69.3.1 and amended Rule 69.3 have many similarities including format, turbine size applicability, exemptions, and monitoring and recordkeeping requirements (Table 1). Rule 69.3.1 has more stringent emission limitations than Rule 69.3. Rule 69.3.1 is more stringent than NSPS Subpart GG in all areas except test methods where the requirements are the same (Table 2). New Rule 69.3.1 is less stringent than BACT for gas turbines in all areas except test methods where the requirements are the same (Table 3). There are no conflicting requirements between new Rule 69.3.1 and amended Rule 69.3, NSPS Subpart GG, or BACT for gas turbines.

TABLE 1: PROPOSED NEW RULE 69.3.1 COMPARISON TO CURRENT RULE 69.3 - STATIONARY GAS TURBINE ENGINES

ELEMENTS	PROPOSED NEW RULE 69.3.1	CURRENT RULE 69.3
APPLICABILITY	Existing units rated ≥1.0 MW and new units rated ≥ 0.3 MW.	Same as proposed new Rule 69.3.1.
EXEMPTIONS FROM RULE	Units operated for research and development. Portable units located at a stationary source for ≤ 12 consecutive months. New units rated ≤ 0.4 MW and used in conjunction with military equipment, and operated at military sites, provided operation is for < 1000 hours/year.	Same as proposed new Rule 69.3.1. Portable units located at a stationary source for ≤ 180 days in a consecutive 12-month period. Same as current Rule 69.3.1 excluding minor differences for clarity and consistency with new state law.
EXEMPTIONS FROM EMISSION STANDARDS	Emergency units operating < 80 hours/year for non-emergency purposes. Any unit for a period ≤ 120 continuous minutes during startup, shutdown, or fuel change.	Same as proposed new Rule 69.3.1. Same as proposed new Rule 69.3.1.
STANDARDS	NOx Emission Concentration Limits (Corrected to 15% O_2): Power Output Rating (MW) / Gaseous Fuel (ppmv) / Liquid Fuel (ppmv) ≥ 0.3 and < 2.9 (new units) / 42 / 65 ≥ 1.0 and < 2.9 (existing units) / 42 / 65 ≥ 2.9 and < 10.0 / 25† / 65 ≥ 10.0 without post-combustion NOx control / 15† / 42† ≥ 10.0 with post-combustion NOx control / 9† / 25† EXCEPT AS FOLLOWS: ≥ 4 MW peaking units < 877 hour/year / 42 / 65 < 4 MW and operating < 877 hour/year / 42 / 65	NOx Emission Concentration Limits (Corrected to 15% O_2): Power Output Rating (MW) / Gaseous Fuel (ppmv) / Liquid Fuel (ppmv) ≥ 0.3 and < 2.9 (new units) / Same as proposed new Rule 69.3.1. ≥ 1.0 and < 2.9(existing units) / Same as proposed new Rule 69.3.1 ≥ 2.9 and < 10.0 / 42 / 65 ≥ 10.0 without post-combustion NOx control / 42 / 65 ≥ 10.0 with post-combustion NOx control / 42 / 65 EXCEPT AS FOLLOWS: ≥ 4 MW peaking units < 877 hour/year / Same as proposed new Rule 69.3.1. < 4 MW operating < 877 hour/year / Same as proposed new Rule 69.3.1.
MONITORING AND RECORDKEEPING REQUIREMENTS	Units shall have continuous monitors to demonstrate continuous compliance of applicable operational characteristics. All CEMS shall comply with applicable federal requirements including applicable sections of 40 CFR 60. CEMS is required for units rated ≥ 10 MW that operate for > 4000 hour/year. Required records shall be maintained for at least 2 years.	Same as proposed new Proposed Rule 69.3.1. Same as proposed new Proposed Rule 69.3.1, excluding the provision requiring units rated ≥ 10.0 MW that operate > 4000 hour/year shall install and maintain CEMS in accordance with applicable federal regulations, and except for minor differences for clarity. Required records shall be maintained for at least 3 yrs.
TEST METHODS	District Source Test Method 100 or the Air Resources Board (ARB) Test Method 100, as approved by the EPA. The averaging period to calculate NOx emissions concentration shall be any 30 consecutive-minute period. Source testing shall be performed at no less than 80% of the power rating, unless otherwise approved by the District. Annual source testing is required.	Same as current Rule 69.3.1, excluding District Source Test Method 100. Same as proposed new Rule 69.3.1. Same as proposed new Rule 69.3.1. Same as proposed new Rule 69.3.1.
SOURCE TEST REQUIREMENTS AND COMPLIANCE DETERMINATION	Test reports shall include appropriate operational characteristics of the unit and of all add-on NOx control systems.	Same as proposed new Rule 69.3.1.
COMPLIANCE SCHEDULE	For an existing unit requiring modifications, the owner/operator shall submit an Authority to Construct and Permit to Operate by (*twelve months after date of adoption*) and demonstrate compliance by (*twenty-four months after date of adoption*). For an existing unit not requiring modification, the owner/operator shall submit an application to modify conditions on the Permit to Operate by (*six months after date of adoption*). New units shall comply with the applicable provisions of this rule upon initial installation and operation.	An owner or operator of an existing unit shall be in compliance with all applicable provisions of this rule no later than May 31, 1995. Same as proposed new Rule 69.3.1.

† The NOx concentration limit shall not be lower than the value reported in this table. However, depending upon the rated turbine thermal efficiency of a particular gas turbine, the actual NOx limit may be as much as 20% higher than the value reported in this table.

TABLE 2: PROPOSED NEW RULE 69.3.1 COMPARISON TO NSPS SUBPART GG - STANDARDS OF PERFORMANCE FOR STATIONARY GAS TURBINE ENGINES

ELEMENTS	PROPOSED NEW RULE 69.3.1	NSPS SUBPART GG
APPLICABILITY	Existing units rated ≥1.0 MW and new units rated ≥ 0.3 MW.	Units with peak heat input load ≥ 10 million Btu/hour (approximately equivalent to a turbine output rating ≥ 0.7 MW.
EXEMPTIONS FROM RULE	Units operated for research and development. Portable units located at a stationary source for ≤ 12 consecutive months. New units rated ≤ 0.4 MW and used in conjunction with military equipment, and operated at military sites, provided operation is for < 1000 hours/year.	Same as proposed new Rule 69.3.1, except for minor differences for clarity. Same as proposed new Rule 69.3.1, except for minor differences for clarity. Same as proposed new Rule 69.3.1 except for minor differences for clarity, and excluding the provision that the unit operate at military sites and operate < 1000 hours/year.
EXEMPTIONS FROM EMISSION STANDARDS	Emergency units operating < 80 hours/year for non-emergency purposes. Any unit for a period ≤ 120 continuous minutes during startup, shutdown, or fuel change.	Same as proposed new Rule 69.3.1, excluding the provision that the unit operate for< 80 hour/year for non-emergency purposes, and except for minor differences for clarity. Military gas turbines, fire fighting gas turbines, and gas turbines used for research & development of equipment for improved turbine efficiency or air pollution controls. Stationary gas turbines in specific geographic areas where mandatory water restrictions are required, while water restrictions are in effect. Stationary gas turbines using water or steam injection, when ice fog is deemed a traffic hazard. Regenerative cycle gas turbines with a heat input of ≤ 100 million Btu/hour. Stationary gas turbines with a heat input rating ≥ 10 million Btu/hour when fired on gaseous fuel, when fired with an emergency fuel. Stationary gas turbines ≥ 10 million Btu/hour and ≤ 100 million Btu/hour with construction commenced prior to 10/3/82. Applicable stationary gas turbines ≥ 100 million Btu/hour that commenced construction, modification, or reconstruction between the dates of 10/3/77 and 1/27/82, except electric utility turbines.
STANDARDS	NOx Emission Concentration Limits (Corrected to 15% O2): Power Output Rating (MW) / Gaseous Fuel (ppmv) / Liquid Fuel (ppmv) ≥ 0.3 and < 2.9 (new units) / 42 / 65 ≥ 1.0 and < 2.9 (existing units) / 42 / 65 ≥ 2.9 and < 10.0 / 25† / 65 ≥ 10.0 without post - combustion NOx control / 15† / 42† ≥ 10.0 with post - combustion NOx control / 9† / 25† EXCEPT AS FOLLOWS: ≥ 4 MW and ≥ 7.3 MW peaking units operating < 877 hour/year *(There are currently no peaking units in San Diego County that are rated ≥ 4 MW and ≥ 7.3 MW.)* / 42 / 65 < 4 MW operating < 877 hour/year / 42 / 65 > 7.3 MW peaking units and operating < 877 hour/year *(Each peaking unit in San Diego County is rated above 7.3 MW and is an electric utility unit.)* / 42 / 65	NOx Emission Concentration Limits (Corrected to 15% O2): Power Output Rating (MW) / Gaseous Fuel (ppmv) / Liquid Fuel (ppmv) ≥ 0.7 and < 2.9 (new units) / 150 / 150 ≥ 1.0 and < 2.9 (existing units) / 150^ / 150^ ≥ 2.9 and < 10.0 / 150 / 150 ≥ 10.0 without post - combustion NOx control / 150 / 150 ≥ 10.0 with post - combustion NOx control / 150 / 150 EXCEPT AS FOLLOWS: ≥ 4 MW and ≥ 7.3 MW peaking units operating < 877 hour/year / 150 / 150 < 4 MW operating < 877 hour/year / 150 / 150 < 7.3 MW electric utility unit / 75 / 75
MONITORING AND RECORDKEEPING REQUIREMENTS	All CEMS shall comply with applicable federal requirements including applicable sections of 40 CFR 60. CEMS is required for units rated ≥10 MW that operate for > 4000 hour/year.	Monitoring requirements shall be those specified in 40 CFR 60, Section 60.334.
TEST METHODS	District Source test method 100 or the Air Resources Board (ARB) test method 100, as approved by the EPA.	Performance tests shall be conducted in accordance with 40 CFR 60, part 60.335: EPA Method 20. *(District test method 100 is an approved alternative test method, as required by 40 CFR part 60.335.)*

† The NOx concentration limit shall not be lower than the value reported in this table. However, depending upon the rated turbine thermal efficiency of a particular gas turbine, the actual NOx limit may be as much as 20% higher than the value reported in this table.

* The NOx concentration limit shall not be lower than the value reported in this table. However, depending upon the rated heat rate of a particular gas turbine and the percentage of fuel-bound nitrogen in the fuel, the actual NOx limit may be as much as 20% higher than the value reported in this table.

^ Existing units that have not been modified or reconstructed after October 2, 1977, are exempt from the standards of this rule.

TABLE 3: PROPOSED NEW RULE 69.3.1 COMPARISON TO A RECENT BEST AVAILABLE CONTROL TECHNOLOGY (BACT) DETERMINATION

ELEMENTS	PROPOSED NEW RULE 69.3.1	RECENT BACT DETERMINATION
APPLICABILITY	Existing units rated ≥ 1.0 MW and new units rated ≥ 0.3 MW.	One natural-gas-fired GE LM 6000 gas turbine engine rated at 42.4 MW (368 MM Btu/hour) with water injection, selective catalytic reduction (SCR) and with a continuous emissions monitoring system (CEMS).
EXEMPTIONS FROM EMISSION STANDARDS	Any unit for a period ≤ 120 continuous minutes during startup, shutdown, or fuel change.	Any unit for a period ≤ 120 continuous minutes following a startup, or for a period ≤ 60 continuous minutes prior to a shut down.
STANDARDS	NOx Emission Concentration Limits (Corrected to 15% O_2): Power Output Rating (MW) — Gaseous Fuel (ppmv) ≥ 10.0 with post-combustion NOx control — 9†	NOx Emission Concentration Limits (Corrected to 15% O_2): Power Output Rating (MW) — Gaseous Fuel (ppmv) 42.4 — 5
MONITORING AND RECORDKEEPING REQUIREMENTS	Units shall have continuous monitors to demonstrate continuous compliance of applicable operational characteristics. All CEMS shall comply with applicable federal requirements including applicable sections of 40 CFR 60. CEMS is required for units rated ≥ 10 MW that operate for > 4000 hour/year. Annual source testing is required. Required records shall be maintained for at least 2 years.	Same as proposed new Rule 69.3.1. Same as proposed new Proposed Rule 69.3.1, except for minor differences for clarity. *(This unit is rated ≥ 10 MW and is operated > 4000 hour/year.)* Same as proposed new Rule 69.3.1. Required records shall be maintained for at least 3 yrs.
TEST METHODS	District Source Test Method 100 or the Air Resources Board (ARB) Test Method 100, as approved by the EPA. Annual source testing is required.	District Source Test Method 100. Same as proposed new Rule 69.3.1.

† The NOx concentration limit shall not be lower than the value reported in this table. However, depending upon the rated turbine thermal efficiency of a particular gas turbine, the actual NOx limit may be as much as 20% higher than the value reported in this table.

INCREMENTAL COST-EFFECTIVENESS ESTIMATES

RULE 69.3.1. STATIONARY GAS TURBINE ENGINES - BEST AVAILABLE RETROFIT CONTROL TECHNOLOGY

STATUTORY REQUIREMENTS

In order to ensure alternative methods of complying with emission control, recordkeeping, and reporting requirements of a proposed rule are considered, California Health and Safety Code Section 40920.6 requires the District to perform an incremental cost-effectiveness analysis prior to adopting rules to meet best available retrofit control technology (BARCT) requirements. To perform this analysis, the District must identify one or more control options achieving the emission reduction objectives for the rule, determine the absolute cost-effectiveness for each option, and calculate the incremental cost-effectiveness between options. To determine incremental cost-effectiveness, the District must calculate the difference in dollar costs divided by the difference in the emission reduction potentials between each progressively more stringent potential control option as compared to the next less expensive option.

INCREMENTAL COST-EFFECTIVENESS DETERMINATION

Proposed Rule 69.3.1 implements state BARCT requirements. Two gas turbines subject to the rule will likely shut down for other reasons. All other gas turbines already comply with the proposed rule requirements except one major NOx source (Monsanto Nutrasweet Kelco) with three existing gas turbines. Thus, only the three turbines at this site are subject to this analysis. The District has identified the following control options to comply with the rule:

1. Monsanto Nutrasweet Kelco is proposing to replace its existing 7.9 megawatt turbines with 10.3 megawatt (MW) turbines equipped with built-in low NOx technology. The output of the turbines can be limited (derated) to less than 10 MW and comply with the required 25 ppm NOx emission concentration limit.

2. Post-combustion emission controls can be installed on the 10.3 MW turbines equipped with built-in low NOx technology. It is assumed the post-combustion control device is selective catalytic reduction.

3. Post-combustion control can be installed on 10.3 MW turbines equipped with standard combustors (in lieu of built-in low-NOx combustors) and water injection NOx controls. It is assumed that the turbines will have a conventional combustor (without built-in NOx controls) and will control NOx emissions with water injection and selective catalytic reduction.

Table 1 shows estimates of emission reductions, annual capital and operational costs, cost-effectiveness, and incremental cost-effectiveness for each of these control options.

The results indicate Option 1 above is most cost-effective and can be used to comply with the proposed rule. While Options 2 and 3 are not as cost-effective, they may also be used. In addition, the low NOx combustor technology being proposed by this source (Option 1) may be able to meet the more stringent emission limits of the proposed rule for larger turbines. Therefore, the source may not be required to limit the power output of the replacement turbines.

TABLE 1. SUMMARY OF THE CONTROL OPTIONS FOR TURBINES SUBJECT TO RULE 69.3.1

Turbine Description	Add-on Control Technology	NOx emission reductions, tons/year	Total Annual Costs, $M/year	Absolute cost-effectiveness, $/lb NOx reduced	Incremental cost-effectiveness, $/lb NOx reduced
New 10.3 MW with low NOx combustor derated (limited to a lower power rating) to 9.9 MW	none	22.5	0.1	2.2	2.2
New 10.3 MW with DLN (dry low NOx built-in NOx control) and add-on control	SCR (selective catalytic combustion add-on (post-combustion) control device)	130	1.6	6.1	7.0
New 10.3 MW with WI (water injection) and add-on control	SCR	135	1.8	6.6	7.6

AIR POLLUTION CONTROL DISTRICT
COUNTY OF SAN DIEGO

WORKSHOP REPORT

NEW RULE 69.3.1 - STATIONARY GAS TURBINE ENGINES - BEST AVAILABLE RETROFIT CONTROL TECHNOLOGY AND AMENDED RULE 69.3 - STATIONARY GAS TURBINE ENGINES - REASONABLY AVAILABLE CONTROL TECHNOLOGY

A workshop notice was mailed to owners and operators of stationary gas turbines 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 March 18, 1998 and was attended by 20 people. Written comments were also received.

The workshop comments and District responses are as follows:

1. WORKSHOP COMMENT

The Monsanto Company is proposing to retrofit its three existing 7.9 MW turbines fired mainly on natural gas with three 10.3 MW turbines equipped with dry low NOx (DLN) combustors. After combustor replacement, one unit will operate on natural gas only, and the other two units will have dual fuel (natural gas and oil) capabilities.

The two proposed dual fuel turbines when fired on oil will not comply with the 65 ppmv nitrogen oxides (NOx) emission standard of Rule 69.3. The manufacturer's guaranteed NOx emission concentration for these turbines operating on oil is 120 ppmv. The manufacturer is also proposing to conduct a three year development and field testing program at the Monsanto site with a maximum combined total of 500 hours per year of oil firing. It is expected that as a result of this program the turbines will comply with all NOx emission standards of Rule 69.3.

Would these units be subject to the exemption specified Subsection (b)(1)(i) of the rule?

DISTRICT RESPONSE

Subsection (b)(1)(i) exempts gas turbines which operate exclusively for the research, development or testing of turbines or their components. The two proposed dual-fueled DLN retrofitted cogeneration units will be used predominantly to provide electrical power and useful thermal energy to the Monsanto Company facility for industrial use. According to District information, a significant portion of the electrical power generated will also be sold commercially. Therefore, these turbines do not qualify for the exemption.

2. WORKSHOP COMMENT

Is there a mechanism to provide a special exemption in Rule 69.3 for the proposed development and field testing program at the Monsanto facility?

DISTRICT RESPONSE

Any new exemption in Rule 69.3 must comply with the requirements of Section 193 of the Federal Clean Air Act (FCAA). Section 193 specifically prohibits a modification of any control requirement in any area which is a non-attainment area for any air pollutant unless such modification ensures equivalent or greater emission reductions of this air pollutant (or its precursor).

San Diego County is a serious ozone non-attainment area and oxides of nitrogen (NOx) are ozone precursors. Rule 69.3 is a part of federally approved California State Implementation Plan (SIP) that includes NOx emission reduction credits applied toward the District attainment of the National Ambient Air Quality Standard for ozone.

The proposed development and field testing program will result in a significant increase of NOx emissions over three years compared to the level currently allowed by Rule 69.3 which represents Reasonably Available Control Technology (RACT). Unless equivalent NOx emission reductions are provided, such an increase will constitute a SIP rule relaxation and will therefore violate the FCAA. EPA will disapprove such a SIP relaxation.

3. WORKSHOP COMMENT

Is it possible to include a provision in Rule 69.3 requiring a more stringent NOx limit for turbines operating on natural gas than the current one? This rule modification, in effect, would provide an internal offset within the rule for the increase in NOx emissions during oil firing.

DISTRICT RESPONSE

The suggested rule modification would constitute an Alternative Emission Control Plan (AECP) for a single source. Since Rule 69.3 does not currently have the AECP option, it would have to be amended and submitted for EPA approval. This would require significant time and expenditure of District resources and would add an additional uncertainty of EPA timely approval.

Because this issue affects only one source subject to Rule 69.3, a preferred option would be for this source to submit a proposed AECP with all the necessary information for District approval. If approved by the District, the AECP could be submitted to EPA as a Source-Specific SIP revision. Further amendments to Rule 69.3 will not be required.

4. WORKSHOP COMMENT

The Monsanto Company's proposal to retrofit existing units would result in their uprating from 7.9 MW to 10.3 MW. The manufacturer's guaranteed NOx emissions concentrations for operating on natural gas will not comply with the proposed standards of Rule 69.3 for units 10 MW and larger. The Monsanto Company has submitted an analysis to the District which indicates no cost-effective control technology is available for these units to comply with the proposed NOx emission standards of Rule 69.3.1. Is it possible to modify the rule to allow the 10.3 MW turbines be subject to the less stringent NOx emission standards for units with power ratings below 10 MW?

DISTRICT RESPONSE

The District has evaluated the Monsanto Company proposals, and has performed both absolute and incremental cost-effectiveness calculations for several control technology options using cost data provided by Monsanto. The results of this analysis indicate that cost-effective control technologies are available for both the three existing 7.9 MW units and for larger 10.3 MW units to achieve the proposed NOx emission

concentration standards of Rule 69.3.1. Some of the cost-effective control alternatives evaluated also provide significantly greater NOx emission reductions.

5. WORKSHOP COMMENT

Does Subsection (b)(1)(i) apply to gas turbine air start engines used as ancillary support equipment for the testing of aircraft engines? These air start gas turbines are only used to start aircraft engines that are being tested.

DISTRICT RESPONSE

Yes. As stated in the District response to Comment #1, gas turbine engines used exclusively for the purposes of testing are exempt from both Rule 69.3 and 69.3.1. In addition, according to the District information, these air start gas turbines are rated below 0.3 MW and therefore are below the applicability limit of both rules.

6. WORKSHOP COMMENT

Does compliance with Rule 69.3.1 assure that a unit also complies with Rule 69.3?

DISTRICT RESPONSE

Yes. A facility that complies with all requirements of Rule 69.3.1 will also be in compliance with Rule 69.3. Rule 69.3.1 reflects Best Available Retrofit Control Technology (BARCT) requirements that are either similar or more stringent than the RACT requirements of Rule 69.3.

7. WORKSHOP COMMENT

Subsection (d)(2) of proposed Rule 69.3.1 contains a very specific description of a 34.5 MW unit that must comply with less stringent emission standards. This subsection should be revised to make it applicable to a generic class of turbines that were originally installed using Best Available Control Technology as determined at the time of installation prior to 1986.

DISTRICT RESPONSE

Only one existing gas turbine was affected by Subsection (d)(2). This subsection is no longer required. The latest information indicates that this 34.5 MW unit can comply with the emission limits of Subsection (d)(1). Rule 69.3.1 has been revised accordingly.

8. WORKSHOP COMMENT

The District is considering adding a requirement that diesel fuel used in all turbines subject to the standards of the proposed Rule 69.3.1 be certified by the California Air Resources Board (ARB). What does this certification mean?

DISTRICT RESPONSE

Diesel fuel certified for use in California must meet the requirements of a regulation adopted by ARB in 1988 and specified in Title 13, California Code of Regulations, Section 2281 and 2282. The regulation requires all diesel fuel sold in California for use in motor vehicles either to have a specified sulfur and

aromatic hydrocarbon content, or to have an alternative formulation that provide comparable emission benefits. California diesel fuel produces significantly lower emissions than conventional diesel. It is now widely available in California and is slightly more expensive than conventional diesel (by approximately 5¢ a gallon).

However, the District has conducted a cost-effectiveness analysis of using clean diesel fuel for turbines and has concluded that this NOx emission control strategy is not cost-effective for turbines in San Diego County. Accordingly, this requirement will not be included in Rule 69.3.1.

9. WORKSHOP COMMENT

Would the District require that a facility keep current California diesel fuel certification on file?

DISTRICT RESPONSE

This requirement will not be included in Rule 69.3.1. Please see the District response to the previous comment.

10. WORKSHOP COMMENT

Rule 69.3.1 regulates NOx emissions from turbines. It is recommended that the District revise Rule 62 (Sulfur Content of Fuels) to include the requirements for California diesel fuel rather than requiring its use in Rule 69.3.1.

DISTRICT RESPONSE

For the reasons stated in the District response to Comment # 8, this requirements will not be included in Rule 69.3.1.

11. WORKSHOP COMMENT

Would the requirement to use California diesel fuel affect the proposed NOx emission standards in Rule 69.3.1?

DISTRICT RESPONSE

As stated in the District responses to Comment #8, this requirement will not be included in proposed Rule 69.3.1. However, in comparison with regular diesel, clean diesel fuel provides a significant reduction in sulfur dioxide and particulate emissions, together with a 7% reduction in NOx emissions. The District encourages owners of turbines operating on liquid fuel or using diesel as a back-up fuel to consider using California diesel fuel as a pollution prevention technique. The lower NOx emissions from this fuel will also facilitate compliance with the proposed Rule 69.3.1 emission standards.

12. WORKSHOP COMMENT

The District future socioeconomic impact analysis for Rule 69.3.1 should include information related to the electrical utility industry restructuring. The industry will likely have some new cost data that should be included in this report.

DISTRICT RESPONSE

It is unclear how utility industry restructuring would affect the economic impacts of Rule 69.3.1. Emission limits apply to individual units, regardless of who operates them. Restructuring may change the economics of cogeneration but that goes beyond the scope of the District's socioeconomic impact analysis. However, the District will consider any information provided regarding the economic impact the proposed rule may have on affected facilities.

13. WORKSHOP COMMENT

The District's workshop notice requested industry comments on the advisability of specifying the use of California diesel fuel. SDG&E currently has in excess of 2.4 million gallons of diesel fuel in reserves which is not certified as California diesel fuel. This inventory is not expected to be completely consumed for many years. SDG&E requests that Rule 69.3.1 allow the use of non-certified diesel fuel until all reserves on site are exhausted. All future diesel purchases will be exclusively California diesel fuel.

DISTRICT RESPONSE

As stated in the District response to Comment #8, the use of California diesel fuel will not be required by Rule 69.3.1. However, the District encourages SDG&E to use clean diesel fuel as a pollution prevention strategy.

14. WRITTEN COMMENT

SDG&E has 19 peaking units that comply with the proposed NOx emission limits in Rule 69.3.1. These units also may be used in emergency situations. For example, if electrical power from the grid were to be lost these units would be started first. The definition of "Emergency Unit" specifically excludes "Peaking Units". It should be clarified that these peaking units can also be used as emergency units provided that they will be in compliance with the applicable NOx limits.

DISTRICT RESPONSE

Turbines used exclusively in defined emergency situations are exempt from emission control requirements of both Rules 69.3 and 69.3.1 because it is technologically infeasible to control them. Peaking units that routinely operate supplying electricity during high power demand periods can be effectively controlled and are subject to NOx emission limits of both rules. Consequently, they are excluded from the definition of an emergency unit. However, the rules do not preclude the use of any turbine in an emergency situation as long as it complies with the applicable emission standards.

15. WRITTEN COMMENT

Rule 69.3.1 will require peaking units larger than 4 MW and operating more than 877 hours per year to comply with more stringent NOx emission standards than the peaking units operating below this time limit. The 877 hour threshold is consistent with the ARB RACT/BARCT guidance issued in 1992. This threshold was based on the limited information available to ARB at that time related only to six comparatively new turbines. SDG&E operates older generation peaking units that were not considered by ARB. In addition, in May 1997, SDG&E submitted information to the District showing that there is no technologically or economically feasible control technology that would allow these peaking units to operate in compliance with the NOx emission limits of Subsection (d)(1). It is suggested that the 877 hour annual threshold be deleted.

DISTRICT RESPONSE

The Districts disagrees. Rule 69.3 defines a peaking unit as a turbine that operates intermittently for generation of power during periods of high energy demand. Based on the District emission inventory, between 1992 and 1997 all 19 SDG&E peaking units have operated well below 877 hours per year. In fact, the highest average annual operating time for a peaking turbine during this period was 103 hours and none of the units operated longer than 230 hours per year. Therefore, the proposed 877 hours limit for a peaking turbine operating time provides enough flexibility for a turbine operator in case the period of high power demand significantly exceeds the historical average.

The ARB RACT/BARCT guidance recognized the fact that add-on control technology such as SCR is not technologically feasible for intermittently operating turbines. This was reflected in the higher emissions limits applicable to peaking units which can be met using other emission control techniques such as water or steam injection. All SDG&E peaking units are presently in compliance with the proposed NOx emission limits in Rule 69.3.1 which are also consistent with the ARB RACT/BARCT guidance.

16. WRITTEN COMMENT

It is suggested that if the 877 hours threshold must be kept, Rule 69.3.1 should include the language allowing the District to make specific determination of whether a peaking unit operating for more than 877 hours is capable of achieving lower NOx emission limits and to do so cost-effectively .

DISTRICT RESPONSE

The District disagrees. If SDG&E expects to use any of its peaking units for more than 877 hours, i.e. for purposes other than supplying energy during peak power demand, this turbine will not be considered a peaking unit and would have to comply with more stringent NOx emission limits specified in Subsection (d)(1) which represent BARCT. If the District determines that this unit cannot comply with the BARCT standards because it is technologically or economically infeasible, Rule 69.3.1 may be amended at that time. Using peaking turbines for unlimited amount of time as suggested could result in significant NOx emission increases.

17. ARB COMMENT

Rule 69.3.1 provides a separate limit of 25 ppmv of NOx for the sole existing 34.5 MW gas turbine engine in Subsection (d)(2). It is less stringent than the NOx emission concentration limits in Subsection (d)(1) for this turbine size. The District did not provide sufficient data to justify less stringent emission limits of Subsection (d)(2).

DISTRICT RESPONSE

Subsection (d)(2) has been deleted from the rule. The latest information provided by the operators of this turbine indicated that the turbine will comply with the limits specified in Subsection (d)(1).

18. EPA COMMENT:

The proposed draft revision of Rule 69.3 exempts any portable gas turbine engine located at the stationary source. However, Rule 69.3 approved into the State Implementation Plan (SIP) only exempts turbines located at the source 180 days or less in a consecutive 12-month period as stated in the portable gas turbine definition. The District should either retain the present language or demonstrate that this rule change is not a SIP relaxation prohibited by Sections 110(l) and 193 of the Federal Clean Air Act (FCAA).

DISTRICT RESPONSE:

The definition of a portable gas turbine engine in Rule 69.3 was revised to make it consistent with the definition of a portable internal combustion engine of Section 41751 of the California Health and Safety Code that preempts local districts from regulating portable equipment provided it is registered with the state. The revised definition also conforms to the EPA definition of a portable non-road engine in 40 CFR 85, Subpart Q - Preemption of State Standards and Waiver Procedures for Non-road Engines and Non-road Vehicles.

It should also be noted that all portable turbines located at stationary sources in San Diego County are exempt from Rule 69.3 because of their small size (less than 0.3 MW). Therefore, the proposed revision to the portable gas turbine definition will not result in any emissions increase and will not be a rule relaxation subject to Sections 110(l) and 193 of the FCAA.

19. EPA COMMENT:

It is recommended that the newly added Subsection (b)(1)(iv) in Rule 69.3 be deleted because it represents a SIP rule relaxation referred to in the previous comment.

DISTRICT RESPONSE:

The District disagrees. Subsection (b)(1)(iv) only paraphrases the current language in Section (a) that the rule does not apply to turbines of 1.0 megawatt or less existing on the day of Rule 69.3 adoption, i.e. on September 27, 1994. For clarity, it has been moved from Section (a), Applicability, into Section (b), Exemptions. Therefore, this rule revision does not represent a SIP rule relaxation.

20. EPA COMMENT:

Subsection (e)(6) being referenced should be changed to read (e)(5).

DISTRICT RESPONSE:

The District agrees. The suggested change has been made.

21. EPA COMMENT:

EPA policy memoranda on excess emissions during startup, shutdown, maintenance and malfunctions dated September 28, 1982 and February 15, 1983 restrict automatic exemptions from emission limits during startup and shutdown periods. It is recommended that the District remove the exemption specified in Subsection (b)(2)(ii) of Rule 69.3 or demonstrate that it is consistent with federal policy.

DISTRICT RESPONSE:

The District disagrees. Rule 69.3 is a part of the EPA approved SIP. This issue was never raised by EPA during the rule development process or the lengthy rule approval process (it was submitted to EPA in October 1994 and approved into the SIP in June 1997). In addition, the exemption of turbines from emission limits during startup and shutdowns periods is consistent with the ARB RACT/BARCT Guidance which states that the NOx emission concentration limits apply only to turbines operating under load conditions.

22. EPA COMMENT:

The definition of portable gas turbine in Subsection (c)(8) is referencing the revised Rule 20.1 which is not included in the federally approved SIP. EPA recommends retaining the definition currently in the SIP; or, a revised version of Rule 20.1 should be approved into the SIP before the revised Rule 69.3 can be fully approved.

DISTRICT RESPONSE:

The District has recently submitted revised New Source Review rules including Rule 20.1 for EPA approval. EPA staff has indicated that the NSR rules will likely receive conditional approval into the SIP.

23. EPA COMMENT:

It is recommended that the averaging provision in Subsection (f)(2) be retained because it defines a compliance period. It is important for the clarity, enforceability and stringency of the current rule.

DISTRICT RESPONSE:

The District agrees. Subsection (f)(2) has been restored.

24. EPA COMMENT:

The phrase "unless otherwise specified by the Air Pollution Control Officer" in Subsection (g)(2) should be deleted because it appears to provide director's discretion inconsistent with Section 110(i) of the FCAA. If the District wishes to retain this phrase, it should be modified by adding that the Air Pollution Control Officer action should be approved by ARB and EPA.

DISTRICT RESPONSE:

The District disagrees. This language is a part of Rule 69.3 which has been approved into SIP(June 1997). Similar to the issue in Comment #21, the question of approvability of an alternative time duration between the source tests was not raised either during rule development process or the lengthy EPA SIP approval process.

It should also be noted that while Subsection (g)(2) allows the Air Pollution Control Officer some discretion in the determination of the frequency of compliance source tests, it does not affect actual rule compliance. The primary tool to assure consistent compliance with Rule 69.3 is the continuous monitoring of turbine and emission control system operational parameters required by Subsections (e)(1) and (e)(2). In addition, some turbines have continuous NOx emission monitoring systems. The periodic source testing serves only as an additional tool to ensure compliance. Considering the costs of source tests, it is unreasonable to require frequent source tests for facilities that have a good track record of compliance.

25. EPA COMMENT:

Section (d) in Rules 69.3 should explicitly state that a 15 minute averaging period is required for compliance determination. This will be consistent with the ARB RACT/BARCT Guidance for Stationary gas turbines.

DISTRICT RESPONSE:

The District disagrees. Section (d) specifies NOx emission standards. The 15 minute averaging period is implicitly referenced in Subsection (e)(2) of the rule which refers to part 60.13 (e)(2) of Title 40, Code of Federal Regulations (40 CFR 60).

26. EPA COMMENT:

Recordkeeping sections of Rule 69.3 and Rule 69.3.1 should be revised to require records be kept for five years instead of two years for consistency with Title V of the FCAA and the federal statutes of limitations.

DISTRICT RESPONSE:

The Title V requirements apply only to major stationary sources, i.e. sources emitting 50 or more tons of NOx per year. Rules 69.3. and 69.3.1 apply to both major-and non-major sources. Therefore, for consistency with other District rules they require keeping records for two years. Sources subject to Title V will be issued federal operating permits with recordkeeping requirements that comply with federal policies.

27. EPA COMMENT:

Section (c)(17) in Rule 69.3.1 is missing.

DISTRICT RESPONSE:

Rule 69.3.1 has been revised to correct this problem.

28. EPA COMMENT:

For clarity, ASTM test methods in Subsection (f)(2)(i)and (f)(2)(ii) should include the last two digits representing the year of the last revision of the test method.

DISTRICT RESPONSE:

The District agrees. Subsections (f)(2)(i) and (f)(2)(ii) have been revised as suggested.

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