



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

Air Pollution Control Officer
R. J. Sommerville

DATE: September 27, 1994
TO: Air Pollution Control Board
SUBJECT: Adoption of New Rule 69.2 (Industrial and Commercial Boilers, Process Heaters and Steam Generators)

SUMMARY:

Rule 69.2 is a new rule to regulate oxides of nitrogen (NOx) emissions from industrial and commercial boilers, process heaters and steam generators. The rule was developed to comply with the Reasonably Available Control Technology (RACT) requirements of the federal Clean Air Act and Best Available Retrofit Control Technology (BARCT) requirements of the California Clean Air Act. Failure to adopt Rule 69.2 for major industrial sources (currently those emitting 25 tons of NOx per year or more) before October 21, 1994, will result in EPA imposing federal sanctions on San Diego County, including a 2.0 to 1.0 emission offset ratio for major new and modified industrial sources and withholding of up to \$75 million in federal transportation funds. In addition, California Clean Air Act BARCT requirements for NOx sources will not be implemented.

The rule will require affected facilities to meet standards for boilers, process heaters and steam generators, or implement a specified operation and maintenance program for units with limited annual usage. It will affect 156 boilers at 69 facilities, and reduce NOx emissions by approximately 45 percent or 117 tons per year.

Adopting this rule is consistent with the Board's direction of February 2, 1993, regarding implementing new or revised rules because the Federal Clean Air Act mandates adopting RACT requirements for major sources of NOx emissions and the California Clean Air Act requires applying BARCT to NOx emissions sources. An assessment of the socioeconomic impacts of the proposed rule was prepared. Adverse impacts were minimized, within the constraints of federal and state requirements.

Issue

Should the Board adopt new Rule 69.2 (Industrial and Commercial Boilers, Process Heaters, and Steam Generators) to reduce oxides of nitrogen emissions in San Diego County?

Recommendation

AIR POLLUTION CONTROL OFFICER

Adopt the resolution amending Rule 69.2 and make appropriate findings:

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- (1) of necessity, authority, clarity, consistency, non-duplication and reference as required by Section 40727 of the State Health and Safety Code.
- (2) that new Rule 69.2 will alleviate a problem and promote attainment of ambient air quality standards (Section 40001 of the State Health and Safety Code);
- (3) that an assessment of the socioeconomic impact of new Rule 69.2 has been prepared and has been made available for public review and comment, and that the socioeconomic impacts of the proposed rule have been actively considered and the District has made a good faith effort to minimize adverse socioeconomic impacts; and
- (4) that there is no reasonable possibility that the new rule may have a significant effect on the environment, and that the adoption of new Rule 69.2 is categorically exempt from the provisions of the California Environmental Quality Act pursuant to California Code of Regulations, Title 14, Sections 15300 and 15308, as an action taken to assure the maintenance or protection of the environment and where the regulatory process involves procedures for protection of the environment.

Advisory Statement

The Air Pollution Control Advisory Committee recommended adopting proposed new Rule 69.2 at its July 27, 1994 meeting.

Fiscal Impact

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

Alternatives

Not adopt new Rule 69.2. The federal Clean Air Act requirements to adopt rules reflecting RACT for NOx major sources and the California Clean Air Act BARCT requirements for NOx sources would not be met under this alternative. Failure to adopt this rule by October 21, 1994 will result in EPA imposing sanctions (2.0 to 1.0 emission offset ratio for new and expanding major industrial sources and withholding of up to \$75 million in federal transportation funds) on San Diego County. Accordingly, this alternative is not recommended.

BACKGROUND:

Rule 69.2 will control NOx emissions from industrial and commercial boilers, process heaters and steam generators in San Diego County with a heat input rating of 5 million Btu per hour or more. The rule requires facilities to limit NOx emissions from units operating on gaseous or liquid fuel to specified levels. Carbon monoxide (CO) emissions from all units subject to the NOx standards are also limited to ensure that combustion modifications necessary to meet these standards would not result in the increase of CO emissions.

Units with limited annual usage are exempt from the emission standards if they maintain a specified stack-gas oxygen concentration or are tuned at least once a year according to a prescribed procedure.

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Electricity generating steam boilers, thermal oxidizers, boilers used in residential dwellings with not more than four families, and waste heat recovery boilers are exempt from the rule. In addition, emission standards do not apply to units burning liquid fuel during periods of natural gas curtailment, emergencies, or testing for maintenance purposes provided that total cumulative operating hours do not exceed specified amounts.

The rule requires monitoring and recordkeeping of operational parameters such as mass or volumetric flow rate of fuel, annual fuel usage, stack-gas oxygen content. These requirements are specified separately for high and low usage units. In addition, high usage units subject to emission standards must install equipment to continuously monitor boiler and flue-gas control system operational parameters.

The majority of affected units will be required to conduct an annual compliance test using specified methods and a protocol approved by the District.

The rule also provides for compliance by May 31, 1996 for most existing boilers located at major industrial sources of NOx emissions to meet EPA requirements. A four-year compliance schedule is specified for all other existing boilers. New units must comply with all applicable provisions upon initial installation and startup.

Section 40001 of the State Health and Safety Code requires the District to determine, prior to adopting any rule to reduce emissions of criteria pollutants, that the rule will alleviate a problem and promote the attainment or maintenance of state or federal air quality standards. San Diego County does not attain the state or federal ambient air quality standard for ozone. The proposed rule will reduce emissions of nitrogen oxides (ozone precursors) by approximately 117 tons per year. Therefore, it will help alleviate San Diego County's ozone non-attainment problem.

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

Socioeconomic Impact Assessment

Section 40728.5 of the State Health and Safety Code requires the District to perform a socioeconomic impact assessment (SIA) for new and revised rules and regulations significantly affecting air quality or emission limitations. Proposed Rule 69.2 imposes new emission limitations on industrial and commercial boilers, process heaters and steam generators. Accordingly, an SIA was prepared with the assistance of Applied Development Economics of Berkeley, California, and made available for public comment.

The majority of boilers, process heaters and steam generators affected by the rule are owned by manufacturing, financial and service industries as well as local government services including military installations, health care and educational institutions. Since the District does not currently have complete information on the operating profiles of most affected boilers, the cost analysis portion of the socioeconomic impact assessment was done for a worst-case scenario that assumed the rule would require all affected units to install control equipment. Using this assumption, the total capital cost to fully implement the rule is estimated to be about \$10.2 million. The corresponding annualized cost is \$2.8 million and the overall cost-effectiveness is

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about \$7 per pound of NOx reduced. This cost-effectiveness is comparable to the cost-effectiveness of other NOx control measures adopted by the District.

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

It should be noted that because it was assumed that all affected units would require control equipment, the estimated cost of compliance is conservatively high. Many affected facilities will only need to do tuning or other specified operating procedures because of low boiler usage. The cost of these operations is substantially less than that of control equipment and this will decrease the overall rule compliance cost.

Within the boundaries of state and federal requirements, adverse impacts on businesses having boilers with low annual usage were minimized. Based on a cost analysis conducted by District staff, the boiler exemption level specified in state BARCT guidance was increased to exempt more units because it is not cost-effective to control them.

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

California Environmental Quality Act

The California Environmental Quality Act requires an environmental review for certain actions. No significant adverse impacts on the environment have been suggested; no such impacts are reasonably possible. The adoption of new Rule 69.2 will not have a significant effect on the environment and is categorically exempt from the provisions of the California Environmental Quality Act pursuant to California Code of Regulations, Title 14, Sections 15300 and 15308, as an action taken to assure the maintenance or protection of the environment where the regulatory process involves procedures for protection of the environment.

Public workshop on proposed Rule 69.2 was held on November 19, 1993. The workshop report and Socioeconomic Impact Assessment are attached.

Concurrence:

DAVID E. JANSSEN
Chief Administrative Officer

Respectfully submitted,


R. J. SOMMERVILLE
Air Pollution Control Officer

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

SUBJECT: Adoption New Rule 69.2 (Industrial and Commercial Boilers, Process Heaters and Steam Generators)

SUPV DIST.: All

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

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

FINANCIAL MANAGEMENT REVIEW: ☐ Yes ☒ No

CONTRACT REVIEW PANEL: ☐ Approved _____ ☒ N/A

CONTRACT NUMBER(S): N/A

PREVIOUS RELEVANT BOARD ACTION: N/A

BOARD POLICIES APPLICABLE:

CITIZEN COMMITTEE STATEMENT: The Air Pollution Control District Advisory Committee recommended adoption of new Rule 69.2 at their July 27, 1994 meeting.

CONCURRENCES: N/A

ORIGINATING DEPARTMENT: Air Pollution Control District San Diego County

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


R.J. SOMMERVILLE

DEPARTMENT AUTHORIZED REPRESENTATIVE

SEPTEMBER 27, 1994
MEETING DATE

FINDINGS OF THE SAN DIEGO COUNTY AIR POLLUTION
CONTROL BOARD IN RESPECT TO ADOPTION OF
NEW RULE 69.2 (INDUSTRIAL AND COMMERCIAL BOILERS,
PROCESS HEATERS AND STEAM GENERATORS)

- A. Pursuant to section 40727 of the Health and Safety Code, the Air Pollution Control Board of the San Diego County Air Pollution Control District makes the following findings:
1. (Necessity) The adoption of the proposed new District Rule 69.2 is necessary for the District to satisfy the requirements of subsection (f)(1) of section 182 of the federal Clean Air Act which mandates rules requiring reasonably available control technology for major stationary sources of oxides of nitrogen emissions, and to satisfy the requirements of subsection (c) of California Health and Safety Code section 40919 for application of best available retrofit control technology.
 2. (Authority) The adoption of the new proposed rule is authorized by Health and Safety Code sections 40001, 40702 and 40919.
 3. (Clarity) The proposed new rule is written so that its meaning can be easily understood by persons directly affected by the rule.
 4. (Consistency) The proposed rule is in harmony with, and not in conflict with or contrary to, existing statutes, court decisions, and State law and Federal regulations.
 5. (Nonduplication) The proposed rule does not impose the same requirements as an existing state or federal regulation.
 6. (Reference) The adoption of the proposed new rule implements subsection (f)(1) of section 182 of the federal Clean Air Act [42 U.S.C. section 7511a, subsection (f)(1)], and subsection (c) of California Health and Safety Code section 40919.
- B. The Air Pollution Control Board further finds that an assessment of socioeconomic impacts of the proposed rule was performed and made available for public comment and review pursuant to Health and Safety Code section 40728.5, and that the socioeconomic impacts of the proposed rule have been actively considered and the District has made a good faith effort to minimize adverse socioeconomic impacts.
- C. The Air Pollution Control Board further finds that there is no reasonable possibility that the proposed rule may have a significant effect on the environment, and that the adoption of the proposed rule is categorically exempt from the provisions of the California Environmental Quality Act pursuant to California Code of Regulations, title 14, sections 15300 and 15308, as an action taken to assure the protection of the environment which will not have a significant effect on the environment and where the regulatory process involves procedures for protection of the environment.
- D. The Air Pollution Control Board further finds in accordance with Health and Safety Code section 40001 that the adoption of the proposed rule is necessary to satisfy federal and state law, and that the proposed rule will promote the attainment of state and federal ambient air quality standards.

APCD Meeting 9/27/94
Agenda Item #2

Approved and/or authorized by the Board
of Supervisors of the County of San Diego

Date: 9-27-94 Minute Order No. APC62

THOMAS J. PASTUSZKA

Clerk of the Board of Supervisors

By: [Signature]
Deputy Clerk

OFFICIAL RECORD

Clerk of the Board of Supervisors

Exhibit No. _____ Agenda No. 2

Meeting Date: 9-27-94 ()

Document No. 761025

NEW ADDED RULE

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

**RESOLUTION ADDING RULE 69.2 -
INDUSTRIAL AND COMMERCIAL BOILERS, PROCESS
HEATERS AND STEAM GENERATORS
TO REGULATION IV
OF THE RULES AND REGULATIONS OF THE
SAN DIEGO COUNTY AIR POLLUTION CONTROL DISTRICT**

On motion of Member Bilbray, seconded by Member MacDonald
the following resolution is adopted:

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

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

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

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

New proposed Rule 69.2 is to read as follows:

**RULE 69.2 INDUSTRIAL AND COMMERCIAL BOILERS, PROCESS
HEATERS AND STEAM GENERATORS**

(a) APPLICABILITY

This rule shall apply to any boiler, process heater, or steam generator with a heat input rating of 5 million Btu per hour or more.

(b) EXEMPTIONS

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

(i) Electricity-generating steam boilers with a heat input rating of 100 million Btu per hour or more including auxiliary boilers used in conjunction with such boilers.

(ii) Waste heat recovery boilers that are used to recover heat from the exhaust of gas turbines or internal combustion engines.

(iii) Furnaces, kilns, and any combustion equipment where the material being heated is in direct contact with the products of combustion.

(iv) Thermal oxidizers and associated waste heat recovery equipment.

(v) Boilers, process heaters and steam generators used exclusively in connection with a structure that is designed for and used exclusively as a dwelling for not more than four families.

(vi) Boilers, process heaters and steam generators used in agricultural operations in the growing of crops or the raising of fowl or animals.

(2) The provisions of Subsection (d)(1)(ii) and (e)(1) shall not apply to any unit which burns liquid fuel only during periods of natural gas curtailment, during emergencies, or during equipment testing for the purpose of maintaining the fuel oil back-up system, provided that both of the following conditions are met:

(i) Total cumulative operation during curtailment periods or emergencies shall not exceed 168 hours per calendar year. It is the responsibility of any person claiming this exemption to keep records in accordance with Subsection (e)(4) of this rule.

(ii) Liquid fuel firing for equipment testing shall not exceed 48 hours per calendar year. It is the responsibility of any person claiming this exemption to keep records in accordance with Subsection (e)(5) of this rule.

(3) The provisions of Subsections (d)(2)(iii) and (g)(4) shall not require the firing of liquid fuel for any unit which otherwise burns liquid fuel only during periods of natural gas curtailment, during emergencies, or during equipment testing for the purpose of maintaining the fuel oil back-up system, provided that operation on liquid fuel complies with Subsections (b)(2)(i) and (ii).

(c) DEFINITIONS

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

(1) **"Annual Capacity Factor"** means the ratio of the amount of fuel burned by a unit in a calendar year to the amount of fuel it could have burned if it had operated at the heat input rating for 8,760 hours during the calendar year.

(2) **"Annual Heat Input"** means the actual, total heat input of fuels burned by a unit in a calendar year, as determined from the higher heating value and cumulative annual usage of each fuel. Annual heat input shall not include the heat input from fuels used during natural gas curtailment, during an emergency, or during equipment testing for the purpose of maintaining the fuel oil back-up system.

(3) **"Boiler" or "Steam Generator"** means any combustion equipment fired with gaseous and/or liquid fuel and used to produce steam or to heat water. "Boiler" or "Steam Generator" shall not include waste heat recovery boilers that are used to recover heat from the exhaust of gas turbines or internal combustion engines, or any unfired waste heat recovery boiler that is used to recover sensible heat from the exhaust of any combustion equipment.

- (4) **"Btu"** means British thermal unit.
- (5) **"Emergency"** means an unforeseen disruption or interruption in the supply of gaseous fuel to the unit.
- (6) **"Existing Unit"** means any unit which was installed and operating on or before (*date of adoption*).
- (7) **"Heat Input"** means the heat derived from combustion of a fuel in a unit, calculated using the higher heating value, excluding the heat input from preheated combustion air, recirculated flue gases, or exhaust gases from other sources, including but not limited to, gas turbines, internal combustion engines and kilns.
- (8) **"Heat Input Rating"** means the maximum steady state heat input capacity of a unit, in Btu per hour, as specified by the manufacturer, or as limited by a District Authority to Construct or a Permit to Operate.
- (9) **"Higher Heating Value"** 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.
- (10) **"Major Stationary Source"** means a stationary source that emits or has the potential to emit 25 tons or more of oxides of nitrogen (NO_x) per year. If the San Diego County Air Pollution Control District is reclassified to a "serious" ozone non-attainment area by the federal Environmental Protection Agency (EPA), then a major stationary source of NO_x will mean a stationary source that emits or has the potential to emit 50 tons or more of NO_x per year.
- (11) **"Natural Gas Curtailment"** means a shortage in the supply of natural gas, due solely to limitations or restrictions in distribution pipelines by the utility supplying the gas, and not due to the cost of natural gas.
- (12) **"New Unit"** means a unit installed after (*date of adoption*).
- (13) **"Process Heater"** means any combustion equipment fired with liquid and/or gaseous fuel and which transfers heat from the combustion gases to water or process streams. Heaters used for swimming pools, spas and/or therapy pools shall be considered process heaters. "Process Heater" shall not include any combustion equipment where the material being heated is in direct contact with the products of combustion, such as furnaces or kilns, or any unfired waste heat recovery heater that is used to recover sensible heat from the exhaust of any combustion equipment.
- (14) **"Stack-Gas Oxygen Trim System"** means a system of monitors that is used to maintain excess air at the desired level. A typical system consists of a flue gas oxygen and/or carbon monoxide monitor that automatically provides a feedback signal to the combustion air controller.
- (15) **"Stationary Source"** means the same as is defined in Rule 20.1.
- (16) **"Therm"** means 100,000 Btu.
- (17) **"Thermal Oxidizer"** means combustion equipment fired with gaseous fuel and used to control emissions of air contaminants from industrial or commercial processes.

(18) "Unit" means any boiler, steam generator or process heater.

(d) STANDARDS

(1) For any unit with a heat input rating less than or equal to 50 million Btu/hr and an annual heat input of 220,000 therms or more, or for any unit with a heat input rating greater than 50 million Btu/hr and an annual capacity factor 10% or greater, emissions of oxides of nitrogen, calculated as nitrogen dioxide at 3% oxygen on a dry basis, shall not exceed the following levels:

(i) 30 parts per million by volume when operated on a gaseous fuel.

(ii) 40 parts per million by volume when operated on a liquid fuel.

(iii) The heat-input weighted average of the limits specified in Subsections (d)(1)(i) and (d)(1)(ii) when operated on combinations of a gaseous and a liquid fuel. The heat-input weighted average is calculated using the following equation:

$$\text{Heat-input weighted average, ppmv} = \{ (H_g) (30 \text{ ppmv}) + (H_l) (40 \text{ ppmv}) \} / (H_g + H_l)$$

where:

H_g = the actual heat input of gaseous fuel to a unit, in Btu per hour.

H_l = the actual heat input of liquid fuel to a unit, in Btu per hour.

(2) Any unit with a heat input rating less than or equal to 50 million Btu/hr and an annual heat input of less than 220,000 therms, or any unit with a heat input rating greater than 50 million Btu/hr and an annual capacity factor less than 10%, shall comply with one of the following provisions:

(i) The unit shall be operated in a manner to maintain stack-gas oxygen concentration at less than or equal to 3.00 percent by volume on a dry basis; or

(ii) The unit shall be operated with a stack-gas oxygen trim system to maintain stack-gas oxygen concentration at 3.00 ± 0.15 percent by volume on a dry basis; or

(iii) The unit shall be tuned at least once per year in accordance with the tuning procedure in Section (j), or in accordance with the manufacturer's recommended tuning procedure, provided such procedure has been approved in advance by the Air Pollution Control Officer; or

(iv) The unit shall be operated in compliance with the applicable emission standards of Subsections (d)(1) and (d)(3).

(3) For any unit with a heat input rating less than or equal to 50 million Btu/hr and an annual heat input of 220,000 therms or more, or for any unit with a heat input rating greater than 50 million Btu/hr and an annual capacity factor 10% or greater, emissions of carbon monoxide shall not exceed 400 parts per million by volume, calculated at 3% oxygen on a dry basis.

(e) MONITORING AND RECORDKEEPING REQUIREMENTS

(1) An owner or operator of a unit which is capable of burning both gaseous and liquid fuel and is subject to the requirements of Subsection (d)(1) except as specified in

Subsection (b)(2), and an owner or operator of a unit which is subject to the requirements of Subsection (d)(2) shall install one of the following:

(i) A non-resettable, totalizing meter in each fuel line to measure the mass flow rate of each fuel to the unit; or

(ii) A non-resettable, totalizing meter in each fuel line to measure the volumetric flow rate, temperature and pressure of each fuel to the unit.

(2) An owner or operator of a unit which is subject to the requirements of Subsection (d)(1) shall install continuous monitors to allow for instantaneous monitoring of the operational characteristics of the unit and of the flue-gas NO_x reduction system, as applicable. Examples of operational characteristics include, but are not limited to, the following:

(i) Stack-gas oxygen content.

(ii) Percentage of flue gas recirculated.

Continuous monitors shall be installed, calibrated and maintained in accordance with all applicable local, state and federal regulations, and procedures approved by the Air Pollution Control Officer.

(3) An owner or operator of a unit which is subject to the requirements of Subsection (d)(2) shall monitor and record the higher heating value and annual usage of each fuel.

(4) An owner or operator of any unit which is burning liquid fuel during natural gas curtailment or an emergency shall monitor and record the cumulative annual hours of operation on liquid fuel. At a minimum, these records shall include the dates and times of operation on liquid fuel and any corresponding totalizer readings.

(5) An owner or operator of any unit which is burning liquid fuel for equipment testing purposes shall monitor and record the cumulative annual hours of operation on liquid fuel. At a minimum, these records shall include the dates and times of operation on liquid fuel and any corresponding totalizer readings.

(6) An owner or operator of a unit complying with Subsection (d)(2)(iii) shall maintain documentation verifying the required annual tuneups including the data required in Section (j).

(7) The owner or operator of any unit subject to this rule shall maintain all records required by Section (e) for a minimum of three 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, carbon monoxide, and stack-gas oxygen content shall be conducted in accordance with ARB Test Method 100 as approved by the EPA.

(2) Certification of the higher heating value of a fuel as required by Subsection (e)(3), if not provided by a third party fuel supplier, shall be determined by one of the following methods:

(i) ASTM Test Method D240-87 or D2382-88 for liquid hydrocarbon fuels.

(ii) ASTM Test Method D1826-88, or D1945-81, in conjunction with ASTM D3588-89 for gaseous fuels.

(3) Certification of continuous monitors shall be conducted in accordance with all applicable local, state and federal regulations, and procedures approved by the Air Pollution Control Officer.

(g) SOURCE TEST REQUIREMENTS

(1) Source testing shall be performed at no less than 80% of the heat input rating.

(2) Source testing shall be preceded by a minimum of two hours of combustion in the unit. Interruptions in combustion within the two hours shall be allowed provided that interruptions total less than 30 cumulative minutes.

(3) Measurement of emission concentrations shall be based on a 15 continuous minute sampling period. For the purpose of averaging, a minimum of five data sets with averaging intervals no greater than three minutes shall be used.

(4) A unit subject to the requirements of Subsections (d)(1), (d)(2)(i), (d)(2)(ii), (d)(2)(iv), or (d)(3) shall be tested for compliance at least once every 12 months, unless otherwise approved 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. Test reports shall include the operational characteristics, as listed in Subsection (e)(2), of the unit and of all flue-gas NO_x control systems.

(h) COMPLIANCE SCHEDULE

(1) No later than May 31, 1995 for an existing unit subject to the provisions of this rule and located at a major stationary source, or no later than *(2 years after date of adoption)* for an existing unit not located at a major stationary source, an owner or operator shall submit an application for an Authority to Construct the air pollution control and monitoring equipment and any unit modification(s) necessary to meet the requirements of Sections (d) and (e) of this rule. The following information shall be submitted with the application:

(i) A list of all units, the anticipated annual heat input of each unit, the heat input rating as specified by the manufacturer, and the heat input rating as stated in a District Authority to Construct or a Permit to Operate.

(ii) For each unit listed, the selected method for meeting the applicable requirements of Section (d).

(2) For an existing unit located at a major stationary source, an owner or operator shall be in compliance with all applicable provisions of this rule as follows:

(i) No later than May 31, 1997 for a unit subject to the provisions of Subsection (d)(1); or

(ii) No later than May 31, 1996 for a unit subject to the provisions of Subsection (d)(2).

(3) An owner or operator of an existing unit not located at a major stationary source shall be in compliance with all applicable provisions of this rule no later than *(4 years after date of adoption)*.

(4) Any person installing a new unit subject to the provisions of this rule shall comply with all applicable provisions of this rule upon initial installation and startup.

(j) TUNING PROCEDURE

The owner or operator of a unit subject to Subsection (d)(2)(iii) of this rule shall comply with the following tuning procedure.

(1) Operate the unit at the firing rate most typical of normal operation. If the unit experiences significant load variations during normal operation, operate it at its average firing rate.

(2) At this firing rate, record stack gas temperature, oxygen concentration, and CO concentration (for gaseous fuels) or smoke-spot number (for liquid fuels), and observe flame conditions after unit operation stabilizes at the firing rate selected. If the excess oxygen in the stack gas is at the lower end of the range of typical minimum excess oxygen values, and if CO emissions are low and there is no smoke, the unit is probably operating at near optimum efficiency - at this particular firing rate. However, complete the remaining portion of this procedure to determine whether still lower oxygen levels are practical.

(i) The smoke-spot number can be determined with ASTM test method D-2156 or with the Bacharach method. The Bacharach method is included in a tune-up kit that can be purchased from the Bacharach Company.

(ii) Typical minimum oxygen levels for boilers at high firing rates are:

1. For natural gas: 0.5 - 3%
2. For liquid fuels: 2 - 4%

(3) Increase combustion air flow to the furnace until stack gas oxygen levels increase by one to two percent over the level measured in Step 2. As in Step 2, record the stack gas temperature, CO concentration (for gaseous fuels) or smoke-spot number (for liquid fuels), and observe flame conditions for these higher oxygen levels after boiler operation stabilizes.

(4) Decrease combustion air flow until the stack gas oxygen concentration is at the level measured in Step 2. From this level, gradually reduce the combustion air flow in small increments. After each increment, record the stack gas temperature, oxygen concentration, CO concentration (for gaseous fuels) and smoke spot number (for liquid fuels). Also, observe the flame and record any changes in its condition.

(5) Continue to reduce combustion air flow stepwise, until one of these limits is reached:

(i) Unacceptable flame conditions - such as flame impingement on furnace walls or burner parts, excessive flame carryover, or flame instability.

(ii) Stack gas CO concentrations greater than 400 ppm.

(iii) Smoking at the stack.

(iv) Equipment-related limitations - such as low windbox/furnace pressure differential, built in air-flow limits, etc.

(6) Develop an O₂/CO curve (for gaseous fuels) or O₂/smoke curve (for liquid fuels) similar to those shown in Figures 1 and 2 using the excess oxygen and CO or smoke-spot number data obtained at each combustion air flow setting.

(7) From the curves prepared in Step 6, find the stack gas oxygen levels where the CO emissions or smoke-spot number equal the following values:

<u>Fuels</u>	<u>Measurement</u>	<u>Value</u>
Gaseous	CO Emissions	400 ppm
#1 and #2 oils	smoke-spot number	number 1
#4 oil	smoke-spot number	number 2
#5 oil	smoke-spot number	number 3
Other oils	smoke-spot number	number 4

The above conditions are referred to as the CO or smoke thresholds, or as the minimum excess oxygen levels.

Compare this minimum value of excess oxygen to the expected value provided by the combustion unit manufacturer. If the minimum level found is substantially higher than the value provided by the combustion unit manufacturer, burner adjustments can probably be made to improve fuel and air mix, thereby allowing operations with less air.

(8) Add 0.5 to 2.0 percent to the minimum excess oxygen level found in Step 7 and reset burner controls to operate automatically at this higher stack gas oxygen level. This margin above the minimum oxygen level accounts for fuel variations, variations in atmospheric conditions, load changes, and nonrepeatability or play in automatic controls.

(9) If the load of the combustion unit varies significantly during normal operation, repeat Steps 1-8 for firing rates that represent the upper and lower limits of the range of the load. Because control adjustments at one firing rate may affect conditions at other firing rates, it may not be possible to establish the optimum excess oxygen level at all firing rates. If this is the case, choose the burner control settings that give best performance over the range of firing rates. If one firing rate predominates, setting should optimize conditions at the rate.

(10) Verify that the new settings can accommodate the sudden load changes that may occur in daily operation without adverse effects. Do this by increasing and decreasing load rapidly while observing the flame and stack. If any of the conditions in Step 5 result, reset the combustion controls to provide a slightly higher level of excess oxygen at the affected firing rates. Next, verify these new settings in a similar fashion. Then make sure that the final control settings are recorded at steady-state operating conditions for future reference.

Nothing in this Tuning Procedure shall be construed to require any act or omission that would result in unsafe conditions or would be in violation of any regulation or requirement established by Factory Mutual, Industrial Risk Insurers, National Fire Prevention Association, the California Department of Industrial Relations (Occupational Safety and Health Division), the Federal Occupational Safety and Health Administration, or other relevant regulations and requirements.

FIGURE 1: OXYGEN/CO CHARACTERISTIC CURVE

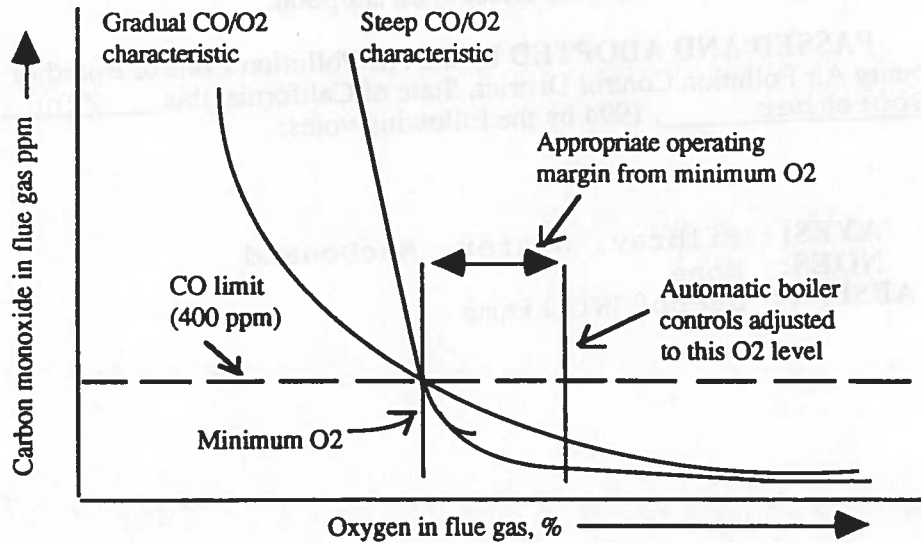
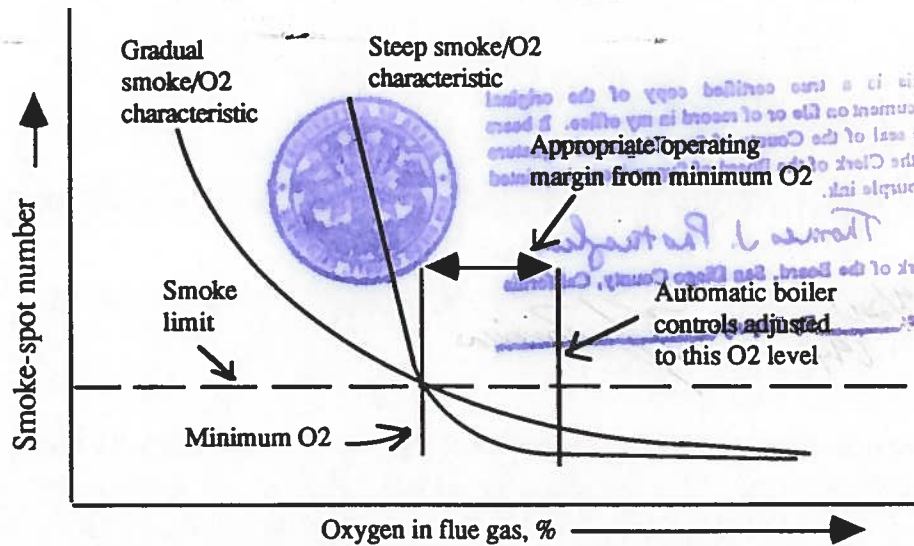


FIGURE 2: OXYGEN/SMOKE CHARACTERISTIC CURVE



IT IS FURTHER RESOLVED AND ORDERED that the subject addition of Rule 69.2 to Regulation IV shall take effect upon adoption.

PASSED AND ADOPTED by the Air Pollution Control Board of the San Diego County Air Pollution Control District, State of California, this 27th day of September, 1994 by the following votes:

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

**APPROVED AS TO FORM AND LEGALITY
COUNTY COUNSEL**

BY W. Dutton

DEPUTY

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

Thomas J. Pastuszek

Clerk of the Board, San Diego County, California

Date 9/29/94 By Deputy [Signature]



Resolution No. 94-415
9/27/94 (APCB 2)

AIR POLLUTION CONTROL DISTRICT
COUNTY OF SAN DIEGO

WORKSHOP REPORT

**RULE 69.2
INDUSTRIAL AND COMMERCIAL BOILERS, PROCESS HEATERS
AND STEAM GENERATORS**

A workshop notice was mailed to owners and operators of industrial and commercial boilers, process heaters and steam generators 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 November 19, 1993 and was attended by 32 people. The comments received and District responses are as follows:

1. WORKSHOP COMMENT:

Some boilers do not have a dedicated fuel meter to indicate fuel usage. How will owners and operators prove the past history or past operation of their boilers?

DISTRICT RESPONSE:

Without a dedicated fuel meter, a facility would initially have to estimate a boiler's annual fuel usage from fuel purchase records. In the application for an Authority to Construct, the owner or operator will indicate the anticipated annual heat input or annual capacity factor to determine the appropriate level of control. The rule has been revised to require fuel meters for boilers which will be expected to operate below 220,000 therms or 10% capacity factor, and for dual-fuel boilers which burn liquid fuels for periods other than emergencies, natural gas curtailment or maintenance.

2. WORKSHOP COMMENT:

Does the proposed rule make any distinction between low-pressure and high-pressure boilers?

DISTRICT RESPONSE:

No, the rule applies to any boiler with a rated heat input of 5 MM Btu/hr and greater regardless of pressure rating.

3. WORKSHOP COMMENT:

Rule 69.2 exempts boilers with an annual heat input less than or equal to 220,000 therms from the emission standards requirements. How many non-exempt boilers would have to install control equipment in order to comply with the emission standards of the rule?

DISTRICT RESPONSE:

Due to the limited information available on fuel usage for each potentially affected boiler, the District at this time cannot provide the exact number of boilers that would require the installation of control equipment. In addition, some boilers with a heat input rating less than 50 MM Btu/hr are

currently exempt from permit requirements pursuant to Rule 11 and, therefore, are not in the District's general permit file. The District estimates that about 50 boilers will be subject to the emission standard requirements of Rule 69.2.

4. WORKSHOP COMMENT:

The standards of Subsection (d)(1) do not apply to boilers 50 MM Btu/hr and smaller with less than 220,000 therms annual heat input, or to boilers greater than 50 MM Btu/hr and less than 10% annual capacity factor. How were these exemption levels determined?

DISTRICT RESPONSE:

These exemption levels were based on the cost-effectiveness of NOx controls. The exemption based on an annual heat input of 220,000 therms was determined from the District's evaluation of the appropriate NOx control technology for 5 and 10 MM Btu/hr boilers, the smallest boilers subject to the rule, operating at various annual heat input levels. The exemption based on an annual capacity factor of 10% was determined using information supplied by the affected industry for large boilers greater than 50 MM Btu/hr. It was shown that for small boilers operating below 220,000 therms annual heat input, and for large boilers operating at less than 10% capacity factor, the cost-effectiveness exceeds \$7 per pound of NOx reduced. This represents the maximum cost-effectiveness that the District believes is appropriate and corresponds to the upper range of the estimated cost-effectiveness of proposed District Rule 69 for Electric Utility Boilers.

5. WORKSHOP COMMENT:

Will agricultural boilers be affected by the rule?

DISTRICT RESPONSE:

No. Section 42310 of the California Health & Safety Code exempts any equipment used in agricultural operations from permit requirements. The rule has been revised to specifically exempt such boilers.

6. WORKSHOP COMMENT:

Do Subsections (h)(2) and (h)(3) require that emissions from boilers not affected by the rule be included in calculations of the total emissions from a stationary source? In addition, the term "all units" should be clarified in these subsections.

DISTRICT RESPONSE:

Subsections (h)(2) and (h)(3) have been revised. Total emissions from the stationary source are no longer included in the requirements of the proposed rule.

7. WORKSHOP COMMENT:

Would a heat recovery steam generator (HRSG) from a turbine be affected by the rule?

DISTRICT RESPONSE:

No. Subsection (b)(1)(ii) specifically exempts "waste heat recovery boilers that are used to recover heat from the exhaust of gas turbines...". The definition of boiler, Subsection (c)(2), also excludes HRSGs.

8. WORKSHOP COMMENT:

Would a boiler with a rated heat input of less than 5 MM Btu/hr, operating more than 220,000 therms per year, be subject to the rule?

DISTRICT RESPONSE:

No. Boilers with a rated heat input less than 5 MM Btu/hr, regardless of the annual heat input, are exempt from all requirements of Rule 69.2.

9. WORKSHOP COMMENT:

Does this rule apply to the boiler output or to the burner rated input?

DISTRICT RESPONSE:

The rule applies to the rated heat input of the burner or combination of burners.

10. WORKSHOP COMMENT:

Can burners be derated to less than 5 MM Btu/hr?

DISTRICT RESPONSE:

Yes, the District would allow a facility to derate a burner below 5 MM Btu/hr provided that the modifications are permanent.

11. WORKSHOP COMMENT:

If a boiler is currently exempt from permit requirements, would an application for an authority to construct (A/C) be required to derate the boiler to less than 5 MM Btu/hr?

DISTRICT RESPONSE:

No, an application to derate a non permitted boiler will not be necessary at the present time. However, in order to implement and enforce Rule 69.2, Rule 11, Exemption from Permit Requirements, will be amended to require permits for all boilers 5 MM Btu/hr and greater. The effective date for these amendments to Rule 11 will occur before the due date that applications should be submitted to the District. Before that time, an application will not be required provided that modifications to derate the boiler are permanent and are completed prior to the effective date of Rule 11 amendments.

In the future, the District may determine that boilers less than 5 MM Btu/hr must be registered or permitted.

12. WORKSHOP COMMENT:

Will proposed Rule 69.2 be submitted as a revision to the State Implementation Plan (SIP)?

DISTRICT RESPONSE:

Yes. Some facilities subject to Rule 69.2 are major sources of NOx emissions (25 tons per year or more). The Federal Clean Air Act requires the District to adopt rules reflecting reasonably available control technology (RACT) for all major sources of NOx emissions and submit them as a SIP revision before October 15, 1994. Rule 69.2 meets these requirements.

13. WORKSHOP COMMENT:

Will amendments to Rule 68 be submitted to EPA to satisfy federal requirements of reasonably available control technology (RACT)?

DISTRICT RESPONSE:

Yes. The District continues to work on these amendments and will submit amended Rule 68 to EPA as a SIP revision before October 21, 1994.

14. WORKSHOP COMMENT:

Is there a certain season when ozone levels are higher during which it may be more beneficial to control NOx emissions?

DISTRICT RESPONSE:

Typically, ozone levels are higher in the summer and early fall than in the winter or spring. However, federal and state laws require the District to implement year round control measures to reduce emissions of ozone precursors such as nitrogen oxides. These requirements apply regardless of the season.

15. WORKSHOP COMMENT:

Will rental units be subject to the rule?

DISTRICT RESPONSE:

Yes, any rental unit larger than 5 MM Btu/hr will be affected by the rule. The owner of a rental unit will be responsible for compliance with applicable provisions of the rule. In addition, proposed revisions to the District's New Source Review rules regarding portable equipment will also apply.

16. WRITTEN COMMENT:

Some companies in California offer a low-nitrogen fuel oil. The amount of fuel-bound nitrogen is about 10 ppm. The use of this fuel may significantly reduce NOx emissions.

DISTRICT RESPONSE:

Low-nitrogen fuel oil can be used as a part of a strategy to comply with the emission standards of Rule 69.2. Other NOx emission reduction measures, in addition to low-nitrogen fuel oil, will likely also be needed to comply with Rule 69.2.

17. WRITTEN COMMENT:

Subsections (g)(1) and (g)(2) require the warm-up procedure to hold the boiler at 80% heat input for two hours with interruptions less than 30 minutes in aggregate. A cyclically operating boiler cannot meet this requirement. Subsections (g)(1) and (g)(2) should be amended to include the statement "boiler must operate normally for an aggregate four-hour period."

DISTRICT RESPONSE:

Subsections (g)(1) and (g)(2) contain separate requirements. Subsection (g)(2) does not require that the boiler be held at 80% heat input during the warm-up procedure. Regarding the cyclically operating boiler in question, the District has obtained information from the operator of this boiler and has determined that it can comply with requirements of these subsections.

18. WRITTEN COMMENT:

A cyclically operating boiler might not be able to operate for 15 consecutive minutes. Subsection (g)(3) should be amended to state "based on a 15-minute averaging period, samples will be taken at five consecutive data sets while the boiler is operating at 80% heat input or better."

DISTRICT RESPONSE:

As discussed in Comment #17 above, the District has determined that a revision of this subsection is not necessary.

19. WRITTEN COMMENT:

Section (j), "Tuning Procedure," indicates that the tune-up procedure should not result in any unsafe condition, or violate any safety or fire regulation. Therefore, Section (j) should be amended to allow for a facility to use the manufacturer's recommended tune-up procedure, as approved by the District.

DISTRICT RESPONSE:

The District agrees. Language has been added to allow for alternative tune-up procedures as recommended by the boiler manufacturer, provided that the procedure has been approved by the District prior to being used.

20. WRITTEN COMMENT:

For boilers which burn liquid fuel, the cost-effectiveness determination should include expenses for conversion to low-nitrogen fuel oils. This option may be desirable for certain industrial/commercial operations and is potentially a significant cost consideration which should be weighed in determining the cost effectiveness of the rule. Industry should be given wide latitude in as many compliance options as possible.

DISTRICT RESPONSE:

The proposed rule does not preclude the use of low-nitrogen fuels for those sources which elect that option. The District did evaluate the cost-effectiveness of converting to low-nitrogen fuel oils and found the cost-effectiveness to be significantly higher than \$7/lb of NOx reduced. However, most of the boilers in San Diego County burn liquid fuel only as a backup and would not need to convert to low-nitrogen fuels. Therefore, such conversion costs were not included in the cost-effectiveness evaluation. In addition, the rule provides for exemption from the emission standards during natural gas curtailment, emergencies and equipment testing of the backup fuel system.

21. WRITTEN COMMENT:

Several factors, such as economic downturns and customer needs, greatly influence the capacity factor of a boiler. Boilers which operate with annual heat inputs close to 220,000 therms may require control equipment, even though the annual heat input may be less than 220,000 therms. It is suggested to raise the exemption level cutoff from 220,000 therms to 250,000 therms or more.

DISTRICT RESPONSE:

The District disagrees. As was stated in Comment #4, the 220,000 therms exemption level cutoff was based on a cost-effectiveness analysis. That analysis does not indicate that an exemption level greater than 220,000 therms can be justified based on cost-effectiveness, nor would such an exemption level be approvable by ARB.

22. WRITTEN COMMENT:

The calculation of annual heat input should exclude the use of liquid fuel during natural gas curtailment periods. This would be consistent with the exemption for boilers operating on liquid fuels during certain emergency or testing periods as contained in Subsections (b)(2)(i) and (b)(2)(ii).

DISTRICT RESPONSE:

The District agrees. Subsection (c)(1) has been revised to exclude the use of liquid fuel during emergencies, during natural gas curtailment and during equipment testing of the fuel oil back-up system.

23. WRITTEN COMMENT:

For boilers with an annual heat input less than 220,000 therms per year, the Workshop Notice and proposed Rule 69.2 cite different requirements with respect to compliance with the NOx emission standards. The Workshop Notice states that such boilers would have to comply only with the NOx emission standards. Rule 69.2, Subsection (d)(2)(iv), states that both NOx and carbon

monoxide (CO) emission standards would have to be met. Please clarify which operational standard is intended: keeping only the NOx below 30 ppm, or also keeping the CO below 400 ppm.

DISTRICT RESPONSE:

For boilers operating below 220,000 therms per year, boiler owners and operators can choose one of four options available as indicated in Subsection (d)(2). These options include the following: maintain stack-gas oxygen concentration to 3% by volume; use an oxygen trim system to maintain stack-gas oxygen concentration to 3% by volume; conduct annual tune-ups; or comply with the NOx and CO emission standards as indicated in Subsections (d)(1) and (d)(3). If an owner or operator chooses to meet the emission standards, then the rule requires that such boilers meet both NOx and CO emission concentration limits. The requirement to comply with the CO emission standard was inadvertently omitted from the Workshop Notice.

24. WRITTEN COMMENT:

If a boiler with an annual heat input less than 220,000 therms per year must also meet the CO emission standard, then there is no difference in the requirements for boilers with low annual heat input. All boilers would require annual source testing to meet the standards of Subsections (d)(1) and (d)(3).

DISTRICT RESPONSE:

As discussed in Comment #23, there are a total of four options in Subsection (d)(2) available for boilers operating below 220,000 therms per year. The provision to comply with the NOx and CO emissions standards is one option and only applies if a facility chooses to meet the emission standards pursuant to Subsection (d)(2)(iv).

25. WRITTEN COMMENT:

There appears to be a contradiction between the exemption for process heaters and the definition, (c)(11), for "Process Heater." Specifically, Subsection (b)(1)(iii) exemption allows for direct contact between materials being heated and combustion gases and Subsection (c)(11) definition does not.

DISTRICT RESPONSE:

The intent of the exemption, Subsection (b)(1)(iii), and of the definition of "process heater," Subsection (c)(11), was to ensure that the rule would not apply to combustion equipment in which the products of combustion are in direct contact with materials being heated. Subsection (b)(1)(iii) has been revised to clarify the intent.

26. WRITTEN COMMENT:

Definitions for "furnace" and "kiln" should be added to the rule.

DISTRICT RESPONSE:

The District disagrees. As discussed in Comment #25 above, the revision to Subsection (b)(1)(iii) clarifies that furnaces and kilns where the products of combustion are in direct contact with materials being heated are exempt from the rule.

27. WRITTEN COMMENT:

The rule should specifically exempt a rotary kiln used in a waste recycling operation.

DISTRICT RESPONSE:

As discussed above in Comment #26, a rotary kiln used in a waste recycling operation would be exempt from the rule based on the definition of "process heater," Subsection (c)(12).

28. WRITTEN COMMENT:

Fuel consumption can be determined by a calculation based on operating hours (at full load) in lieu of installing fuel flow meters for each boiler, process heater and/or steam generating unit. This will reduce the costs of compliance for most facilities. A main fuel flow meter for the facility can be used to verify the accuracy of fuel usage. Rule 69.2 should allow for this option.

DISTRICT RESPONSE:

The District disagrees. Using operating hours to determine fuel usage would only be valid when the boiler operates at full load unless there is a definitive method to measure the operating load of the boiler. Most boilers do not operate at full load. The District estimates the cost of fuel meters to be approximately \$2500, including installation, for a boiler with both liquid fuel and natural gas capability. Including the costs of fuel meters increases the cost-effectiveness for a 5 MM Btu/hr boiler at 220,000 therms by only \$0.28 per pound of NOx reduced.

As discussed in Comment #1, the rule has been revised to require fuel meters for boilers which will be expected to operate below 220,000 therms or 10% capacity factor, and for dual-fuel boilers which burn liquid fuels for periods other than emergencies, natural gas curtailment or maintenance.

29. WRITTEN COMMENT:

The District should generate a standardized form for boiler tune-up procedures. This form should include the steps for complying with tune-up requirements along with a sample of a properly filled-out form for comparison. This will help ensure consistency for all sources choosing to comply with Rule 69.2 using the tune-up option.

DISTRICT RESPONSE:

The District agrees. The standardized form will be sent along with an advisory notice to all sources subject to the requirements of Rule 69.2 approximately six months before applications for an Authority to Construct are due. A draft of the proposed form will be made available in advance to affected industry.

30. WRITTEN COMMENT:

The frequency of required source testing cannot be accomplished on an annual basis for all affected sources due to the lack of available and qualified source testing resources, both public and private. Furthermore, the cost to a facility will be unnecessarily high and only serve to aggravate an already depressed total economy. It is recommended that an initial source test be performed prior to the final compliance date as per Section (h) of this rule with subsequent testing once every five (5)

years. For major sources, this would concur with the Title V permit renewal cycles. This testing schedule would reduce the cost of meeting annual source testing requirements for all affected sources. For smaller sources, the cost burden of annual source testing might be overwhelming.

DISTRICT RESPONSE:

The ARB RACT/BARCT Guidance Document states that source testing shall be performed at least once every 12 months, and other districts have adhered to this requirement. The District has provided affected sources with some flexibility as indicated in Subsection (g)(4). In order to adequately determine the frequency of future renewal source testing, the District will have to address several issues such as the applicability of Title V requirements, the compliance history of a boiler, and the availability of certified source testing companies. It should also be noted that the cost of annual source testing was included in the cost-effectiveness evaluation of Rule 69.2.

31. WRITTEN COMMENT:

The District should develop a uniform test protocol for all sources subject to this rule.

DISTRICT RESPONSE:

The District agrees. A uniform test protocol will be developed and made available approximately two years after the adoption date of the rule. This would coincide with the compliance schedule in the rule when applications for Authorities to Construct should be submitted to the District.

32. WRITTEN COMMENT:

The District should allow a source test to be performed on one unit if a stationary source has multiple, identical units subject to this rule. This test would be representative for all those identical units.

DISTRICT RESPONSE:

The District disagrees. Although combustion in boilers is generally fairly stable, several factors can influence boiler emissions such as boiler age, operating history, and proper tuning. Identical boilers can perform differently under source test conditions. The frequency and scope of retesting may consider comparable NOx and CO control performance of identical boilers.

33. WRITTEN COMMENT:

The District should publish a guideline fee schedule for permitting costs and permit processing times associated with this rule.

DISTRICT RESPONSE:

The District will revise the appropriate fee schedules contained in Rule 40 prior to the date when applications for an Authority to Construct are due. The fees will be determined in accordance with the District's established methods for fee calculations and will either be fixed or based on the actual time expended on processing each application.

34. WRITTEN COMMENT:

Every effort should be made to streamline the review and approval of the applications for an Authority to Construct and compliance plans. Affected industries are willing to assist the District to achieve these goals.

DISTRICT RESPONSE:

The District welcomes the offer of assistance from affected industries to streamline the permitting process for this rule. The District intends to form a work group within the next year to accomplish this.

35. WRITTEN COMMENT:

The estimated average cost-effectiveness of Rule 69.2 is \$6 to \$7/lb of NO_x reduction, but may be much higher in some cases. By contrast, the estimated cost-effectiveness of draft Rule 69 (Electrical Generating Boilers) is \$3.86/lb. It is suggested to amend Rule 69.2 to ensure that its cost-effectiveness is comparable to Rule 69.

DISTRICT RESPONSE:

The cost-effectiveness of recently adopted Rule 69 varies depending on future operations of the system of utility boilers. The upper range of Rule 69 cost-effectiveness is approximately \$6 to \$7 per pound of NO_x reduced. The maximum cost-effectiveness of control equipment for Rule 69.2 is comparable. As discussed in Comment #4, it corresponds to the worst case scenario: the cost of meeting the emission standards of the rule for small boilers (5 and 10 MM Btu/hr) with an annual heat input of 220,000 therms, and for boilers greater than 50 MM BTU/hr with an annual capacity factor of 10%. The cost-effectiveness of boilers operating at higher capacities are expected to be lower.

36. WRITTEN COMMENT:

Rule 69.2 should be revised to include an exemption level cutoff for large boilers based on a 10% annual capacity factor. For boilers greater than 150 MM Btu/hr at 220,000 therms (1.3% capacity factor), the cost-effectiveness was calculated to be \$34.71/lb. The APCD has estimated an average cost-effectiveness for Rule 69.2 of \$6 to \$7/lb.

DISTRICT RESPONSE:

The District agrees. The rule has been revised to exempt boilers greater than 50 MM Btu/hr and operating less than 10% capacity factor from complying with the emission standards of the rule. This exemption level cutoff was based on a cost-effectiveness analysis which evaluated the cost of the control technology at various capacity factors from 1 to 50%.

37. WRITTEN COMMENT:

The present draft of Rule 69.2 exempts gas turbine waste heat recovery boilers, and auxiliary boilers that are used in conjunction with utility boilers, which are regulated under Rule 69. Auxiliary boilers, such as a package boiler that is a backup unit for a gas turbine waste heat boiler, should also be exempted.

DISTRICT RESPONSE:

The District disagrees. A package boiler such as that described is a stand-alone unit and does not qualify as an auxiliary boiler for a utility boiler. An auxiliary boiler subject to Rule 69 is located at the same site as the utility boiler and augments the steam produced by the utility boiler.

38. WRITTEN COMMENT:

Rule 69.2 should include a provision for Alternative Emission Control Plans (AECPs). This would allow each site, or each owner, to combine, or "bubble," its emissions in order to obtain the required emission reductions in the most cost-effective manner. The principle of aggregating emissions from several units, in order to reduce the cost of control, has been recognized in the Acid Rain provisions of the FCAA, Rule 69, SCAQMD's Reclaim program and other NOx emission reduction rules.

AECPs have been accepted by ARB in order to meet the BARCT requirements of the California Clean Air Act. Although the EPA imposed stringent requirements on AECPs proposed as part of earlier VOC regulations, Rule 69.2 may not require EPA approval.

DISTRICT RESPONSE:

Rule 69.2 will be submitted to EPA as a part of the revised State Implementation Plan (SIP), and, therefore, will have to comply with federal requirements. However, the District agrees with the concept suggested and intends to revise Rule 67.1, Alternative Emission Control Plans, to also include sources subject to rules for NOx emission sources.

39. WRITTEN COMMENT:

The rule effectively prohibits the burning of fuel oil in boilers using only liquid fuel, because it requires substituting the current fuel oil with a low-nitrogen fuel oil in addition to control equipment. The calculations show that for any such boiler, the cost-effectiveness is about \$100/lb for all annual heat inputs. By contrast, Rule 69.2 has an estimated average cost-effectiveness of \$6 to \$7/lb.

DISTRICT RESPONSE:

The District agrees that converting a boiler using a conventional liquid fuel to low-nitrogen fuel oil is not cost-effective. However, it may be advisable to convert such a boiler to natural gas. The District evaluated the cost-effectiveness of converting a liquid fuel-fired boiler to natural gas, combined with control equipment such as low-NOx burners. For a 150 MM Btu/hr boiler, the cost-effectiveness at 10% capacity factor was found to be \$8.90/lb of NOx reduced. Therefore, the proposed rule has been revised to exempt large boilers operating below 10% annual capacity factor from the emission standard requirements.

There are only two existing, permitted boilers in San Diego County which burn liquid fuel only. Both operate below 10% capacity factor. With the revision to Rule 69.2, these boilers would not be required to meet the emission standards of the rule.

40. WRITTEN COMMENT:

It may be desirable to convert a boiler using liquid fuel to natural gas. This will require a change to the Permit to Operate. Although emissions would not increase, the provisions of APCD Rule 20.2(d) might require Lowest Achievable Emission Rate (LAER), or Best Available Control Technology (BACT), and to reduce emissions below those required by Rule 69.2. The rule should be revised to ensure that the fuel change, from oil to natural gas, does not require BACT or LAER.

DISTRICT RESPONSE:

The conversion from liquid fuel to natural gas is not expected to result in an emissions increase. Proposed revisions to New Source Review rules, specifically, proposed Rule 20.1(b)(2)(iv), exempts the use of alternate fuels provided that there is no emissions increase. Therefore, New Source Review rules should not apply.

41. WRITTEN COMMENT:

The District should encourage owners to reduce emissions before the effective dates of Rule 69.2, by allowing banking of additional emission reductions as Emission Reduction Credits (ERCs). However, Rule 26.0 (c)(3), Rule 26.2 (a)(2) and Rule 26.9 (b) impose restrictions on ERC banking for emissions control measures that are included in the State Implementation Plan (SIP).

DISTRICT RESPONSE:

Under the current banking rules, if emissions are reduced prior to adoption of Rule 69.2, then ERCs may be eligible for banking. Since Rule 69.2 will be submitted to EPA as a SIP revision, then temporary ERCs may be issued under Rule 26.9, provided that ERCs occur two years before the applicable compliance date.

However, such ERCs would only be valid up to the compliance date of Rule 69.2 and cannot be used to permanently offset emission increases from new and modified sources.

42. ARB COMMENT:

Subsection (b)(1)(iv) exempts thermal oxidizers and associated waste-heat recovery equipment. This exemption should either be eliminated, or be allowed only for specified equipment where NOx emission control is not technologically feasible or cost-effective.

DISTRICT RESPONSE:

The District disagrees. The function and operation of thermal oxidizers differs from boilers. The main purpose of a thermal oxidizer is to combust an organic-laden gas stream, not to generate steam or hot water. A waste heat recovery steam generator is placed in the exhaust duct simply to recoup some of the energy costs.

In addition, an organic-laden gas stream is in direct contact with the products of combustion from a thermal oxidizer. Both the RACT/BARCT Guidance Document and proposed Rule 69.2 exempt combustion equipment where the material being heated is in direct contact with the products of combustion.

It should also be noted that there are only three thermal oxidizers in San Diego County. NOx emissions from these thermal oxidizers are estimated at less than 0.5 ton/year.

(Following the workshop, ARB has since concurred that the rule will not apply to thermal oxidizers.)

43. ARB COMMENT:

Section (d), Standards, requires units with annual heat inputs of 220,000 therms or more to comply with emission standards and units with annual heat inputs of less than 220,000 therms to comply with operational procedures. This cutoff is much higher than the annual heat input cutoffs contained in the adopted rules of other districts and the best available retrofit control technology (BARCT) determination for industrial boilers. At this level, the cost-effectiveness is within the range specified in the District's 1991 Regional Air Quality Strategy. Therefore, we recommend that the annual heat input exemption level cutoff be 90,000 therms.

DISTRICT RESPONSE:

The District disagrees. The range of cost-effectiveness values in the RAQS was obtained considering all technologically feasible control measures regardless of their economic viability. The RAQS specifically states that some cost-effectiveness estimates represent control alternatives unlikely to be implemented by affected industries because of their costs.

The District provided to the ARB a thorough economic analysis of the anticipated cost of the control technology using the cut-off limit suggested in the RACT/BARCT Determination. It showed that the cost-effectiveness of emission control at this level will be between \$14 and \$17 per pound of NOx reduced which is much higher than the cost-effectiveness of other District rules, or the highest value adopted in California as indicated in the ARB Cost-Effectiveness Guidance Document. In addition, the air quality benefit of such an expensive control measure would be minimal. At the cut-off level suggested by ARB staff, the incremental amount of NOx emissions reduced will be only five tons per year, or less than 2% of the total NOx emissions from industrial and commercial boilers.

The cut-off level of 220,000 therms corresponds to a cost-effectiveness of \$6 to \$7/lb of NOx reduced for 5 to 10 MM Btu/hr boilers. Likewise, the cut-off level of 10% annual capacity factor for boilers greater than 50 MM Btu/hr corresponds to a cost-effectiveness of \$6 to \$7/lb of NOx reduced. This is comparable to the upper range of cost-effectiveness of District Rule 69 for utility boilers. Considering the present economic situation in California and the growing public concern with the economic burden of environmental regulations, the District believes that the proposed rule represents a prudent balance between regulatory costs and anticipated air quality benefits.

The District will closely monitor the number of boilers operating below 220,000 therms annual heat input and below 10% annual capacity factor. The District will also monitor fuel usage and emissions from such boilers. If it appears that emissions from such boilers are increasing significantly, then the District will reevaluate the effectiveness of the rule and revise the rule accordingly. It should be noted that a new boiler installed after adoption of the rule would be subject to New Source Review (NSR) rules and would likely have best available control technology. NSR would assist in limiting emissions growth from such boilers.

As discussed in Comment #1, the rule has been revised to require fuel meters for boilers operating below the indicated exemption levels. These fuel meters will be instrumental in recording fuel usage to develop the needed information.

44. EPA COMMENT:

Continuous monitors must satisfy the federal requirements for installation, calibration, and maintenance as found in 40 CFR 51, Appendix P, since stack-gas oxygen content will be used as an operational parameter to indicate compliance. Other requirements for continuous monitors are found in 40 CFR 60.13. Subsection (e)(2) should be revised to include federal requirements.

DISTRICT RESPONSE:

Subsections (e)(2) and (f)(3) have been revised to ensure that continuous monitors will be installed in accordance with all federal, state and local regulations.

45. EPA COMMENT:

The annual heat input de minimis level of 220,000 therms is inconsistent with the level of 90,000 therms established by the RACT/BARCT Guidance Document for boilers, steam generators, and process heaters.

DISTRICT RESPONSE:

Please refer to the response to Comment #43 above.

46. EPA COMMENT:

Subsection (d)(i)(iii) should refer to Subsections (d)(1)(i) and (d)(1)(ii) instead of (d)(2)(i) and (d)(2)(ii).

DISTRICT RESPONSE:

The rule has been revised as suggested.

47. EPA COMMENT:

In Subsection (d)(1)(iii), parentheses should be placed around H_g and H_l in the equation for heat-input weighted average, to clearly indicate multiplication by the emission limits.

DISTRICT RESPONSE:

Parentheses have been added for clarity.

48. EPA COMMENT:

In Subsection (e)(2), reference should be made to Subsection (e)(3) because it is the provision that requires a record of the higher heating value be made and not (e)(2)(ii).

DISTRICT RESPONSE:

The rule has been revised as suggested.

49. EPA COMMENT:

The language in Subsection (g)(3) suggests that a minimum of five instantaneous measurements shall be made at three minute intervals, which could produce significant scatter and error. EPA requires a minimum of 30 measurements in a sampling run. Each interval should contain a discrete number of measurements or be an integration.

DISTRICT RESPONSE:

Subsection (g)(3) has been revised to reflect that continuous sampling will be conducted. This will be consistent with District Method 20 which is required in Subsection (f)(1) and has been approved by the EPA. Method 20 uses continuous emissions monitors and requires a continuous, permanent recording of the data. A fully annotated chart recording or data log printout is required for each test. Therefore, the five data sets are not instantaneous measurements, but are the consecutive, average measurements recorded during each continuous three minute interval. One average measurement during each three minute interval should be sufficient for a 15-minute sampling run.

05/24/94
KC:jo

SOCIOECONOMIC IMPACT ASSESSMENT

PROPOSED RULE 69.2 - INDUSTRIAL AND COMMERCIAL BOILERS, PROCESS HEATERS AND STEAM GENERATORS

JULY 1994

Prepared for

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

Prepared by

**Applied Development Economics
3254 Adeline Street
Berkeley, CA., 94703**

SOCIOECONOMIC IMPACT ASSESSMENT PROPOSED RULE 69.2

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. This report contains the assessment of the socioeconomic impacts of proposed District Rule 69.2. Rule 69.2 is a new rule designed to reduce NO_x emissions from new and existing boilers, process heaters and steam generators. It reflects the best available retrofit control technology (BARCT) for these sources as required by the California Clean Air Act. The rule applies to any boiler, process heater, or steam generator in San Diego County that has a heat input rating of 5 million Btu per hour or more. It exempts electricity generating steam boilers with heat input ratings of 100 million Btu per hour or more, thermal oxidizers, and waste heat recovery boilers.

Rule 69.2 requires affected facilities to either install control equipment and meet emissions limits, or implement specific operation and maintenance practices based on the annual usage of the boiler. Boilers with high annual usage will be required to install control equipment. These are boilers with a heat input rating less than or equal to 50 million Btu/hr and an annual heat input of 220,000 therms or more, and boilers with a heat input rating greater than 50 million Btu/hr and an annual capacity factor of 10% or more. Low usage boilers which operate below these levels will be required to implement only specific operation and maintenance practices. The control technologies available to comply with the requirements of the rule include the following:

- boiler tune-up
- stack-gas excess oxygen control
- low-NO_x burners
- selective catalytic reduction
- selective non-catalytic reduction
- flue-gas recirculation
- use of alternative fuels
- combinations of any of the above

The rule also requires recordkeeping of fuel usage, fuel higher heating value, and hours of operation on liquid fuels for all boilers. High usage boilers require the installation of continuous monitors to monitor operational characteristics of the boiler, such as stack-gas oxygen content or percentage of flue-gas recirculated. Continuous emissions monitors for CO and NO_x emissions are not required.

Proposed Rule 69.2 will affect an estimated 156 boilers throughout San Diego County. The majority of these boilers are permitted and located at 69 establishments which represent a number of manufacturing, financial and service industries as well as local government services, health care and educational institutions. Local government services include a number of military installations in the region. The rule also affects boilers with a heat input rating less than 50 mmBtu/hr but more than 5 mmBtu/hr which are currently exempt from District permit requirements but subject to Rule 69.2. NO_x emissions in 1990 from all affected boilers were approximately 278 tons per year.

Rule 69.2 has an estimated control efficiency of 70% for boilers using control equipment, specifically low-NOx burners with flue-gas recirculation, and 20% for boilers using annual tune-ups or implementing specified operating practices. The socioeconomic impact assessment related to the cost of the rule was performed using a worst-case scenario which assumes that all affected boilers would be required to install control equipment to comply with the emissions standards of the rule.

Using this worst-case scenario, Rule 69.2 would result in 70% NOx emissions reduction, about 194 tons per year. Estimated capital costs of the full implementation of Rule 69.2 are approximately \$10.2 million. The corresponding annualized costs and cost-effectiveness are \$2.8 million and \$7 per pound of NOx reduced, respectively.

The worst-case scenario assumption likely overestimates the cost of compliance with the rule, because the owners of most boilers would only need to implement required operating practices due to the low usage of their boilers. The costs to implement operating practices are considerably lower than the cost of control equipment. These cost overestimates may be justified, however, because the District does not presently have adequate information on the operating profiles of most of the affected boilers. Therefore, the suggested worst-case scenario may be a fair estimate for the purpose of evaluating the socioeconomic impact of Rule 69.2 on the economy and employment of San Diego County.

THE NECESSITY OF ADOPTING RULE 69.2

A number of businesses and public agencies in San Diego County contribute to NOx emissions in the region. The Federal Clean Air Act Amendments of 1990 (FCAA) requires the District to adopt rules reflecting Reasonably Available Control Technology (RACT) for major NOx sources (25 tons per year or more). Additionally, the District is mandated by the California Clean Air Act (CCAA) to adopt all feasible measures in an expeditious manner in order to attain the state and national ambient air quality standards for ozone. Proposed Rule 69.2 reflects Best Available Retrofit Control Technology (BARCT) as required by the CCAA and was included in the 1991 Regional Air Quality Strategy (RAQS).

IMPACT ASSESSMENT

As specified by the Health & Safety Code, "socioeconomic impact" means the following:

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

5. The emission reduction potential of the rule or regulation.
6. The necessity of adopting, amending, or repealing the rule or regulation in order to attain state and federal ambient air standards.

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

The Type of Industries Affected by Rule 69.2

The proposed rule affects a wide variety of businesses and public institutions as shown in Table 1. Overall, the businesses and public agencies affected by Rule 69.2 are estimated to have gross revenues in excess of \$11 billion and to employ more than 60,000 workers. This represents about 5% of total employment in San Diego County. More detailed information about the affected industries may be found in Appendix A.

A number of the affected industries are particularly important to the San Diego regional economy. The aircraft and shipbuilding industries comprise 15% of total manufacturing employment in San Diego County, compared to only 3.6% statewide. San Diego also has a strong tourist industry and the hotel sector provides 10.5 percent of local service sector employment, compared to 6.9 percent statewide.

In addition, eight military facilities in the region are affected by the rule. While specific employment data for these facilities are not available, there are an estimated 111,000 uniformed military personnel in San Diego County, representing 9% of total jobs. Statewide, Department of Defense personnel account for less than 1% of employment.

Some of the affected industries have experienced rapid structural change in recent years. The apparel industry has been subject to severe labor cost competition from foreign producers. As a result, employment in the U.S. clothing industry has decreased more than 13% since 1987. Semiconductors and other electronics industries have also decreased employment, despite increasing sales, as a result of consolidations and other responses to foreign competition.

Fabricated rubber products also declined in employment between 1989 and 1992, but improved production techniques instituted during this time have resulted in strong growth which is projected to continue.

Military employment has been reduced at many facilities as a result of changes in national policy. Industries strongly connected to defense such as aircraft and ship building have also experienced substantial employment losses. In some cases, commercial markets are expanding to replace the federal contracts. For example, the markets for small vessels such as casino boats, ferries, and tow boats are especially strong. However, many of these markets are best served by smaller firms with the flexibility to meet changing product demands.

Table 1
Industries Affected by Rule 69.2

SIC	Industry	Affected Establishments	Estimated Employment [a]	Estimated Revenues [a] (\$000's)
2086	Bottled/Canned Soft Drinks	1	360	\$104,123
2300	Apparel	1	500	26,000
2833	Medicinals & Botanicals	1	600	329,693
3069	Fabricated Rubber Products	1	90	10,000
3479	Metal Coatings	1	240	62,500
3674	Semiconductors	4	760	234,169
3679	Electronic Components	1	1,120	221,000
3724	Aircraft Engines & Parts	3	800	89,200
3728	Aircraft Parts	2	610	14,555
3731	Shipbuilding & Repair	3	5,820	648,800
4931	Energy Production	2	4,170	2,047,100
5141	Grocery Distribution	1	50	198,289
6022	Banks	1	NA	4,854,000
6531	Financial Services	1	NA	NA
7011	Hotels	3	420	18,014
7213	Linen Supply	3	480	19,623
7218	Industrial Launderers	4	280	15,472
8062	Hospitals	15	12,800	524,104
8063	Psychiatric Hospitals	1	210	13,101
8221	Universities	3	18,400	1,450,304
8222	Community Colleges	2	2,200	47,154
8661	Church	1	NA	NA
8733	Noncommercial Research Inst.	1	NA	49,000
9199	U.S. Border Station	1	NA	NA
9223	Correctional Facilities	2	2,480	88,000
9611	Convention Center	1	7,500	12,000
9621	Port District	1	570	4,481
9711	Military Facilities	8	NA	NA
TOTAL		69	60,460	\$11,080,681

[a] These figures are estimated by Applied Development Economics and have not been verified in every case by the companies.

Many of the affected establishments are service businesses or public agencies and institutions. These economic sectors will continue to benefit from strong population growth in the San Diego area, estimated at 2.1 percent over the next 20 years. An exception may be the hotel market, which has suffered from overbuilding along with reduced tourist spending during the recent recession.

Several small businesses are affected by the rule including those in fabricated rubber products, financial services, linen and laundry services, medical care and social services. Other business in Table 1 that may appear to have small employment sizes are actually divisions of large corporations.

Economic Impacts and Range of Probable Costs

The costs to comply with proposed Rule 69.2 have been estimated for each affected facility, as shown in Table 2. These cost estimates represent a worst-case scenario and assume that all boilers will require the installation of control equipment, specifically low-NOx burners equipped with flue-gas recirculation, rather than boiler operating adjustments or annual tune-ups. This rather conservative assumption is necessary because complete data on boiler usage and annual capacity factors were not available for all facilities. This results in higher costs than may actually be required. The total costs for each facility include annualized one-time capital and permitting costs, and annual O&M and source test costs.

About half of the capital cost is for equipment, with the remaining 50% divided equally between engineering and installation. The unit capital costs for various sizes of boilers are shown below:

5 to <15 mmBtu/hr:	\$44,000/boiler
15 to <30 mmBtu/hr:	\$64,000/boiler
30 to <50 mmBtu/hr:	\$100,000/boiler
50 to <100 mmBtu/hr:	\$190,000/boiler
≥100 mmBtu/hr:	\$283,000/boiler

Permitting costs are estimated at \$4,000 per boiler. These capital and permitting costs are annualized assuming a 10 year useful life for the equipment and a 10% interest rate.

O&M costs are estimated at 5% of the capital costs of the boiler. O&M costs consist of 50% replacement equipment costs and 50% services and maintenance. Source test costs are estimated at \$3,000 per year.

Total capital costs are estimated at \$10.3 million, with permitting expenses adding another \$624,000 in one-time costs. Annual O&M costs are estimated at \$515,000 with another \$468,000 required for annual source tests. As Table 2 indicates, the annualized costs for all affected facilities would be nearly \$2.8 million.

The cost-effectiveness of the proposed controls is highly dependent on boiler size and annual usage (expressed as annual heat input in therms, or capacity factor in percent); as boiler sizes and annual usages decrease, cost-effectiveness numbers increase. The District analysis of cost-effectiveness indicates that for a 10 mmBtu/hr boiler, cost-effectiveness increases from \$7/lb of NOx at 220,000 therms to more than \$17/lb of NOx at 90,000 therms. Similar increases in cost-effectiveness occur for 5 mmBtu/hr boilers. For large boilers greater than 50 mm Btu/hr, cost-effectiveness increases from about \$11/lb of NOx at a 10% capacity factor to \$41/lb of NOx at 90,000 therms. The District has determined that an overall cost-effectiveness of Rule 69.2 is

about \$7/lb of NOx reduced. This number is consistent with the cost-effectiveness of NOx controls required for utility boilers.

Table 2 evaluates the significance of these costs in relation to the total revenues for the affected businesses and public agencies, where such data are available. The annual compliance costs for all industries are below 1% of revenues. These compliance costs would not be considered a significant financial impact, considering that the cost estimates were based on a very conservative assumption and that low-usage boilers, for which control costs may be greatest, may actually only require operating adjustments or annual tune-ups. In the one industry category that approaches 1%, aircraft parts (SIC 3728), General Dynamics Convair has announced plans to leave San Diego County in the next 18 months. The other business in this category, Caspian, Inc., is relatively small but its share of costs represent only .3% of its revenues. Of the other categories populated by small businesses, industrial launderers are affected most, at .53% of revenues.

Employment Impacts

The cost impacts of proposed Rule 69.2 are unlikely to result in employment losses in San Diego County. The financial impact on individual establishments does not appear to be sufficient to induce employers to leave the region or to reduce jobs. Under worst case assumptions, if all affected employers determined to reduce payrolls proportionately with other operating costs to make up the costs of emissions control, the largest possible employment loss would be just over 20 jobs of more than 61,000 existing jobs in these businesses. The multiplier effects of this job loss could increase the total employment decline to 32 jobs.

A portion of this regional economic impact would be mitigated, however, by increasing job opportunities in firms engaged in the environmental technology field. The District estimates that as much as 50% of the control equipment may be purchased from San Diego County firms, with 50% of the installation cost going to local labor. Overall, nearly 50% of the total annual costs of compliance would result in revenues for other firms in San Diego County. In addition, a portion of the regular maintenance activity on the control equipment would be performed by in-house personnel, reducing the net employment loss, if any, among the affected firms.

In many cases, businesses will be able to pass the costs on to customers, avoiding the need to make up the costs elsewhere. This would be especially true for the soft drink and drug manufacturing industries, as well as local private and public services where competition from businesses outside the region is not a major factor. This would contribute to minor inflation of less than one percent for the affected goods and services in the region, and would not be noticeable to most consumers.

Table 2
Compliance Cost Impacts

SIC	Industry	Annualized Compliance Costs [a]	Costs as % of Revenues [b]	Direct Employment Impact [c]	Total Employment Impact [d]
2086	Bottled/Canned Soft Drinks	\$26,000	0.02%	<1	<1
2300	Apparel	26,000	0.10%	<1	1
2833	Medicinals & Botanicals	113,200	0.03%	<1	1
3069	Fabricated Rubber Products	26,000	0.26%	<1	1
3479	Metal Coatings	39,100	0.06%	1	1
3674	Semiconductors	78,100	0.03%	1	1
3679	Electronic Components	39,100	0.02%	<1	1
3724	Aircraft Engines & Parts	174,700	0.20%	2	3
3728	Aircraft Parts	112,500	0.77%	1	2
3731	Shipbuilding & Repair	78,100	0.01%	1	1
4931	Energy Production	306,100	0.01%	NA	NA
5141	Grocery Distribution	13,000	0.01%	<1	<1
6022	Banks	26,000	NA	NA	NA
6531	Financial Services	13,000	NA	NA	NA
7011	Hotels	65,100	0.36%	1	2
7213	Linen Supply	43,300	0.22%	1	1
7218	Industrial Launderers	82,400	0.53%	1	1
8062	Hospitals	483,000	0.09%	7	10
8063	Psychiatric Hospitals	26,000	0.20%	<1	<1
8221	Universities	170,300	0.01%	2	3
8222	Community Colleges	39,100	0.08%	<1	1
8661	Church	13,000	NA	NA	NA
8733	Noncommercial Research Inst.	34,600	0.07%	<1	<1
9199	U.S. Border Station	26,000	NA	NA	NA
9223	Correctional Facilities	69,400	0.08%	NA	NA
9611	Convention Center	52,100	0.43%	NA	NA
9621	Port District	13,000	0.29%	NA	NA
9711	Military Facilities	604,600	NA	NA	NA
TOTAL		\$2,792,800	0.03%	21	32

[a] One-time costs are annualized assuming a 10-year useful life for the equipment and a 10% interest rate.

[b] See Table 1 for estimated annual revenues.

[c] Assumes worst-case scenario that employer will attempt to reduce payrolls in proportion to compliance costs.

[d] San Diego County employment multipliers published by California Department of Commerce in, Impacts of New Jobs. Sacramento, n.d.

Availability and Cost-Effectiveness of Alternatives to Rule 69.2

There are three basic alternatives to Rule 69.2: not adopt the rule, adopt a less stringent rule, and adopt a more stringent rule.

The first two alternatives are not viable options. A less stringent rule, or no rule at all, would not be consistent with the FCAA which requires Reasonably Available Control Technology, or the CCAA, which requires the District to adopt rules implementing the Best Available Retrofit Control Technology for NOx sources. San Diego County is currently a non-attainment area for ozone, for which NOx is a precursor.

A more stringent alternative has been considered by the District. The alternative would lower the applicability of the NOx emissions standards from the currently proposed levels to 90,000 therms annual heat input as required by BARCT. It would require the installation of emission control equipment on all boilers subject to the rule and operating above this level. Proposed Rule 69.2 applies this requirement to boilers rated at 50 mm Btu/hr or lower and operating at 220,000 therms or higher, or to boilers rated greater than 50 mm Btu/hr and operating at a 10% capacity factor or higher.

The total costs and the overall cost-effectiveness of a more stringent alternative cannot be compared with that of the proposed rule or a less stringent rule. The comparison cannot be made because the worst-case scenario was used to estimate total costs and assumed that control equipment would be required for all boilers regardless of the annual usage. Instead the comparison can be made by evaluating the cost-effectiveness of the proposed control as applied to an individual boiler at 90,000 therms, 220,000 therms and at 10% capacity factor (for large boilers greater than 50 mm Btu/hr).

As stated previously, the District has determined that an overall cost-effectiveness of Rule 69.2 is about \$7/lb of NOx reduced which is consistent with the cost-effectiveness of NOx controls required for utility boilers. Lowering the exemption to 90,000 therms would require sources with small boilers to install control equipment which is less cost-effective than that required at utility boilers, the largest source of NOx emissions in San Diego County. In addition, the District estimates that the incremental decrease in NOx emissions would only be 5 tons per year, or 2% of the total NOx emissions affected by Rule 69.2. For these reasons, it is unacceptable to adopt the more stringent alternative is not recommended.

Emission Reduction Potential

In 1990, NOx emissions from boilers that would be affected by the rule were about 278 tons per year including emissions from boilers that would likely be derated below 5 mmBtu/hr. The rule has an estimated control efficiency of 70% for units using control equipment (specifically low-NOx burners with flue-gas recirculation) and 20% for units making only operating adjustments. The cost analysis above assumed a worst case scenario in which all units would require control equipment. This assumption results in higher costs for the affected firms and magnifies the potential for adverse economic impacts.

Under the worst-case scenario, the emissions reduction potential of the rule would be 194 tons per year, 70% of existing emissions. The total annualized costs for all affected facilities is approximately \$2.8 million with an ensuing overall cost-effectiveness of about \$7/lb of NOx

reduced. Thus, the rule's overall cost-effectiveness is consistent with the cost-effectiveness of controls as applied to an individual boiler.

The worst-case scenario, however, is not believed to be a representative scenario. A more reasonable scenario estimates that 50% of the boilers will be required to install control equipment and meet the emissions standards, and the remaining 50% will be able to comply with the rule by implementing specified operating practices. In this case, the emissions reduction potential of the rule would be about 117 tons per year, or 45% of existing emissions. Correspondingly, the actual total costs of compliance would be lower, because fewer boilers will be required to install control equipment. This scenario more likely represents the minimum NOx emissions reduction of the rule.

CONCLUSIONS

Based on the above analysis, Rule 69.2 is expected to have minimal impacts on employment and the economy in San Diego County. The rule is not expected to cause any undue financial hardship on any of the affected businesses or public agencies and institutions. Rule 69.2 is estimated to reduce NOx emissions from existing boilers, process heaters and steam generators by 117 tons per year and will significantly reduce the potential for emissions from new equipment.

REFERENCES

1. SANDAG/SOURCEPOINT, Series 8 Regional Growth Forecast, 1990-2015, February 3, 1994.

APPENDIX A

DESCRIPTIONS OF SELECTED AFFECTED INDUSTRIES

The following sections describe the economic characteristics of the affected businesses and public agencies. Tables A-1 and A-2 provide data to support the discussions.

2086 - Bottled & Canned Soft Drinks & Carbonated Waters

In San Diego County, the bottled & canned soft drink and water industry comprised a larger portion of San Diego's manufacturing base than in the state. The U.S. value of shipments for soft drinks and waters (SIC 2086) was higher yet at 0.9 percent of shipments for all manufacturing industries. The percentage of employees in this industry in San Diego was higher than the state at 0.5 percent of all manufacturing employees while nationally, 0.8 percent of all manufacturing employees worked in this industry.

Shipments of bottled & canned soft drinks & waters increased at an annual 1.4 percent between 1987 and 1991, and are forecast to continue the same rate of growth through 1996.¹ Despite the constant increases, there has been a long term steady decline in the industry's growth rate due to health concerns, interest in new products, demographic shifts (older consumers tend to drink fewer soft drinks.) Although the consumption of "New Age" (fruit drinks, teas, natural sodas) drinks has been increasing dramatically at 15-20 percent per year, this addition is not expected to significantly alter industry trends. Exports account for less than 1 percent of U.S. industry shipments, even though U.S. soft drinks dominate the world market.

The soft drink bottling industry has become increasingly concentrated with Coca-Cola and PepsiCo having acquired many of the independent bottler affiliates. Coca-Cola and PepsiCo account for more than 72 percent of total shipments.²

2300 - Apparel & Fabricated Textile Products

U.S. apparel & fabricated textile products industry consists of a few large companies and many small and medium sized firms. The divergence between the performance of the two is widening as profits of the small and medium sized firms have declined. Labor is a significant cost component in manufacturing; producers in lower wage countries have a significant cost advantage. U.S. manufacturers have responded by increasingly shifting production to the Caribbean, Central America or South America.³

¹ Census of Manufactures, Annual Survey of Manufactures, U.S. Industrial Outlook 1994.

² U.S. Industrial Outlook, 1992

³ U.S. Industrial Outlook, 1994

TABLE A-1
Characteristics of
Manufacturing Industries

SIC	Industry	U.S.	U.S. % of Total Mfg.	CA	CA % of Total Mfg.	San Diego	San Diego % of Total Mfg.
2086	Bottled & Canned Soft Drinks						
	Establishments	2,026	0.6%	75	0.2%	6	0.2%
	Employees	144,900	0.8%	6,501	0.3%	695	0.5%
	Shipments (\$mil)	\$27,429.1	0.9%	\$1,543.2	0.5%	\$466.7	2.7%
	Value Added (\$mil)	\$10,403.6	0.7%	\$596.6	0.4%	\$180.4	1.8%
	Cost of Materials (\$mil)	\$17,034.1	0.6%	\$951.9	0.6%	\$287.9	3.7%
2300	Apparel & Fabricated Textile Products						
	Establishments	21,214	5.8%	5,987	12.3%	205	6.2%
	Employees	959,600	5.3%	122,00	6.2%	4,194	2.9%
	Shipments (\$mil)	\$71,150.2	2.3%	\$10,515.0	3.3%	\$213.2	1.2%
	Value Added (\$mil)	\$36,402.2	2.5%	\$5,210.6	3.3%	\$121.8	1.2%
	Cost of Materials (\$mil)	\$34,788.2	1.1%	\$5,338.4	3.4%	\$91.4	1.2%
2833	Medicinal Chemicals & Botanical Products						
	Establishments	208	0.1%	37	0.1%	NA [a]	0.0%
	Employees	12,500	0.1%	868	0.0%	NA [a]	0.0%
	Shipments (\$mil)	\$6,868.6	0.2%	\$477.0	0.2%	NA [a]	0.0%
	Value Added (\$mil)	\$3,447.7	0.2%	\$239.4	0.2%	NA [a]	0.0%
	Cost of Materials (\$mil)	\$3,484.3	0.1%	\$241.9	0.2%	NA [a]	0.0%
3069	Fabricated Rubber Products, NEC						
	Establishments	1,015	0.3%	123	0.3%	2	0.1%
	Employees	55,800	0.3%	4,898	0.2%	175	0.1%
	Shipments (\$mil)	\$7,234.4	0.2%	\$489.7	0.2%	\$38.2	0.2%
	Value Added (\$mil)	\$3,589.8	0.3%	\$267.1	0.2%	\$20.8	0.2%
	Cost of Materials (\$mil)	\$3,630.2	0.1%	\$224.4	0.1%	\$17.5	0.2%
3479	Coating, Engraving & Allied Services						
	Establishments	1,837	0.5%	294	0.6%	17	0.5%
	Employees	43,400	0.2%	5,901	0.3%	470	0.3%
	Shipments (\$mil)	\$5,046.0	0.2%	\$616.2	0.2%	\$21.8	0.1%
	Value Added (\$mil)	\$2,254.7	0.2%	\$282.5	0.2%	\$10.0	0.1%
	Cost of Materials (\$mil)	\$2,790.9	0.1%	\$336.9	0.2%	\$11.9	0.2%

TABLE A-1 (con'd)
Characteristics of
Manufacturing Industries

SIC	Industry	U.S.	U.S. % of Total Mfg.	CA	CA % of Total Mfg.	San Diego	San Diego % of Total Mfg.
3674	Semiconductors						
	Establishments	876	0.2%	290	0.6%	23	0.7%
	Employees	175,00	1.0%	56,240	2.9%	2,671	1.9%
	Shipments (\$mil)	\$32,303.8	1.0%	\$11,218.2	3.6%	\$820.47	4.7%
	Value Added (\$mil)	\$21,942.2	1.5%	\$7,868.3	5.0%	\$323.3	3.3%
	Cost of Materials (\$mil)	\$10,014.8	0.3%	\$3,210.2	2.1%	\$489.3	6.3%
3679	Electronic Components						
	Establishments	2,618	0.7%	489	1.0%	43	1.3%
	Employees	165,400	0.9%	21,711	1.1%	2,422	1.7%
	Shipments (\$mil)	\$21,178.3	0.7%	\$2,439.0	0.8%	\$545.4	3.1%
	Value Added (\$mil)	\$10,358.1	0.7%	\$1,389.3	0.9%	\$301.5	3.1%
	Cost of Materials (\$mil)	10,753.2	0.3%	\$973.9	0.6%	\$231.7	3.0%
3724	Aircraft Engines & Parts						
	Establishments	449	0.1%	78	0.2%	15	0.5%
	Employees	122,300	0.7%	14,485	0.7%	3,988	2.8%
	Shipments (\$mil)	\$24,767.0	0.8%	\$2,597.5	0.8%	446	2.5%
	Value Added (\$mil)	\$13,368.9	0.9%	\$1,273.9	0.8%	274	2.8%
	Cost of Materials (\$mil)	\$10,973.9	0.4%	\$1,229.8	0.8%	147	1.9%
3728	Aircraft Parts & Equipment						
	Establishments	1,048	0.3%	339	0.7%	19	0.6%
	Employees	187,300	1.0%	47,952	2.4%	10,000	7.0%
	Shipments (\$mil)	\$23,458.4	0.8%	\$5,971.9	1.9%	\$1,254.4	7.1%
	Value Added (\$mil)	\$14,892.7	1.0%	\$3,632.2	2.3%	\$757.5	7.8%
	Cost of Materials (\$mil)	\$7,943.7	0.3%	\$2,053.6	1.3%	\$428.3	5.5%
3731	Shipbuilding & Repairing						
	Establishments	532	0.1%	65	0.1%	16	0.5%
	Employees	120,800	0.7%	9,999	0.5%	7,380	5.2%
	Shipments (\$mil)	\$11,812.6	0.4%	\$977.8	0.3%	\$330.1	1.9%
	Value Added (\$mil)	\$6,918.7	0.5%	\$572.7	0.4%	\$193.4	2.0%
	Cost of Materials (\$mil)	\$4,894.0	0.2%	\$405.1	0.3%	\$136.8	1.8%

All 1991 figures reported in 1994 dollars.

[a] Although limited data is available on Kelco, data for this industry sector as a whole in San Diego is not available.

Source: ADE. Based on Census of Manufactures, Annual Survey of Manufactures & County Business Patterns.

Industry statistics reflect the continued outsourcing. Since 1987 the industry has seen an overall 13.1 decrease in the number of employees and a 27.3 percent decrease in shipments, accounting for inflation.⁴

California apparel shipments comprise approximately 3.3 percent of all manufacturing industries in the state, while comprising a relatively large proportion (12.3 percent) of all manufacturing establishments. This industry is a much less important component of the San Diego manufacturing economy than of the U.S. and California, however. Value of shipments in the region comprise 1.2 percent of all manufacturing shipments versus 3.3 percent of California's and 2.3 percent of national shipments.

SIC 2833 - Medicinal Chemicals & Botanical Products

Medicinal and botanical establishments are primarily engaged in manufacturing bulk organic and inorganic medicinal chemicals and their derivatives and processing bulk botanical drugs and herbs. It comprises approximately 10 percent of the pharmaceutical industry shipments.

This area of pharmaceuticals has been growing, propelled by increasing consumer interest in natural products, and demand for generic and OTC drugs, although it is a relatively small proportion of the manufacturing base. It is forecast to grow by 2 percent per year over the next few years due to demographic trends and the expiration of patent protection for several major drugs.⁵

The industry employs fewer than 0.05 percent of all manufacturing employees in the state. It accounts for 0.2 percent of all shipments for both state and national manufacturing industries.

The specific business in this category affected by Proposed Rule 69.2 is Kelco, a division of Merck, Inc. Kelco manufactures food additive products from kelp harvested in the San Diego area. Fat free and low fat food products frequently use the kinds of materials made at Kelco, and the market is expected to expand significantly. Kelco has facilities in a number of U.S. locations and worldwide.⁶

SIC 3069 - Fabricated Rubber Products, NEC

This industry includes a wide variety of rubber products, including products made out of recycled rubber. Shipments in San Diego County of \$38.2 million comprised 0.2 percent of all manufacturing shipments, and employed 0.1 percent of all manufacturing employees. The percentage of shipments in the U.S. and state were similar, although the percentage of employees in the state and nation were higher than in San Diego.

Between 1989 and 1992, employment in the industry decreased by an annual rate of 0.6 percent and the value of shipments, accounting for inflation, also decreased by an annual rate of 2.4 percent. During this time, however, highly flexible, client-oriented production has come to the fore in the industry resulting in more individualized product design and more efficient production.

⁴ U.S. Industrial Outlook, 1994

⁵ U.S. Industrial Outlook, 1994

⁶ San Diego Union-Tribune, "Kelco sails in new seas." April 26, 1994.

This more efficient production resulted in growth between 1992 and 1993 of 3.0 percent, after several years of decline. The industry is projected to grow by 3 percent in 1994 with automotive and health related products showing the greatest strength.⁷

SIC 3479 - Coating, Engraving & Allied Services, NEC

This industry performs the following types of services on metals, for the trade 1) enameling, lacquering, and varnishing, 2) hot dip galvanizing and coating, 3) engraving, and etching.

The U.S. assumed industrial leadership in surface coating technology early in the century via the mass-produced automobile. Competition is significant now, however, especially in the Asia-Pacific region of the world, partially accounting for the decrease in industry shipments of 1.4 percent between 1987 and 1991 (accounting for inflation). The electronics industry now dominates demand, propelling the growth rate of this industry in the United States, and throughout the Asia-Pacific region. Environmental considerations are an important component of the industry's competitiveness and has forced an upgrading of industry facilities.⁸

Coating, engraving & allied services comprise a smaller share of San Diego County's economy (0.1 percent) than it does in the state and the nation (0.2 percent). It comprises a slightly larger share of the manufacturing employment base in San Diego than the state and the nation.

SIC 3674 - Semiconductors

Shipments of electronics goods is forecast to grow by an annual rate of 6 to 8 percent throughout the 1990's with most of this growth due to increased shipments of semiconductors. The semiconductor industry is extremely competitive with constant innovation being one of the characteristics of the industry. Investment in R & D and capital facilities is 26 percent of annual revenue in the industry, well above other U.S. manufacturing industries.⁹

Despite the annual increase in value of shipments of 3.7 percent since 1989, the semiconductor industry has seen a decrease in the number of employees reflecting the competitiveness of the industry and consolidation in the industry.¹⁰ Consolidation is expected to continue through 1994.

About one third of U.S. production takes place in California. San Diego County manufacturers comprise about 7 percent of the state industry in terms of shipments and employees. Semiconductor manufacturing represents a larger share of the San Diego manufacturing base than in the state or nation at 4.7 percent of all manufacturing industry shipments.

There are 23 establishments in San Diego County, ranging in size from very small to two very large facilities with more than 500 employees each.

SIC 3679 - Electronic Components, NEC

Electronic components include switches, relays, printed circuit assemblies, antennas, etc. The market is extremely competitive with the greatest challenge for manufacturers being the production of high-volume, low cost components. Although significant challenge comes from East Asian

⁷ U.S. Industrial Outlook, 1994

⁸ Plating and Surface Finishing Magazine, 1992-1994

⁹ U.S. Industrial Outlook, 1994

¹⁰ U.S. Industrial Outlook, 1994

producers, many of which manufacture at the Mexican maquiladores, U.S. industry is very competitive and enjoyed a trade surplus of \$200 million in NEC components in 1992. California comprises a significant share of U.S. production at 20 percent of national shipments with San Diego supplying 22.0 percent of California shipments.¹¹

In San Diego County, the electronics components industry comprises more than 3 percent of the manufacturing shipments and employs 1.7 percent of manufacturing employees in the county. In terms of shipments and employment, the industry is relatively more important to the region than to the state and the nation.

Despite general consolidation in the electronics industry, the electronics components industry has increased its employment base by 1.7% since 1987. Value of shipments has also increased by 5.2 percent. Long term future opportunities exist in the industry with the further development of high-definition systems in consumer electronic products and interactive media, and an increased focus on digital electronics.

SIC 3724 - Aircraft Engines & Parts

The aircraft engine and parts industry is closely tied to the U.S. aircraft sector which has suffered losses due to cuts in defense spending, sluggish economies worldwide, and increased international competition. The industry is undergoing an unprecedented consolidation as reflected by the trends. Between 1987 and 1993, the number of employees has decreased by 31.7 percent and value of shipments has decreased by 18.5 percent in real dollar terms.

The California aircraft engine and parts industry ships 41 percent of all U.S. industry shipments. Statewide, however, the industry comprises only 0.8 percent of all state manufacturing shipments. The industry is comparatively much more important to the San Diego economy at 2.8 percent of all county manufacturing employees, and 2.5 percent of all manufacturing shipments.

The industry is expected to continue its decline through the near future. For those manufacturers successful on the commercial side, long term employment forecasts are for stabilization while continued declines are expected for those manufacturing for military.

SIC 3728 - Aircraft Parts and Equipment

Aircraft and aircraft parts and engines manufactured in California represent a large part of U.S. industry at nearly a quarter of all employees in the industry and 18.9 percent of U.S. shipments. The aircraft parts business has been hit hard by cuts in military spending. In addition, the industry has been adversely affected by decreased need for aircraft replacements due to the recession. International competition has also become a factor; the manufacturers of major U.S. aircraft are increasingly making use of foreign-manufactured parts.

The industry comprises a larger share of the San Diego economy than the state or nation with 7.0 percent of all employees and 7.1 percent of all shipments from manufacturing industries. Despite the state's importance to the industry, the industry, employs only 2.4 percent of all California manufacturing employees and ships 1.9 percent of California's manufacturing shipments.

Nationally, the industry has decreased by nearly 27 percent since 1987 in employee numbers, and nearly 10 percent in shipments. 1994's outlook is very negative at a forecast decrease in

¹¹ Annual Survey of Manufactures

shipments of 19 percent and employee downsizing of 11.3 percent. The long term outlook mirrors the aircraft engine and parts industry.

SIC 3731 - Ship Building and Repairing

The two largest shipbuilding and repairing establishments in the state are in San Diego County, employing over 1,000 people each. This industry is relatively more important to San Diego's economy than to the state economy or to the nation. It comprises 1.9 percent of manufacturing shipments and employs 5.2 percent of manufacturing employees.

The Navy continues to be the primary source of work for major shipyards. While this source of work is winding down, the industry is seeking commercial work. Currently, however, the U.S. commercial shipbuilding industry ranks 27th in the world in terms of gross tonnage on order.¹²

The downsizing and depressed state of the industry is reflected in the decline in number of employees (14.3 percent decrease) and shipments (12.7 percent decrease) in the past five years. This downward trend is projected to continue in the near future. The outlook is brighter, however, for the small and medium sized facilities which specialize in smaller vessels. There is a booming market for casino boats, towboats, drug interdiction crafts, ferries, among other type of smaller craft.

SIC 4931 - Supply of Electricity and Gas

San Diego Gas & Electric is the investor-owned gas and electric utility serving San Diego County. It provides electric service to 1,129,000 customers in San Diego County and part of Orange County; it also provides gas to 690,000 customers in San Diego County.

SDG&E's electric and gas energy prices are regulated by the California Public Utilities Commission (CPUC). SDG&E is experiencing increased competition in both gas and electric energy. In recent years, changes in governmental regulations, new technology, increased self- and co-generation and alternative sources have provided major utility customers with other energy sources. The CPUC is still grappling with whether to allow customers to purchase electricity from any company it chooses.

SDG&E's revenues for electricity in 1993 were \$1,514.6 million, for gas, \$346.7 million. Total revenues were \$1,980.1 million, an increase over 1992 revenues by 5.8 percent. Expenses were \$1,686.4 million, an increase of 7.1 percent. The utility employs 4,166 persons, 2 percent less than in 1992 as part of an effort to improve efficiency. The utility prides itself on being the lowest-cost provider of electricity among investor-owned utilities in California.¹³

SIC 5141 - Distribution of General Line of Groceries

The grocery wholesale distributor affected by this rule is the distributor for Lucky's grocery stores. Grocery stores have consistently accounted for about 80 percent of all food store sales although in recent years they have lost sales to discount stores and warehouse clubs. According to the Census Bureau, sales of nondurable goods rose from \$326 billion in 1988 to \$387 billion

¹² U.S. Industrial Outlook 1994

¹³ SDG&E 1993 Annual Report

TABLE A-2
Characteristics of
Wholesale & Service Industries

SIC	Industry	U.S.	U.S. % of Total	CA	CA % of Total	San Diego	San Diego % of Total
5141	Distribution of Groceries						
	Establishments	3,280	0.7%	400	0.7%	26	0.7%
	Employees	147,356	2.5%	7,416	1.0%	243	0.6%
	Sales (\$000's)	\$95,145,758.7	3.2%	\$4,624,554.7	1.2%	\$87,607.8	0.7%
7011	Hotels						
	Establishments	40,576	2.3%	4,999	2.1%	454	2.3%
	Employees	1,524,167	7.7%	190,069	6.9%	23,653	10.5%
	Sales (\$000's)	\$60,566,400.9	5.9%	\$7,865,307.0	4.6%	\$1,004,439.9	7.9%
7213	Linen Supply						
	Establishments	1,243	0.1%	155	0.1%	11	0.1%
	Employees	56,524	0.3%	7,474	0.3%	727	0.3%
	Sales (\$000's)	\$2,436,745.4	0.2%	\$349,212.5	0.2%	\$29,720.0	0.2%
7218	Industrial Launderers						
	Establishments	1,305	0.1%	151	0.1%	10	0.1%
	Employees	72,473	0.4%	9,744	0.4%	562	0.2%
	Sales (\$000's)	\$3,613,884.3	0.4%	\$553,044.6	0.3%	\$30,922.0	0.2%
8062	General Hospitals						
	Establishments	977	0.1%	155	0.1%	11	0.1%
	Employees	423,706	2.2%	78,597	2.8%	6,898	3.1%
	Sales (\$000's)	\$24,925,731.9	2.4%	\$4,784,786.2	2.8%	\$384,342.6	3.0%
8063	Psychiatric Hospitals						
	Establishments	412	0.0%	51	0.0%	5	0.0%
	Employees	78,304	0.4%	9,176	0.3%	1,067	0.5%
	Sales (\$000's)	\$4,595,302.6	0.4%	\$604,820.8	0.4%	\$65,507.4	0.5%

All Figures reported in 1994 dollars.

Source: ADE. Based on Census of Wholesale Trade, Census of Service Industries and County Business Patterns

in 1992, with food stores comprising about 29 percent of the market for nondurable goods.¹⁴ Among all wholesale industries, the sales generated by distributors in San Diego County are a relatively less important part of the economy compared to the state and the U.S. Grocery distribution in San Diego County comprises only 0.7 percent, while in the U.S., it generally comprises 3.2 percent of all sales within wholesale industries.

SIC 6022 - Bank

Wells Fargo bank operates 624 branches and employs 19,700 full time staff. It offers a full range of banking services to approximately 3.5 million California households.

Credit problems relating to commercial real estate contributed to depressed financial results in 1991 and 1992. This was due to the prolonged recession in commercial real estate markets, the weak California economy and the bank's prominent role in financing real estate development.

In 1993, however, the bank was able to return to the level of profitability it enjoyed in 1990. Net income increased to \$612 million in 1993, compared to \$283 million in 1992 and \$21 million in 1991. Return on average common equity (ROE) increased to 16.74 percent, from 7.93 percent in the prior year and .07 percent in 1991. Return on average total assets (ROA) grew to 1.2 percent from .54 percent in 1992 and .04 percent in 1991.

In the immediate future, the weakened state of the Southern California economy is of concern to the bank. Approximately three-quarters of the bank's mortgage and construction loans are in California and about one-third of these are in Southern California. Approximately 12 percent of the bank's loans in Southern California as of January, 1994 were in nonaccrual.

SIC 7213 - Linen Supply

Establishments in this category are those that supply, on a rental basis, laundered items such as uniforms and coats (medical), linens and towels to commercial or household users. There are only 1,243 of these establishments in the United States with an average of 45 employees per establishment. The average establishment generates over \$2 million in receipts annually.¹⁵

The importance of the linen supply industry in San Diego County in terms of number of employees and sales is roughly proportionate to its importance in California and the United States. The establishments in San Diego tend to be larger, however, at about 66 employees per establishment.

SIC 7218 - Industrial Launderers

Industrial launderers engage in supplying laundered or drycleaned industrial work uniforms, protective apparel, clean room apparel to industrial, commercial, and government users. There are only 1,379 establishments in the nation; however, on average each establishment generates receipts of over \$2 million dollars.

Industrial launderers comprise a slightly smaller portion of the service economy in San Diego than in California or in the U.S. In the county, 10 San Diego County industrial launderers employed approximately 56 persons per establishment.

¹⁴ U.S. Industrial Outlook, 1994

¹⁵ Census of Service Industries.

SIC 8062 & 3 - General Medical and Surgical, and Psychiatric Hospitals

In 1993, the cost of health care in the U.S. was an estimated \$942.5 billion, or about \$3,900 per capita. U.S. health and medical care sector outlays amount to 14 percent of the nation's economy. In 1991, health care service revenues were an estimated \$571.3 billion with hospitals accounting for 53 percent.

Health care services is a leading U.S. employment sector and is projected to continue its growth in the immediate future. Despite the recession, employment in the health care industries rose by an annual 3.8 percent between 1990 and 1993. Although hospitals have the lowest rate of growth in the industry, they account for more than half of the total employment in the industry.¹⁶ General hospitals account for 3.1 percent of all service employment in San Diego County; psychiatric hospitals employ fewer people and account for 0.5 percent of the employment base. They account for a slightly greater proportion of service sector employment in the county than in the nation and the state.

8733 - Noncommercial Research Institute

The Salk Institute for Biological Studies is a private, non-profit research institution dedicated to research in molecular biology, genetics and the neurosciences. There are 50 faculty and more than 500 research and other staff.

Approximately two thirds of the institute's support is in the form of federal grants to individual investigators, principally from the National Institutes of Health. The remaining third of the support is from private sources, including foundation and corporate support. Because the Institute is such a prominent research institution, it has been able to maintain this mix of funding from the federal government and contributions. However, the process for obtaining research grants is and will continue to be more competitive with more investigators applying for dollars. Recessionary pressures have also forced cuts in the level of corporate contributions.

The Salk Institute is growing; in 1995, a large structure will be added, providing space for new scientific programs, research support services, administrative services, and meeting facilities.

9223 - San Diego County Mesa Detention Center

The full operation of the East Mesa Detention Facility is considered one of the top priorities of the San Diego Board of Supervisors. For Fiscal Year 1993-1994, the Board of Supervisors approved \$9 million for the full operation of the facility, an increase of \$6 million over the previous year. This allocation is partially offset by the closure of the East County Detention facility and the Las Colinas Men's Detention Facility. The net increase to the county is 600 beds.

To put the allocation in context, total expenditures for criminal justice and protection for this fiscal year is \$395.9 million, 70 percent of County general revenues. Expenditures for the criminal justice system are growing rapidly and consumes by far the largest portion of county general revenues. At the same time, county general revenues are expected to continue to shrink.

9611 - San Diego Convention Center

¹⁶ U.S. Industrial Outlook, 1994.

The Convention Center, opened in 1989, was constructed by the San Diego Unified Port district on district land. The District has an agreement to lease the Convention Center to the City for \$1 per year for 20 years.

The City reimburses the San Diego Convention Center Corporation, Inc. (SDCCC), a non-profit public benefit corporation, for marketing, operations and maintenance of the convention center. The City normally relies on the Transient Occupancy Tax revenue to fund SDCCC's approved budgetary amounts.

The approved budget for the fiscal year ending June 30, 1993 was \$12,659,039. The actual budget was \$12,076,600 primarily due to a shortfall of \$1.3 million from the City of San Diego.

9621 - San Diego Port District

The San Diego Port District is an autonomous public agency charged with promoting commerce, navigation, fisheries and recreation in the San Diego Bay tidelands. Income from operations in 1993 was \$4,480,989 with 47 percent of revenues derived from property operations and 47 percent derived from the airport operations. Maritime operations contributed 6 percent to the Port's operating revenues.

In 1993, the Port District showed an operating loss of \$8,074,505, primarily due to the settlement of lawsuits; in 1992, the district showed a surplus of \$16,407,585. The Port currently employs 574 persons, up from its employment of 557 persons in 1992.