

**Revisions to RULE 74.11.1
LARGE WATER HEATERS AND SMALL BOILERS
Revisions to RULE 74.15.1
SMALL BOILERS, STEAM GENERATORS AND PROCESS HEATERS**

BACKGROUND

The specifications for proposed Rule 74.11.1 originated in the 1987 Ventura County Air Quality Management Plan (AQMP) as Oxides of Nitrogen (NOx) Control Measure N-19 (Natural Gas Fired Commercial Water Heaters). The measure required all units sold in Ventura County to meet an emission limit of 40 nanograms of NOx per joule of heat output (ng/j). The control measure N-19 was carried forward to the 1991 AQMP as Control Measure N-102 (Boilers, Steam Generators and Water and Process Heaters Less Than 1 MMBtu's in Size). Control Measure N-102 was once again carried forward to the 1994 AQMP. Staff felt that a key requirement in developing N-102 was concurrent development in the South Coast Air Quality Management District (SCAQMD). The development of Rule 74.11.1 began after the adoption of a SCAQMD Rule 1146.2 on December 12, 1997.

Rules 74.11.1 and 74.15.1 overlap in the control of units in the 1,000,000 BTU/hr to 2,000,000 BTU/hr heat input capacity. The reason for this appears in the Staff Report for Rule 74.11.1 dated August 31, 1999:

In mid-1998, staff made the decision to expand the applicability of the proposed rule to units with an input capacity of up to 2,000,000 BTU/hr. This was done to further the similarity between the proposed rule and SCAQMD Rule 1146.2. Rule 74.15.1 already requires units between 1,000,000 BTU/hr and 2,000,000 BTU/hr to meet a NOx limit of 30 ppm; however, that rule applies primarily to existing units. Proposed Rule 74.11.1 will apply to new units only. Staff believes that, since both rules require a NOx limit of 30 ppmv, no conflict will occur.

In subsequent years, there have been problems implementing the two rules. For this reason, staff is

proposing to revise the applicability of Rule 74.15.1 to units equal to or greater than 2,000,000 BTU/hr capacity. Rule 74.11.1, a point-of-sale rule, will continue to apply to units over 75,000 BTU/hr and less than 2,000,000 BTU/hr.

Another issues have come up over the years as well. Some operators have complained about the cost of a biannual source test on small boilers. On the other hand, staff has noted a number of units significantly out of compliance during source tests. Also, other local air districts began requiring periodic NOx screening analyses. These issues are considered in the proposed revisions.

For this revision of Rule 74.11.1, staff felt that a key requirement was a commitment to the process from the SCAQMD. Revised Rule 1146.2 creates a new market for low-NOx residential water heating equipment in Southern California; the rule requires smaller units to meet a 14 ng/j NOx limit and larger units to meet a 20 ppm NOx limit. Ventura County will expand on that market. Since the 20 ppm NOx limit for larger units took effect on January 1, 2010 in the SCAQMD, it has become clear that complying units are available. The 14 ng/j NOx limit for smaller units went into effect on January 1, 2012.

Equipment Users

Large water heaters and small boilers are used primarily in commercial operations. According to staff estimates (based on data received in October, 1997, from the Gas Company and US Census data), there are 2708 commercial units between 75,000 BTU/hr and 2 million BTU/hr in Ventura County. This includes 107 units greater than 1 million BTU/hr and equal to 2 million BTU/hr with District Permits to Operate.

PROPOSED RULE

Rule 74.11.1

As noted above, in order to create a market for low NOx residential water heaters that is as broad as possible, the emission limits recommended for Rule 74.11.1 are the same as those in SCAQMD Rule 1146.2. In addition, the proposed future effective dates for each new NOx limit in amended Rule 74.11.1 (January 1, 2013 and January 1, 2014) are intended to allow existing non-complying water heater inventory to be sold through.

Staff proposes to amend the applicability statement in Section A to specify that the rule applies only to natural gas-fired equipment. In addition, this section will specify that the rule applies to equipment "with a rated heat input capacity greater than or equal to 75,000 BTU/hr." This will better align the rule with existing Rule 74.11, *Residential Water Heaters*.

Section B, Requirements

In order to implement revised NOx emission limits, two new subsection will be added. The existing subsections will continue to apply until the specified implementation date. After that date, the new subsections will apply, as follows:

2. After January 1, 2014, no person shall sell, offer for sale, or install in Ventura County any new unit with a rated heat input capacity of greater than or equal to 75,000 BTU/hr and less than or equal to 400,000 BTU/hr that does not meet the following criteria:

a. Oxides of nitrogen emissions shall not exceed 14 nanograms per joule of heat output (32.5 pounds per billion BTU), or 20 parts per million, and

b. The unit is certified in accordance with Section C.

Subsection B.2.a shall not apply to units specifically designed to heat swimming pools, hot tubs or spas. For such units, oxides of nitrogen emissions shall not exceed 40 nanograms per joule of heat output (93 pounds per billion BTU), or 55 parts per million.

Note that pool heaters and similar equipment are exempt from the new, lower NOx limit in Subsection B.2.a, and will retain the existing NOx limits. Pool

heaters are exempt from SCAQMD Rule 1146.2 because complying equipment is not cost-effective.

4. After January 1, 2013, no person shall sell, offer for sale, or install in Ventura County any new unit with a rated heat input capacity of greater than 400,000 BTU/hr and less than or equal to 2,000,000 BTU/hr that does not meet the following criteria:

a. Oxides of nitrogen emissions shall not exceed 20 parts per million and carbon monoxide emissions shall not exceed 400 parts per million, and

b. The unit is certified in accordance with Section C.

c. All units shall be tuned upon initial installation.

d. Any unit with a rated heat input capacity of equal to or greater than 1,000,000 BTU/hr and an annual heat input rate of equal to or greater than 0.3×10^9 BTU shall:

1) Perform an annual tune-up. The unit shall be tuned in accordance with the procedure described in Rule 74.15.1, Attachment 1, for forced draft-fired equipment or Rule 74.15.1, Attachment 2, for natural draft-fired equipment.

2). Perform an annual screening analysis of NOx and CO emissions. The operator shall notify the APCD by telephone 24 hours prior to any annual screening analysis.

Note that several new requirements are included in Subsection B.4. Because of occasional compliance problems with new equipment, initial installation tune-ups are required. Also, equipment with a rated heat input capacity of equal to or greater than 1,000,000 BTU/hr and an annual heat input rate of equal to or greater than 0.3×10^9 BTU shall perform both an annual tune-up and an annual NOx and CO screening analysis. These issues are discussed in detail on page 5.

Note also that parts per million (PPM) measurements are by volume and made at three percent oxygen on a dry basis. There may appear to be a discrepancy between the ng/j NOx limits in Section B and the concentration (ppm) limits. The concentration limits are based on an assumed thermal efficiency of 76 percent. This adjustment reflects both the efficiency benefit of a ng/j limit and the relative difficulty of determining ng/j, which requires both an emission and energy measurement. Although many units manufactured today have a thermal efficiency greater than 76 percent, no emission limit correction factor for higher efficiency units is suggested for the rule. Such a correction factor would complicate the rule unnecessarily.

Section C. Certification

The original text of this section acquires a sub-heading (1.) and renumbering but the requirements are unchanged. New Subsection 2 is added to allow equipment certified in the South Coast AQMD to be certified by comity in Ventura County.

- 2. The requirements of Subsection C.1 notwithstanding, applicable equipment certified by the South Coast Air Quality Management District in accordance with the requirements of SCAQMD Rule 1146.2, adopted May 5, 2006, shall be considered certified for use in Ventura County.**

Renumbered Section E states that any model certified for sale in Ventura County must be marked as such. The certification status of a unit must appear on both the permanent nameplate and the packaging. The model number and date of manufacture must also appear. District staff will assume that a unit offered for sale without the necessary certification status declaration is non-complying.

Section D. Recordkeeping Requirements

This is a new section that requires records and reporting for the new requirements in Section B. The first of these requirements applies to any unit attempting to establish an exemption from the tune-up requirement in Subsection B.4.d.1) due to low heat input rate (fuel use). These units must install a permanent totalizing fuel meter, as follows:

- 1. Any unit with an annual heat input rate of less than 0.3×10^9 BTU and not complying with the requirements of Subsection B.4.d shall install a totalizing fuel meter. Meters shall be accurate to \pm one (1) percent, as**

certified by the manufacturer in writing. Fuel consumption for the unit shall be compiled monthly into a rolling twelve (12) calendar month report. All records shall be maintained for a period of four (4) years and shall be available for inspection by the APCO upon request.

Subsections D.2 and D.3 require reports for both tune-ups (both initial and annual) and the NOx and CO screening analyses. There is no requirement that the activities be performed together; however, it may be more convenient to do so. In that case, it is permissible for the required report to discuss both the tune-up and the screening analysis.

- 2. The owner or operator of a unit subject to the provisions of Subsection B.4.d.1) or Subsection B.4.c shall submit a report to the APCO within sixty (60) days after achieving compliance with either subsection. For units subject to the provisions of Subsection B.4.d.1), reports shall continue to be submitted every twelve (12) months. The report shall verify that the tune-up has been performed and the results were satisfactory. The report shall contain all information and or documentation that the APCO may determine, in writing, to be necessary.**

- 3. The owner or operator of a unit subject to the provisions of Subsection B.4.d.2) shall submit a report to the APCO within sixty (60) days after achieving compliance with the subsection. Reports shall continue to be submitted every twelve (12) months. This report shall verify that the screening analysis has been performed and report the results. The report shall contain all information and or documentation that the APCO may determine, in writing, to be necessary.**

Section F. Enforcement

Renumbered Subsection F.1 currently states that the District may require source tests results on units stocked by local distributors, retailers, and installers. If a source test report is not on file at the SCAQMD, specific tests may be required. Tests are not limited to units without a certification status declaration; a test may be requested on any unit. All testing shall be done at the manufacturer, distributor, retailer, or installer's expense. With a certification process in place, few specific source tests are expected.

New Subsection F.3 is being added to establish requirements for the portable analyzer used for the screening analysis required in Subsection B.3.d.2). A number of analyzers are currently approved for use in Santa Barbara County¹. It is likely that the analyzers on this list will be approved for use in Ventura County. Regular maintenance is required for all analyzers.

3. Screening analyses shall be performed using a portable analyzer either verified by the Environmental Protection Agency or approved in writing by the APCO. The portable analyzer shall be calibrated, maintained and operated in accordance with the recommendations of the manufacturer.

In addition, non-compliance situations regarding screening analysis results must be addressed. Staff takes the position that screening analyses, while accurate when performed correctly, are not equivalent to a full source test and should not be treated as such. For this reason, staff recommends a 15 day grace period before a violation is attached to the results of a screening analysis. This gives the operator time to correct the problem and re-screen. Also, a full source test that indicates compliance will remove a violation. The following is proposed as Subsection F.4:

4. An applicable unit shall be in violation if, according to a screening analysis, it is operated out of compliance with the requirements of Section B of this rule for more than 15 consecutive days. However, if data from a source test of the applicable unit operating under identical conditions indicates that the unit is in compliance with the requirements of this rule, then a violation will not have occurred. The source test shall be conducted at the operator's expense.

Rule 74.15.1

Rule 74.15.1 currently applies to units with a rated heat input capacity equal to or greater than 1 million BTU per hour and less than 5 million BTU per hour. The rule also requires "high use units" (those with an annual heat input rate of equal to or greater than 1.8×10^9 BTU) to perform a source test every two years. For some operators, the cost of a full source tests on these relatively small units is excessive.

The proposed revisions to Rule 74.15.1 will, in conjunction with the proposed revisions to Rule 74.11.1, address this issue. The first proposed

revision involves Section A, Applicability. Staff proposes to raise the lower applicability threshold from one (1) million BTU/hour to two (2) million BTU/hour, as follows:

The provisions of this rule apply to any boiler, steam generator, or process heater with a rated heat input capacity ~~equal to or~~ greater than 2 million BTU per hour and less than 5 million BTU per hour.

With this change, the applicability of Rule 74.11.1 and Rule 74.15.1 will no longer overlap.

Note also that the phrase "equal to or" is proposed for deletion. This will also better align the rule with Rule 74.11.1, which applies to units "less than or equal to 2,000,000 BTU/hr."

Section B, Requirements

Staff proposed to add the requirement for an initial installation tune-up and an annual screening analysis to this section. The source testing and periodic tune-up provisions will remain the same, except Subsection B.2a. will require tune-ups annually, as follows:

- a. **The unit shall be tuned ~~every 6 months or after 750 hours of operation since the previous tune-up, whichever occurs last, but in no case less than once per~~ calendar year. The unit shall be tuned in accordance with the procedure described in Attachment 1 for forced draft-fired equipment or Attachment 2 for natural draft-fired equipment; or**

This will make the tune-up requirements similar to those in Rule 74.11.1. In addition, requirements for an initial installation tune-up and an annual screening analysis are proposed as new Subsections B.3 and B.4, as follows:

3. All units shall be tuned upon initial installation.

4. All units shall perform an annual screening analysis of NOx and CO emissions unless the biennial source test specified in Subsection B.1 is required. The operator shall notify the APCD by telephone 24 hours prior to any annual screening analysis.

The new subsections will apply to all units regulated by the rule (greater than 2 million BTU/hr to less than 5 million BTU/hr).

Section D. Recordkeeping Requirements

Subsection D.2 is being revised to include reporting requirements for the initial installation tune-up added to Section B. Also revised is the report submittal time, modified from 12 months to 60 days. Staff believes that 60 days is a reasonable amount of time to prepare a report.

- 2. Any person subject to the provisions of Subsection B.2.a or Subsection B.3 shall submit a report to the Air Pollution Control Officer (APCO) within ~~twelve (12) months~~ sixty (60) days after achieving compliance with ~~either subsection~~ Subsection B.2.a. ~~For units subject to the provisions of Subsection B.2.a, Reports shall continue to be submitted every twelve (12) months. This~~ The report shall verify that each the tune-up has been performed and the results were satisfactory. The report shall contain all information and or documentation that the APCO may determine, in writing, to be necessary.**

New Subsection D.3 requires reports for the NO_x and CO screening analyses. There is no requirement that the analysis be performed with any other activity, but it may be more convenient include the analysis with the annual tune-up report.

- 3. Any person subject to the provisions of Subsection B.4 shall submit a report to the APCO within sixty (60) days after achieving compliance with Subsection B.4. Reports shall continue to be submitted every twelve (12) months. The report shall contain all information and or documentation that the APCO may determine, in writing, to be necessary.**

Section E. Test Methods

New Subsection E.4 is being added to establish requirements for the portable analyzer used for the screening analysis required in Subsection B.4. The text is identical to that of Rule 74.11.1, Subsection F.3, above.

Section F. Violations

New Subsection F.4 is being added to address non-complying screening analysis results. The text is identical to that of Rule 74.11.1, Subsection F.4, above.

Section G. Definitions

A definition of "Alternative Fuel," as referenced in Section C, Exemptions, is proposed as follows:

- 1. "Alternate Fuel": Any fuel that is not natural gas.**

The remaining definitions in Section G are renumbered.

DISCUSSION

The proposed revisions began as a reaction to complaints about the cost of source tests for boilers under 2 million BTU/hr input capacity. The original concept was to amend Rule 74.15.1 to allow units of equal to or less than 2 million BTU/hr and subject to emission limits (per Sub-section B.1, with a heat rate equal to or greater than 1.8×10^9 BTU/year) to source test once every 48 months. All "B.1" units over 2 million BTU/hr would continue to source test every 24 months. Tune-ups would continue to be required for units with heat rates under 1.8×10^9 BTU/year.

In addition, staff felt that the NO_x and CO screening analysis required in Santa Barbara County APCD Rule 361 could be incorporated into the rule. The NO_x and CO screening would be done with approved

portable analyzers. SBCAPCD maintains a list of approved analyzers on their website.

Incorporating these ideas into Rule 74.15.1 quickly became unwieldy. In addition, the overlap in applicability between Rule 74.15.1 and Rule 74.11.1 also needed to be addressed. Staff settled on a revision to both rules that will eliminate certain source testing requirements for units between 1 and 2 million BTU/hr but add tune-up and emission screening requirements. Tune ups are considered important because, based on source test monitoring and reports, small boilers can sometimes operate significantly out of compliance.

Staff has also found that non-compliance problems extended to new equipment, so an initial installation

tune-up is being added to both rules. Also, equipment with a rated heat input capacity of equal to or greater than 1,000,000 BTU/hr and an annual heat input rate of equal to or greater than 0.3×10^9 BTU are now required to perform both an annual tune-up and an annual NOx and CO screening analysis. These requirements will reduce emissions with the expense of a full source test.

Complying Equipment

As of January 1, 2012, all provisions of SCAQMD Rule 1146.2 will be implemented. As a result, many complying water heater and small boiler currently exist. SCAQMD maintains a long list of certified equipment.² Currently, 86 individual brands and

hundreds of models are certified in both categories; Type 1 (< 400,000 BTU/hr, complies with 14 ng/J) and Type 2 (> 400,000--2,000,000 BTU/hr, complies with 20 ppm NOx @ 3% O2)

As noted above, the District issues Permits to Operate for units equal to or greater than 1,000,000 BTU/hr capacity. Currently, 107 units are permitted. Based on available source test data, the average NOx emission concentration for these units is 18.08 ppm at 3 percent oxygen. 68 percent of the tests are less than 20 ppm and 32 percent are above 20 ppm. Since many existing boilers are in compliance with the proposed NOx limit, staff concludes that compliance with the limit will not be significant issue for most manufacturers.

EMISSIONS / COST-EFFECTIVENESS

Rule 74.11.1 Emission Reduction – New Limits

An important part of estimating the emission reduction from the proposed revisions is to estimate of the number of large water heaters and small boilers in Ventura County. Since most units are used in commercial operations, *Economic Census Summary Statistics for Ventura County* from the US Census Bureau³ were used to estimate the number of commercial businesses. This NAICS-based data, for both 1997 and 2007, reports "economic establishments," or businesses, in the county. Between 1997 and 2007, a 29 percent increase in the number of businesses occurred (Appendices A-B). Staff assumes that each business is likely to have at least one large water heater or small boiler. If we assume that the same percentage increase will occur between 2007 and 2012, a total increase of 43 percent will occur.

According to the Gas Company in December, 1996, there were 1422 large water heaters (from 75,000 BTU/hr to 400,000 BTU/hr) and 397 small boilers (between 400,000 BTU/hr and 1 million BTU/hr) in the county, for a total of 1819 applicable units. Assuming a 43 percent increase for a total 2012 estimate of 2601 applicable units. In addition, 107 small boilers between 1 million and 2 million BTU/hr currently hold District Permits to Operate. Therefore, a total of 2708 large water heaters and small boilers are currently in use in the county (Appendix C)

To estimate emissions, it is assumed that all existing units are meeting the requirements of the current version on Rule 74.11.1. This means that all existing large water heaters between 75,000 and 400,000

BTU/hr capacity emit NOx at no more that 40 ng/j, which is equal to about 93 pounds of NOx per billion BTUs of natural gas burned ($93 \text{ lb}/10^9 \text{ BTU}$). The proposed NOx emission rate of 14 ng/j is equal to $32.5 \text{ lb}/10^9 \text{ BTU}$. (These estimates are based in a conversion factor of $1 \text{ lb}/\text{mmBTU} = 430 \text{ ng/j}$)⁴

Existing small boilers between 400,000 and 2 million BTU/hr capacity currently emit NOx of 30 ppm, which is equal to about $37 \text{ lb}/10^9 \text{ BTU}$. The proposed NOx limit of 20 ppm is equal to $32.5 \text{ lb}/10^9 \text{ BTU}$.

As noted in Appendix C, the 1996 Gas Company data provides fuel use totals for groups of units between 75,000 BTU/hr and 1 million BTU/hr. Adding 43 percent, the 2012 estimate is as follows:

Capacity Range	Quantity	MBTU per year
75,000 – 400,000	2033	405,947,439
400,001 – 1,000,000	<u>568</u>	<u>466,558,670</u>
Total	2601	872,506,109

For small boilers between 1 million and 2 million BTU/hr, staff assumed operation at capacity for 15 hours per day, 5 days a week and 50 weeks a year. At 3750 hours per year and using the actual capacity of each of the 107 units, fuel use is estimated at 688,913,000 MBTU/year. Unit efficiency is assumed to be 76 percent.

Revised Rule 74.11.1, which will apply to units from 75,000 BTU/hr to 2 million BTU/hr capacity, is a point of sale rule. Assuming a 10 percent replacement rate, a total of 271 units are expected to be replaced annually in Ventura County. On this basis, NOx emission reductions are calculated as follows:

Large Water Heaters (75,000 - 400,000 BTU/hr)

Current Emissions

$(40,595 \times 10^6)(204)(93)(0.76)/(1000)(2000) =$
292.7 tons per year (tpy) NOx at 40 ng/j countywide

Proposed Reduction:

$(40,595 \times 10^6)(204)(32.5)(0.76)/(1000)(2000) =$
102.3 tpy NOx emissions at 14 ng/j countywide.
190.4 tpy NOx reduction

Small Boilers (400,000 – 2,000,000 BTU/hr)

Current Emissions

$(115,547 \times 10^6)(67)(37)(0.76)/(1000)(2000) =$
108.8 tpy NOx emissions at 30 ppm countywide

Proposed Reduction:

$(115,547 \times 10^6)(67)(32.5)(0.76)/(1000)(2000) =$
95.6 tpy NOx emissions at 20 ppm countywide.
13.2 tpy NOx reduction

Therefore, over the 10 year period of implementation for the revised rule, **2036 tons** of NOx will be reduced from large water heaters and small boilers. On an annual basis, starting in mid-2012, a total of 203.6 tpy of NOx will be reduced until all units are replaced in 2022.

Cost-Effectiveness – New Limits

Much of the cost information used in this analysis is from the South Coast AQMD Staff Report for the 2006 revision to Rule 1146.2.⁵ Since this data was collected in 2006, the analysis may change as new information is collected.

The cost-effectiveness analysis is based on the following assumptions:

1. Ten percent of existing units will be replaced each year. New units are not included.
2. After one initial expenditure, each low-NOx unit will reduce NOx for 10 years.

Cost effectiveness for various size ranges appears in Table 1. These estimates are less than the District guideline of \$18,000 per ton NOx reduced.

For large water heaters under 100,000 BTU/hr capacity and meeting the 14 ng/j NOx limit, complying water heater costs are expected to increase an estimated \$150 per unit. This is based on cost increase reports for residential water heaters that comply with the 10 ng/j NOx limit in Rule 74.11, *Residential Water Heaters*.

For large water heaters between 100,000 BTU/hr and 300,000 BTU/hr capacity, SCAQMD estimated an cost increase of about \$1000 per unit. For units between 300,000 BTU/hr and 400,000 BTU/hr, the cost increase was estimated at about \$3000. This discrepancy relates to a need for requirement for ASME certification in certain situations. Uncertified equipment may be less expensive.⁶

Conversely, the SCAQMD cost increase for units between 400,000 BTU/hr and 1,000,000 BTU/hr is very low; in fact, some complying units are shown to be less expensive than existing units. Staff has set the cost increase for this category at approximately \$150 per unit. Complying units between 1,000,000 BTU/hr and 2,000,000 BTU/hr capacity are estimated to increase in cost by about \$1000 per unit, based on SCAQMD estimates.⁷

Table 1
Cost-Effectiveness of Proposed Emission Limit Revisions to Rule 74.11.1

Capacity (BTU/hr)	NOx Limit	Annual Quantity	Incremental Cost (\$)	Annual Cost (\$)	10 Yr Life NOx Reduced (t/y)	Cost Effectiveness (\$/ton)
Large Water Heaters						
75,000 - 100,000	14 ng/j	117	150	17,610	436.8	403
100,000 - 300,000	14 ng/j	61	1000	60,489	85.6	7,237
300,000 - 400,000	14 ng/j	25	3000	76,362	68.2	11,198
Small Boilers						
400,000 - 1 MM	20 ppm	57	150	8,515	8.0	13,722
1 MM - 2 MM	20 ppm	15	1000	15,301	25.8	5,936

Rule 74.11.1 and Rule 74.15.1 Emission Reduction – Tune-Ups

Rule 74.15.1 currently allows tune-ups in lieu of source tests for units that use at least 0.3 billion BTU of fuel and less than 1.8 billion BTU per year. This will continue for units between 2 million and 5 million BTU/hr capacity.

Rule 74.11.1 is a point-of-sale rule that requires certification; periodic source testing is not required. However, staff has observed that a number of units over 1,000,000 BTU/hr capacity have been significantly out of compliance when source tested (per existing Rule 74.15.1). This observation has resulted in the proposed tune-up requirement for Rule 74.11.1.

It is very likely that periodic boiler tune-ups reduce air emissions. However, these emission reductions

cannot be quantified. Although the new requirement for annual NO_x and CO screening analyses will provide some emission information, it is not enough to quantify an emission reduction.

Cost-Effectiveness – Tune-Ups

Without an emission reduction estimate, cost-effectiveness (in dollars per ton of emissions reduced) cannot be calculated. However, annual tune-ups are estimated to cost between \$100 and \$200 dollars; this may include the screening analysis. Full source tests cost between \$1,000 and \$3,000, depending on the complexity. Therefore, a switch from annual source testing to annual tune-up for units between 1,000,000 BTU/hr and 2,000,000 BTU/hr is expected to significantly reduce costs to operators.

SOCIOECONOMIC IMPACT

Assembly Bill 2061 (Polanco)[H&S § 40728.5], which went into effect on January 1, 1992, requires that the APCD Board consider the socioeconomic impact of any new rule or amendment to an existing rule if air quality or emission limits are affected. Both proposed Rule 74.11.1 and 74.15.1 impose emission limits and may affect air quality in Ventura County, so the requirements of the bill must be evaluated. Each rule will be evaluated separately.

Rule 74.11.1

The Board must evaluate the following socioeconomic information on revised Rule 74.11.1:

- (1) *The type of industries or business, including small business, affected by the rule or regulation.*

Rule 74.11.1 will primarily affect commercial users of small boilers in Ventura County. It is not possible to predict any other type of new source to which Rule 74.11.1 will apply.

- (2) *The impact of the rule or regulation on employment and the economy of the region affected by the adoption of the rule or regulation.*

The adoption of Rule 74.11.1 is expected to have no impact on employment in and the economy of Ventura County. The proposed rule

is a point-of-sale rule, where new, low-NO_x units replace obsolete standard units gradually over time. The cost-effectiveness of the proposed rule is favorable. While new lower-NO_x units will be more expensive than existing units, this additional expense is expected to have no effect on either employment in or the economy of the region.

- (3) *The range of probable costs, including costs to industry or business, including small business, of the rule or regulation.*

Complying equipment may cost between \$150 and \$3,000 per unit more than existing equipment. For the proposed NO_x emission limits, the cost-effectiveness varies from \$403 to \$13,722 per ton of NO_x reduced. This is consistent with the District's cost-effectiveness guideline of \$18,000 per ton of NO_x reduced. See Table 1 above.

- (4) *The availability and cost-effectiveness of alternatives to the rule or regulation being proposed or amended.*

Complying equipment for the proposed 14 ng/j NO_x limit in Subsection B.2 has been available in the SCAQMD since January 1, 2012. Complying equipment for the proposed 20 ppm NO_x limit in Subsection B.4 has been available

in the SCAQMD since January 1, 2010. No alternatives are available.

- (5) *The emission reduction potential of the rule or regulation.*

After full implementation in 2022, the total estimated total NOx emission reduction for both proposed NOx limits is estimated to be 2036 tons over 10 years.

- (6) *The necessity of adopting, amending, or repealing the rule or regulation in order to attain state and federal ambient air standards pursuant to Chapter 10 (commencing with Section 40910).*

By reducing NOx emissions, adoption of proposed Rule 74.11.1 will assist in the District's progress towards attainment and maintenance of the federal and California ambient air quality standards.

Rule 74.15.1

The Board must evaluate the following socio-economic information on revised Rule 74.15.1:

- (1) *The type of industries or business, including small business, affected by the rule or regulation.*

Rule 74.15.1 will primarily affect commercial users of small to medium size boilers in Ventura County. It is not possible to predict any other type of new source to which Rule 74.15.1 will apply.

- (2) *The impact of the rule or regulation on employment and the economy of the region affected by the adoption of the rule or regulation.*

The adoption of Rule 74.15.1 is expected to have no impact on employment in and the economy of Ventura County. While the requirement for an initial installation tune-up and an annual screening analysis is being added, the emission reduction requirements of the rule will remain the same. The additional expense of these new requirements is expected to have no effect on either employment in or the economy of the region.

- (3) *The range of probable costs, including costs to industry or business, including small business, of the rule or regulation.*

It is not possible to calculate an emission reduction for the proposed revisions. Without an emission reduction estimate, cost-effectiveness cannot be calculated. However, annual tune-ups are estimated to cost between \$100 and \$200 dollars; this may include the screening analysis. Full source tests cost between \$1,000 and \$3,000, depending on the complexity. Therefore, a switch from annual source testing to annual tune-up is expected to significantly reduce costs to operators.

- (4) *The availability and cost-effectiveness of alternatives to the rule or regulation being proposed or amended.*

The requirement for an initial installation tune-up and an annual screening analysis is being added. The cost effectiveness is undetermined. No alternatives are available.

- (5) *The emission reduction potential of the rule or regulation.*

The requirement for an initial installation tune-up and an annual screening analysis may catch non-compliance situation earlier than the existing version of Rule 74.15.1. NOx emissions are expected to be reduced. However, it is impossible to predict the situations where this will happen. Therefore, it is not possible to make an emission reduction estimate for the proposed revisions.

- (6) *The necessity of adopting, amending, or repealing the rule or regulation in order to attain state and federal ambient air standards pursuant to Chapter 10 (commencing with Section 40910).*

Although the quantity cannot be predicted, NOx emissions reductions realized from adoption of proposed Rule 74.15.1 will assist in the District's progress towards attainment and maintenance of the federal and California ambient air quality standards.

ENVIRONMENTAL IMPACTS OF METHODS OF COMPLIANCE

California Public Resources Code Section 21159 requires the District to perform an analysis of the reasonably foreseeable environmental impacts of the methods of compliance. The analysis shall take into account a reasonable range of environmental, economic, and technical factors, population and geographic areas, and specific sites. Each rule will be evaluated separately.

The analysis must include the following information on the proposed rule:

- (1) *An analysis of the reasonably foreseeable environmental impacts of the methods of compliance.*

Rule 74.11.1 is a point-of-sale rule, where new, low-NOx units replace obsolete standard units over time. Since units become obsolete at different rates and low-NOx units are expected to become obsolete at the same rate as standard units, no additional waste is expected to appear in landfills. In addition, old water heaters and small boilers are frequently recycled. The new low-NOx units are expected to cause no adverse environmental impacts. Since properly tuned units operate more efficiently, a decrease in fuel consumption may occur for many units.

Emission reduction requirements for Rule 74.15.1 are not changing, so no environmental impacts are anticipated.

- (2) *An analysis of the reasonably foreseeable mitigation measures.*

Since no adverse environmental impacts are expected, no mitigation measures are proposed.

- (3) *An analysis of the reasonably foreseeable alternative means of compliance with the rule or regulation.*

No alternatives are proposed. As shown in the staff report, there are a number of manufacturers supplying equipment that complies with the proposed rule. Manufacturers are expected to continue to develop complying equipment, increasing competition and decreasing costs.

The above analysis under Public Resource Code Section 21159 further demonstrates that there is no reasonable possibility that the adoption of proposed Rule 74.11 will have a significant effect on the environment due to unusual circumstances.

CEQA Requirements

Staff concludes that the adoption of proposed Rule 74.11.1 and proposed Rule 74.15.1 is within the scope of the categorical exemptions from the California Environmental Quality Act (CEQA) under state CEQA guideline Sections 15307, Protection of Natural Resources, and 15308, Protection of Environment, and that no exception to these categorical exemptions apply.

ANALYSIS OF EXISTING REGULATIONS

California Health & Safety Code Section 40727.2(a) requires districts to provide a written analysis of existing regulations prior to adopting, amending or repealing a regulation. Section 40727.2(a) states:

In complying with Section 40727, the district shall prepare a written analysis as required by this section. In the analysis, the district shall identify all existing federal air pollution control requirements, including, but not limited to, emission control standards constituting best available control technology for new or modified equipment, that apply to the same equipment or source type as the rule or regulation proposed for adoption or modification by the district. The analysis shall also identify any of that district's existing or

proposed rules and regulations that apply to the same equipment or source type, and all air pollution control requirements and guidelines that apply to the same equipment or source type and of which the district has been informed pursuant to subdivision (b).

Proposed Rule 74.11.1 applies to large water heaters and small boilers rated 75,000 BTU/hr through 2 million BTU/hr input capacity. No known state or federal air pollution control regulations apply to this equipment. Units 1 million BTU/hr and up require District Permits to Operate.

Proposed Rule 74.15.1 applies to small and medium sized boilers rated at less than 2 million BTU/hr through less than 5 million BTU/hr input capacity.

No known state or federal air pollution control regulations apply to this equipment. All applicable

units require District Permits to Operate.

INCREMENTAL COST-EFFECTIVENESS

Health and Safety Code Section 40920.6 requires the performance of an incremental cost-effectiveness analysis for a regulation that identifies more than one control option to meet the same emission reduction objectives. Incremental cost-effectiveness is defined as the difference in costs divided by the difference in emission reductions between one level of control and the next more stringent level of control.

Rule 74.11.1 regulates the supply of applicable units in Ventura County; in doing so, it requires large water heater and small boiler users only to purchase a

complying unit. Large water heaters and small boilers have been subject to NO_x emission control since 1999. The proposed revisions reduce the NO_x emission limit for these units.

For this rule, complying equipment is currently available in the SCAQMD. Implementation of the proposed limits in Ventura County depends in the availability of complying equipment. Therefore, no alternate control option is available and an incremental cost-effectiveness analysis is not necessary.

REFERENCES

1. Santa Barbara County Air Pollution Control District, *List of Approved Portable NO_x/CO Analyzers*, <http://www.sbcapcd.org/eng/boiler/analyzers.htm>
2. South Coast Air Quality Management District, *Rule 1146.2 Certified Equipment List*, <http://www.aqmd.gov/rules/doc/r1146/r1146table.html>
3. U.S. Census Bureau, *Economic Census Summary Statistics for Ventura County*, <http://www.census.gov/epcd/ec97/ca/CA111.htm> (1997), http://factfinder.census.gov/servlet/IBQTable?_bm=y&-ds_name=EC0700A1&-geo_id=05000US06111 (2007)
4. *Technical Support Document: Energy Efficiency Standards For Consumer Products: Residential Water Heaters*, U.S Department of Energy, Assistant Secretary, Energy Efficiency & Renewable Energy, Building Research and Standards Office, Washington, DC 20585, December 2000, Chapter 7, Markup, Page 7-8
5. Barcikowski, Wayne, *Staff Report: Proposed Rule 1146.2 – Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers and Process Heaters*, South Coast Air Quality Management District, Planning, Rule Development, and Area Sources, April, 2006
6. *ibid.*, page 3-3
7. *ibid.*, page 3-4
8. Correspondence from Reese Martin, Southern California Gas Company, December 30, 1996

Appendix A
Economic Census Summary Statistics for Ventura County
For 1997 from the US Census Bureau

NAICS code	Description	Establishments	
21	Mining (not published for counties)	N	
22	Utilities (not published for counties)	N	
23	Construction (not published for counties)	N	
31-33	Manufacturing	1,008	
42	Wholesale trade	1,088	
44-45	Retail trade	2,348	
48-49	Transportation & warehousing (not published for counties)	N	
51	Information (total not published for counties)	N	
52	Finance & insurance (not published for counties)	N	
53	Real estate & rental & leasing	672	
54	Professional, scientific, & technical services	Taxable	1,597
		Exempt	13
55	Management of companies & enterprises (not published for counties)	N	
56	Administrative & support & waste management & remediation services	698	
61	Educational services	Taxable	93
		Exempt	8
62	Health care & social assistance	Taxable	1,591
		Exempt	222
71	Arts, entertainment, & recreation	Taxable	214
		Exempt	34
72	Accommodation & foodservices	1,201	
81	Other services (except public administration)	Taxable	875
		Exempt	155
Total Employer Establishments		11,817	

<http://www.census.gov/epcd/ec97/ca/CA111.HTM>

Appendix B
Economic Census Summary Statistics for Ventura County
For 2007 from the US Census Bureau
 (Release date – 7/1/2011)

NAICS code	Description	Establishments
21	Mining (not published for counties)	N
22	Utilities (not published for counties)	N
23	Construction (not published for counties)	N
31-33	Manufacturing	954
42	Wholesale trade	1,024
44-45	Retail trade	2,766
48-49	Transportation & warehousing (not published for counties)	N
51	Information (total not published for counties)	N
52	Finance & insurance (not published for counties)	N
53	Real estate & rental & leasing	1051
54	Professional, scientific, & technical services	Taxable 2,597
		Exempt 17
55	Management of companies & enterprises (not published for counties)	N
56	Administrative & support & waste management & remediation services	1112
61	Educational services	Taxable 183
		Exempt 19
62	Health care & social assistance	Taxable 2,118
		Exempt 199
71	Arts, entertainment, & recreation	Taxable 371
		Exempt 37
72	Accommodation & foodservices	1,602
81	Other services (except public administration)	Taxable 1031
		Exempt 165
Total Employer Establishments		15,246

http://factfinder.census.gov/servlet/IBQTable?_bm=y&-ds_name=EC0700A1&-geo_id=05000US06111

Appendix C
Amended Water Heater Use Information from
Southern California Gas Company
12/30/96⁸

Boiler And Water Heater Rating	Number of Boilers and Water Heaters	Number of Boilers and Water Heaters	Percentage of Total	Total Throughput 1996	Total Throughput 2011(+ 43%)	Average Unit Throughput 2011
BTU/hr	1996	2011(+ 43%)		MBTU/year	MBTU/year	MBTU/year
Less Than 75,000						
75,000 to 100,000	821	1,174	42.63	113,166,530	161,828,138	197,111
100,001 to 200,000	242	346	12.56	33,875,061	48,441,337	200,171
200,001 to 300,000	181	259	9.40	55,349,838	79,150,268	437,294
300,001 to 400,000	178	255	9.24	81,487,899	116,527,696	654,650
Subtotal	1422	2,033				
400,001 to 500,000	87	124	4.52	40,213,782	57,505,708	660,985
500,001 to 600,000	48	69	2.49	37,214,913	53,217,326	1,108,694
600,001 to 700,000	71	102	3.69	50,752,016	72,575,383	1,022,188
700,001 to 800,000	74	106	3.84	54,410,344	77,806,792	1,051,443
800,001 to 900,000	42	60	2.18	27,964,740	39,989,578	952,133
900,001 to 1 MM	75	107	3.89	115,709,009	165,463,883	2,206,185
Subtotal	397	568				
< 1 MM to 2MM(1)	107	107	5.56	688,913,000	688,913,000	6,438,439
TOTAL	1,926	2,708	100	1,299,057,132	1,561,419,109	-----

(1) 1996 data for this group is unknown. 2012 estimate is included for comparison only