

**SACRAMENTO METROPOLITAN
AIR QUALITY MANAGEMENT DISTRICT**

For Agenda of **March 25, 2010**

To: Board of Directors
Sacramento Metropolitan Air Quality Management District

From: Larry Greene
Executive Director/Air Pollution Control Officer

Subject: Adopt a Resolution Approving Amendments to Rule 414, Water Heaters, Boilers, and Process Heaters Rated Less Than 1,000,000 Btu per Hour

Recommendations

1. Determine that the amendments to Rule 414 are exempt from the California Environmental Quality Act (CEQA); and
 2. Adopt the attached resolution approving the amendments to Rule 414.
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Executive Summary

Staff is proposing to amend Rule 414, Natural Gas-Fired Water Heaters¹ to help meet state and federal health standards for ozone and fine particles. NOx is a precursor to ozone and fine particles. Rule 414 will require residents and businesses that buy or install new water heaters, boilers and process heaters to meet the proposed NOx emission standards. The effective dates for the new standards were extended as a result of comments on the draft proposal.

Equipment subject to this rule is projected to emit 1.30 tons of NOx per day in 2018, the deadline for attaining the federal 8-hour ozone standard. The proposed amendments will reduce this amount by 0.7 tons per day in 2018. This rule achieves the most NOx reductions of all rules in the 2009 ozone SIP and recently approved state plan.

The proposed rule amendments will:

- expand the applicability of the rule to include larger equipment greater than or equal to 75,000 and less than 1,000,000 Btu/hr;
- expand the applicability to units fired by fuels other than natural gas (except for LPG (propane) fired units);
- set new emission standards for previously unregulated units and sets more stringent standards for units rated <75,000 Btu/hr (generally residential water heaters);
- allow units above the emission standards to be distributed, offered for sale, or

¹ Staff proposes to revise the rules title to: Rule 414 – Water Heaters, Boilers and Process Heaters Rated Less than 1,000,000 Btu per Hour

sold for six months after the effective dates.

These amendments will satisfy commitments in the 2009 federal 8-hour ozone attainment demonstration plan and the 2009 state Triennial Plan. The proposed requirements match rules that have been adopted and implemented in other California districts in southern California, the San Joaquin Valley and the Yolo/Solano air districts.

Attachments

The following table identifies the attachments to this memo.

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Background

The District is currently designated as a nonattainment area for both the state and federal ozone and fine particle standards. Since NO_x is a precursor to ozone and fine particles, one of the attainment strategies for both pollutants is to reduce NO_x emissions from existing stationary sources. As documented by the U.S. Environmental Protection Agency (EPA) in the most recent Criteria Document for ozone (U.S. EPA 2006), both short-term and long-term exposure to ozone can irritate and damage the human respiratory system, resulting in:

- Decreased lung function;
- Development and aggravation of asthma;
- Increased risk of cardiovascular problems such as heart attacks and strokes;
- Increase hospitalizations and emergency room visits; and
- Premature deaths.

Health studies have linked exposure to particulate matter, especially fine particles, to several significant health problems, including:

- increased respiratory symptoms, such as irritation of the airways, coughing, or difficulty breathing;
- decreased lung function;
- aggravated asthma;
- development of chronic bronchitis;
- irregular heartbeat;
- nonfatal heart attacks,
- premature death in people with heart or lung disease; and
- increased risk of cardiovascular and cerebrovascular events in post-menopausal women.

A significant source of NOx emissions from stationary sources is natural gas combustion. Currently, NOx emissions from natural gas-fired water heaters, boilers, and process heaters are regulated by two existing District rules: Rule 414 (for units with rated heat input capacities of less than 75,000 Btu/hr) and Rule 411 (for units with rated heat input capacities of 1,000,000 Btu/hr and higher). Staff has identified more stringent, feasible NOx limits in two South Coast Air Quality Management District (SCAQMD) rules: SCAQMD Rule 1121, which sets more stringent NOx limits for water heaters with rated heat input capacities less than 75,000 Btu/hr, and SCAQMD Rule 1146.2, which sets limits for units with rated heat input capacities from 75,000 to 2,000,000 Btu/hr. Several other districts, including San Joaquin Valley Unified APCD (Rule 4308), Bay Area AQMD (Rule 9-6) Yolo Solano AQMD (Rule 2.37), Ventura County APCD (Rule 74.11.1), and Santa Barbara County APCD (Rule 360) have adopted some or all of these standards.

In the 2009 federal 8-hour ozone attainment demonstration plan, the District committed to reducing NOx emissions from this source category by 0.7 tons per year by 2018. The 2009 state Triennial Plan also included a commitment to reduce NOx emissions from this category. The proposed amendments are the first step in fulfilling those commitments.

Summary of Proposed Rule Amendments

The major proposed rule changes are summarized below. The changes as proposed will take effect immediately upon adoption unless otherwise noted. Please refer to Appendix A of the Staff Report (Attachment C) for a more detailed description of changes.

- The proposed amendment expands the applicability of the rule to include water heaters, boilers and process heaters with an input rating greater than or equal to 75,000 and less than 1,000,000 Btu/hr. This size of equipment is currently unregulated.
- Additionally, the amendment will change the applicability of the rule to apply to water heaters, boilers, and process heaters using fuels other than natural gas. An exemption for units using liquid petroleum gas (LPG) is also proposed.
- The proposed emission standards for new units are shown in the following table:

Heat Input Range and Type	NOx Limit Nanograms per Joule of Heat Output (ppmv @ 3% O ₂)*		CO Limit ppmv @ 3% O ₂	
	Effective 3/1/1997	Effective 1/1/2011	Effective 1/1/2013	Effective 1/1/2011
< 75,000 Btu/hr Mobile Home All others	50 40	40 (55) 10 (15)		No Limit No Limit
75,000 to < 400,000 Btu/hr Pool/Spa All others	No Limit No Limit	40 (55) 40 (55)	14 (20)	No Limit No Limit
400,000 to < 1million Btu/hr All Types	No Limit	14 (20)		400

* Where limits are shown in units of both nanograms per joule of heat output and ppmv at 3% oxygen, compliance can be demonstrated using either limit.

- In response to comments Staff added an amendment to allow retailers and distributors to sell devices that do not meet the new limits for 6-months after the January 1, 2011 and January 1, 2013 effective dates. This will allow distributors and retailers time to sell their stock. These amendments also allow for end users to install units at any time provided they met the rule requirements at the time of purchase.

Impact on Businesses and Public

Staff contacted manufacturers of water heaters and small boilers to determine the additional costs to meet the proposed emission limits. All of the compliant units used low NOx burners to meet the proposed NOx emission standards. The additional costs of the compliant units are shown below.

Unit Size (Btu/hr)	Average Additional Cost of Unit	Annualized Additional Cost ²
< 75,000	\$86	\$12
75,000 to < 400,000	\$1,941	\$293
400,000 to < 1,000,000	\$7,359	\$695

The overall cost effectiveness of the proposed amendments is \$9.04 per pound of NOx reduced.

Rule 414, applies to new units only and does not require existing water heaters or boilers to be replaced or modified to meet the lower emission standards. Rule 414 affects water heater manufacturers, distributors, plumbing wholesalers, retail home supply stores, plumbers and contractors, and business and homeowners that use

² The additional cost annualized over the estimated lifespan of the unit (10 years for < 75,000; 15 years for 75,000 to < 400,000; 20 years for 400,000 to < 1,000,000; with a 7% interest rate)

water heaters and small commercial boilers. Since the water heaters and boilers affected by the proposed amendments are found throughout the residential and commercial sectors, a wide range of businesses and industries may be affected including restaurants, retail stores, and schools. There are an estimated 7,800 business establishments that may be equipped with affected units. As many as 97% of these may be small business.

There are approximately 550,000 residential housing units in Sacramento County. Most homes are equipped with small natural gas-fired water heaters; but some may be electric or liquid petroleum gas-fired.

Approximately 99% of residential units are rated less than 75,000 Btu/hr. The increased capitol costs, annualized for residents are \$12 per year for units under 75,000 Btu/hr which represents approximately 0.02% of the median household income. In the commercial sector, the increased capitol costs, annualized ranges from \$293 to \$695 per year which is less than 0.003% of earnings. Using many conservative assumptions, our contractor estimated that 4.23 jobs could be lost annually due to this regulation for the entire commercial sector, which contains over 160,000 jobs. It is estimated that 0.6 job losses are directly due to the additional cost of a compliant unit and 3.63 jobs are losses are indirectly caused by residents spending less money in the commercial sector due to the increased cost of replacing a water heater. Rebates are available for residents who choose to meet the new air quality standard by purchasing a unit that is also more energy efficient. Currently PG&E offers \$30 to \$50 rebates for natural gas fired units with an energy factor greater than or equal to 0.62 and a \$30 rebate for electric water heaters with an energy factor greater than or equal to 0.93. Additionally, the federal government offers a 30% tax credit off the total cost of a unit if the energy factor is greater than or equal to 0.82.

District Impacts

The proposed amendments to the rules are not expected to result in additional costs to the District. The majority of the units affected by the rule amendments are already subject to requirements under the existing rules. The District will utilize its existing staff resources to regulate units greater than or equal to 75,000 Btu/hour that are currently unregulated.

Emission Impacts

The estimated NOx emission reductions due to the proposed rule amendments are summarized in the table below. Because this rule applies only to new units, the rate of emission reduction increases every year as owners replace their older units. Based on average life spans, Staff predicts that the existing water heaters and boilers will be replaced and meet the proposed standards by 2029. These ongoing replacements will help meet the more health protective federal ozone air quality standards expected later this year.

Unit Size (Btu/hr)	NOx Emission Reductions (tons per day)				
	2011	2014	2017	2018	2029
< 75,000	0.10	0.26	0.42	0.48	0.57
75,000 to < 400,000	0.02	0.07	0.12	0.14	0.29
400,000 to < 1,000,000	0.02	0.05	0.08	0.09	0.22
Total	0.14	0.38	0.63	0.71	1.08

Units fired by nongaseous fuels like oil, wood and coal produce higher levels of particulate matter than gaseous fuels as well as several toxic air contaminants. Applying the proposed standards to these fuels will likely prevent boilers and water heaters using existing technologies from being installed in the District. Our research indicates that there are very few, if any, used in Sacramento.

Environmental Review and Compliance

Staff finds that the proposed rules are exempt from the California Environmental Quality Act as an action by a regulatory agency for protection of the environment (Class 8 Categorical Exemption, Section 15308 State CEQA Guidelines) and because it can be seen with certainty that there is no possibility that the activity in question may have a significant adverse effect on the environment (Section 15061(b)(3), State CEQA Guidelines).

California Public Resources Code (Section 21159) requires an environmental analysis of the reasonably foreseeable methods of compliance. Compliance is expected to be achieved by the purchase of compliant equipment when new units are needed or when existing units need to be replaced at the end of their normal useful life. The proposed rules will not increase emissions and will not cause any other significant adverse effects on the environment; therefore Staff has concluded that no environmental impacts will be caused by compliance with the proposed rules.

Public Outreach and Comments

Staff held a public workshop to discuss the proposed Rule 414 amendments on December 16, 2009. The noticing for this workshop included:

- Mailing a notice to:
 - interested and affected parties including all permitted stationary sources;
 - industry associations, retailers, and plumbing/service shops identified through the yellow pages;
 - all persons who have requested to receive rulemaking notices.
- A notice was also published in the Sacramento Bee in the Our Region section.
- The notice was also posted on the District web site. The draft rule and staff report were made available for public review at that time.

Staff received several comments and questions at the workshop, as well as written comments from industry and the EPA. All comments and responses are included in Appendix E of the Staff Report (Attachment C). In response to public comments,

Staff has extended the effective date of the first set of standards from 6 months after adoption to January 1, 2011. Additionally, because of the current economic climate, Staff added an amendment to allow retailers and distributors to sell devices that do not meet the limits for 6 months after the January 1, 2011 and January 1, 2013 effective dates. This will allow time to sell their stock. End users will be able to install those units at any time provided the unit complied with the rule at the time of purchase.

Staff received comments from Raypak, Inc. on February 18, 2010 after the rule and staff report were posted publicly for comments during the public hearing notice period. These comments and the Staff's responses can be found in Attachment D of this board package.

Conclusion

The proposed amendments will achieve reductions in NOx emissions necessary for the District to make progress towards meeting the state and federal ozone and fine particle health standards and satisfy state and federal plan commitments. This rule achieves the most NOx reduction of all rules in the 2009 ozone SIP and recently approved state plan. Several other Districts including the SCAQMD, SJVUAPCD, BAAQMD, and YSAQMD have adopted these standards and have demonstrated them to be feasible. The proposed amendments will also subject units fired by non-gaseous fuels (excluding LPG fired) to the proposed standards, likely preventing the installation of oil and solid fuel fired units, which produce higher levels of particulate matter emissions and toxic air contaminants. The amendments will result in relatively small costs to residents and the service/commercial industry for the additional cost of a new compliant unit. Staff responded to public comments by extending the first effective date to January 1, 2011 and allowing a 6-month sell through period after both effective dates to allow distributors and retailers to clear their stock. Staff recommends that the Board determine that Rule 414 is exempt from CEQA and approve the attached resolution adopting Rule 414 as proposed.

Respectfully submitted,

Approved as to form:

Larry Greene
Executive Director/Air Pollution Control Officer

Kathrine Pittard
District Counsel

Attachments

Attachment A
Board Resolution

Attachment B

Draft Rule 414

Attachment C

Staff Report

Attachment D
Written Comments

Attachment E

Evidence of Public Notice