



Staff Report

**Proposed Amendments to:
Rule 239**

NATURAL GAS-FIRED WATER HEATERS LESS THAN 1,000,000 BTU PER HOUR

October 21, 2025

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Introduction

The El Dorado County Air Quality Management District (AQMD) is the agency with primary responsibility for achieving and maintaining clean air standards in El Dorado County. The Sacramento Federal Ozone Nonattainment Area (SFNA) includes Sacramento and Yolo counties, the southern portion of Sutter County, the western portions of El Dorado and Placer counties, and the northeastern portion of Solano County.

On October 21, 2025, AQMD staff will present to the Board of Directors a proposed amendment to Rule 239 to fulfill a federal commitment made under the 1997 8-hour Ozone State Implementation Plan (SIP). Under that plan, AQMD committed to amend Rule 239, which currently regulates nitrogen oxides (NOx) emissions from natural gas-fired water heaters rated at less than 75,000 British thermal units per hour (Btu/hr). The proposed amendments would meet this obligation by expanding the rule's applicability to units up to 1,000,000 Btu/hr and by further reducing NOx emissions.

The proposed emission limits are consistent with those adopted by neighboring air districts within the SFNA, beginning as early as 2014, as well as by several other districts across California.

The purpose of this staff report is to provide the AQMD Board of Directors with background information and a summary of the proposed amendments, and to establish supporting evidence to defend against any potential legal challenges to the approval of amended Rule 239.

The emission limits proposed for the affected units are in Table 1 below:

Table 1 : Rule 239 Proposed Limits

Heat Input Range and Type	Existing NOx Limit Nanograms per Joule of Heat Output (parts per million by volume(ppmv) @ 3% O₂)*	Proposed NOx Limit Nanograms per Joule of Heat Output (ppmv @ 3% O₂)*
< 75,000 Btu/hr Mobile Home All others	50 (66) 40 (55)	50 (66) 40 (55)
75,000 to < 400,000 Btu/hr Pool/Spa All others	No existing emission limit	40 (55) 14 (20)
400,000 to < 1,000,000 Btu/hr All Types	No existing emission limit	14 (20)

* 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.

Background

Ozone is formed when volatile organic compounds (VOCs) and NOx undergo photochemical reactions in the presence of sunlight. In the SFNA, a regional sea breeze pattern, driven by

temperature differences between the Pacific Ocean and the Sacramento Valley, produces significant variations in ozone concentrations across the region. The western and southwestern upwind sites typically record the lowest concentrations, while the highest levels are measured in eastern Sacramento County and in foothill sites within El Dorado and Placer Counties. The National Ambient Air Quality Standards (NAAQS) for ozone were first established in 1979 as a 1-hour standard, and subsequently revised in 1997, 2008, and 2015 as 8-hour standards. The 1997 8-hour ozone NAAQS was set at 80 parts per billion (ppb) (62 FR 38856, July 18, 1997). The SFNA was designated as a nonattainment area with a Severe-15 classification under the 1997 8-hour ozone NAAQS. The U.S. Environmental Protection Agency (EPA) has since revoked the 1997 standard for purposes of new designations; however, areas previously designated as nonattainment under this standard remain subject to Clean Air Act (CAA) requirements, including SIP commitments, until those obligations are satisfied, and the area is formally redesignated to attainment (75 FR 29361, May 25, 2010).

The emissions reductions of NO_x and/or VOC in the nonattainment area will lead to lower ambient ozone concentration. These precursor emissions are tracked by the California Air Resources Board's (CARB's) emissions inventory. Forecasted emissions inventories for ozone precursors in the SFNA demonstrate a declining trend in emissions across the entire nonattainment area. This decline in emissions is the result of existing federal, state, regional and local control programs and new State control measure commitments.

The AQMD Board, along with other air districts Boards in the SFNA, approved the 1997 Sacramento Regional 8-hour Ozone Attainment and Reasonable Further Progress Plan (Plan) in 2009, which was revised in 2011 and 2013. This Plan demonstrates how existing and new control strategies will provide the necessary emission reductions to meet CAA requirements for attainment of the 1997 8-hour ozone NAAQS. To achieve the additional reductions needed, the Plan included new control measures to be incorporated into the SIP. As part of these SIP commitments, the SFNA air districts agreed to adopt various control strategies and rule updates. Specifically, the Plan included a commitment for the AQMD to achieve NO_x emission reductions from a water heater control measure within the heat input range of 75,000 to 1,000,000 Btu/hr.

To demonstrate attainment of the 1997 8-hour ozone NAAQS, valid design values at all SFNA ozone monitoring sites must be less than or equal to 80 ppb. The SFNA is currently working with the CARB to prepare a request for EPA to issue a clean data determination under the 1997 ozone NAAQS.

Discussion of the Proposed Revisions

The current version of Rule 239 was adopted in 1998 limits NO_x emissions for new residential water heaters to 40 nanograms per joule (ng/J) and 50 ng/J for mobile home water heaters. The AQMD committed to implementing a new control measure establishing a NO_x emission standard of 14 ng/J (20 ppmv at 3% O₂) for units with a heat input capacity of less than 1 million Btu/hr to greater than or equal to 75,000 Btu/hr. However, for water heaters used to heat pools and spas with a rated heat input capacity of 400,000 Btu/hr or less, the control measure sets a less stringent limit of 40 ng/J (55 ppmv at 3% O₂). The new standards will be effective as of the effective date of the EPA's final action approving the rule.

The U.S. Department of Energy classifies residential gas water heaters as units with an input capacity of 75,000 Btu/hr or less. Accordingly, the term residential was removed from Rule 239 to avoid unnecessary repetition, and the rule was expanded to apply to units with heat input capacities greater than 75,000 Btu/hr.

Existing equipment will not be subject to the proposed changes. The new emission limits will apply only when existing units are replaced, at which point the replacement equipment must meet the

updated standards. Several other California air districts already regulate the full size range of water heaters and boilers, and it is anticipated that AQMD will be encouraged to adopt a similar approach in future SIP updates. Additionally, except for AQMD, all SFNA air districts, Placer County Air Pollution Control District, Sacramento Metropolitan Air Quality Management District, Feather River Air Quality Management District, and Yolo -Solano Air Quality Management District have rules in effect that limit NO_x emissions to 20 ppmv for new boilers and water heaters from 75,000 to 1 million Btu/hr at Point of Sale. Most of the large air districts in the state, including South Coast and San Joaquin Valley, limit NO_x emissions in new natural gas water heaters and boilers to 20 ppmv or even less in some size ranges. Several districts like Sacramento and Bay Area took a different approach and require retrofit of existing boilers to 30 ppmv.

The AQMD staff surveyed hardware stores in El Dorado County that sell water heaters within the proposed size range. The market survey identified both water heaters rated below 75,000 Btu/hr and models rated between 75,000 and 1,000,000 Btu/hr. No units rated at or above 400,000 Btu/hr were found, which is consistent with the limited inventory typically carried by smaller hardware and general stores that often rely on distributor ordering systems. Nevertheless, the survey confirmed that low-NO_x products were available. Importantly, all units rated below 1,000,000 Btu/hr were offered as either Low NO_x or Ultra Low NO_x.

In California, including under South Coast AQMD Rule 1121, Low NO_x water heaters are defined as meeting 40 ng/J (55 ppmv at 3% O₂), while Ultra Low NO_x units meet the more stringent 14 ng/J (20 ppmv at 3% O₂) standard. The availability of these models in the local market demonstrates that equipment meeting the proposed Rule 239 emission limits is already available, technically feasible, and consistent with long-standing regulatory requirements in other California air districts.

Additional findings further support the feasibility of the proposed limits:

- Water heaters that meet the proposed standards are offered for sale in El Dorado County.
- The 20 ppmv (14 ng/J) requirement is so common in California that some manufacturers no longer produce higher-emitting units.
- Many purchasers are selecting Low NO_x replacement equipment because new models combine low-emission burners with high-efficiency designs that reduce operating costs.

Emissions Impacts

In the 2013 revised Plan, SFNA staff used the CARB emissions inventory to estimate NO_x emissions from natural gas consumption by boilers, process heaters, water heating, and other categories within Manufacturing/Industrial and Service/Commercial sectors. Manufacturers reported that the typical life of this equipment is about 15 years, with the control measure implementation year set at 2016; therefore, full implementation would occur by 2031. Future reductions were projected for 2018 using the CARB database, with a total of 0.27 ton per day (tpd) NO_x from all SFNA districts and 0.0035 tpd attributable to Rule 239. Heating equipment meeting the 20 ppmv standard has been available in El Dorado County since at least 2010, and permitting staff have observed increasing voluntary use of this equipment.

The existing inventory of affected equipment types can be characterized by NO_x emissions similar to the EPA AP-42 Compilation of Emission Factors for uncontrolled small boilers, which is 80 ppmv. Under the revised rule, all Other units ≥75,000 Btu/hr must meet 20 ppmv (75% reduction), while Pool/Spa heaters must meet 40 ppmv (50% reduction). Equipment <75,000 Btu/hr is already regulated at 40/50 ng/J, so no additional reductions are expected from that category. Assuming linear turnover, one-third of the inventory is replaced every 5 years, yielding full reductions by 2031.

YEAR	CARB NOx ¹ (tpd) Subject to Rule 239	≥75,000—<400,000 Btu/hr Pool/Spa Reduction (tpd)	≥75,000—<1,000,000 Btu/hr All others Reduction (tpd)
2018	0.085	0.014	0.021
2021	0.086	0.029	0.043
2026	0.086	0.043	0.064
2031	0.087	0.044	0.065

The reduction in NOx resulting from revising Rule 239, once the current equipment inventory is fully replaced, is substantial: approximately 0.044 tpd by 2031 from pool/spa heaters and 0.065 tpd by 2031 from all other affected units. Based on the assumed 15-year equipment life, full turnover will be complete by 2031. The Plan included a 2018 projection estimating a 0.0035 tpd reduction from Rule 239. However, CARB's current emissions inventory indicates that an actual reduction of approximately 0.017 tpd has already occurred, suggesting that most new water heaters being sold already comply with the new standards. Revising Rule 239 ensures these reductions are permanent and enforceable, rather than voluntary.

Additionally, under CAA section 107(d)(3)(E)(iii), an area may only be redesignated to attainment if it demonstrates that air quality improvements are the result of permanent and enforceable emission reductions from implementation of the approved SIP. CAA section 107(d)(3)(E)(v) also requires that the area has met all applicable requirements of CAA Part D for nonattainment areas, including section 172(c)(1) and (6), which mandate implementation of reasonably available control measures and other enforceable emission limitations. Together, these provisions mean that all nonattainment area requirements addressed in a SIP revision, including commitments to revise enforceable emission limitations in District rules, must be fully implemented before EPA can approve a redesignation to attainment.

Therefore, all SIP commitments, including the amendment of Rule 239, must still be fulfilled before a maintenance plan and redesignation request can move forward.

Cost Effectiveness

The California Health and Safety Code section 40703 requires the AQMD, in the process of adopting a regulation, to consider and make public its findings related to the cost-effectiveness of a control measure. Cost-effectiveness for rulemaking purposes is calculated by dividing the cost of air pollution controls required by the rule by the amount of air pollution reduced. Based on the March 25, 2010 Sacramento Metropolitan Air Quality Management District Staff Report for Rule 414, Water Heaters, Boilers, and Process Heaters Rated Less Than 1,000,000 Btu/hr, the cost-effectiveness was approximately \$9.04 per pound of NOx reduced, equivalent to about \$13.23 per pound in 2031 dollars.

AQMD staff collected the most current information available regarding the cost and availability of comparable-size water heaters subject to Rule 239. The local survey of El Dorado County retailers identified Low-NOx models ranging from about \$1,149 to about \$15,124, with an average cost of approximately \$7,830. The cost-effectiveness was calculated using an 8% interest rate over the useful life of the equipment, with the annualized cost divided by the

¹ CEPAM: California 2019 Ozone SIP Baseline Emission Projections - Version 1.03 Sacramento Nonattainment Area Tool

annual emissions reduced. The overall cost-effectiveness of the proposed amendment ranges from about \$1.00 per pound of NO_x reduced for small-size water heaters to about \$9.50 per pound for large-size units, or approximately \$1.46 and \$13.21 per pound, respectively, in 2031 dollars. These values are consistent with those reported by other California air districts and reflect both categories of affected equipment under the proposed rule, including pool/spa heaters and all other units up to 1,000,000 Btu/hr.

Fiscal Impact:

The adoption of revised Rule 239 will have a low to moderate fiscal impact on purchasers of new water heaters and boilers in the affected size categories. Compliant Low-NO_x and Ultra Low-NO_x models are already widely available in the marketplace. For units rated between 75,000 and 400,000 Btu/hr, these models are generally comparable in cost to higher-emitting units, with most priced within about 10–20% more. For larger units up to 1,000,000 Btu/hr, compliant models are also available, typically at somewhat higher cost than older or higher-emitting equipment. Because manufacturers often pair Low-NO_x technology with high-efficiency designs, the added costs are not entirely attributable to emission controls, and it has not been possible to separate them.

Socioeconomic Impact:

California Health and Safety Code, Section 40728.5, Required Assessment, subdivision (d) states “this section does not apply to any district with a population of less than 500,000 persons”. As the population in El Dorado County is less than 500,000 persons, a socioeconomic impact analysis is not required.

Control Requirements:

The amended rule does not impose any control requirements.

Public Comments:

As of the time of submittal of this staff report to the County Clerk, AQMD had received no comments on the proposed revised Rule.

Environmental Review:

California Public Resource Code Section 21159 requires the AQMD to perform an environmental

analysis of the reasonably foreseeable methods of compliance. The analysis must include the following information for the proposed Rule 239:

1. An analysis of the reasonably foreseeable environmental impacts of the methods of compliance.
2. An analysis of the reasonably foreseeable mitigation measures.
3. An analysis of the reasonably foreseeable alternative means of compliance with the rule or regulation.

However, Section 21159 also states, “In the preparation of this analysis, the agency may utilize numerical ranges or averages where specific data is unavailable; however, the agency shall not be

required to engage in speculation or conjecture.” Further, “This section does not require the

agency to conduct a project-level analysis.”

Since there are no current permitted facilities in El Dorado County to which the new Rule 239 would apply, staff will not engage in speculation or conjecture. AQMD staff cannot reasonably foresee any environmental impacts, mitigation measures or alternative means of compliance.

Findings:

The California Health and Safety Code (HSC), Division 26, Air Resources, requires local districts to comply with a rule adoption protocol as set forth in §40727 of the Code. This section contains six findings that the District must make when developing, amending, or repealing a rule. These findings and their definitions are listed in the following table.

Finding	Finding Determination
Authority: The District must find that a provision of law or of a state or federal regulation permits or requires the District to adopt, amend, or repeal the rule. [HSC Section 40727(b)(2)].	HSC, sections 40000, 40001, 40702, 40716, 40919, 42300 and section 185 of the Clean Air Act Amendments are provisions of law that provide air districts with the authority to adopt the proposed regulation.
Necessity: The District must find that the rulemaking demonstrates a need exists for the rule, or for its amendment or repeal. [HSC Section 40727(b)(1).]	The adoption of revised Rule 239 is necessary in order to fulfill a District commitment in the 8-hour Ozone State Implementation Plan to promulgate a control measure to regulate NOx emissions from natural gas fired water heaters.
Clarity: The District must find that the rule is written or displayed so that its meaning can be easily understood by the persons directly affected by it. [HSC Section 40727(b)(3)].	Staff has reviewed the proposed rule and determined that it can be understood by the affected industry.
Consistency: The rule is in harmony with, and not in conflict with or contradictory to, existing statutes, court decisions, or state or federal regulations. [HSC Section 40727(b)(4)].	The regulation is in harmony with, and not in conflict with or contradictory to, existing statutes, court decisions, or state or federal regulations.
Non-Duplication: The rule does not impose the same requirements as an existing State or federal regulation, unless the District finds that the requirements are necessary and proper to execute the powers and duties granted to, and imposed upon, the District	This rule does not impose requirements that are duplicative of existing laws or regulations.
Reference: Any statute, court decision, or other provision of law that the district implements, interprets, or makes specific by adopting, amending, or repealing a regulation.	All statutes, court decisions, and other provisions of law used by AQMD in interpreting this regulation is incorporated into this analysis, and this finding by reference

Staff Recommendation:

Staff recommends that the Board conduct a public hearing, approve the resolution and adopt the revised Rule 239, Natural Gas-Fired Water Heaters Less than 1,000,000 BTU per Hour to fulfill the commitment the AQMD made in the 1997 Ozone SIP.

References:

“Implementation of the 2008 National Ambient Air Quality Standards for Ozone: Nonattainment Area State Implementation Plan Requirements”, Federal Register 80:44 (March 6, 2015) p. 12264.

“Implementation of the 2015 National Ambient Air Quality Standards for Ozone: Nonattainment Area State Implementation Plan Requirements”, Federal Register 83:234 (December 6, 2018) p. 62998.

“Implementation of the 1997 National Ambient Air Quality Standards for Ozone: Nonattainment Area State Implementation Plan Requirements”, Federal Register 80:4795 (January 29, 2015) p. 4799.

Attachments

Attachment A

PROPOSED AMENDMENTS TO RULE 239,
STRIKE-OUT UNDERLINE VERSION & CLEAN VERSION

ATTACHMENT B
RESOLUTION ADOPTING AMENDED RULE 239

ATTACHMENT C

NOTICE OF EXEMPTION FROM CEQA GUIDELINES

Notice of Exemption

To: ☐ Office of Planning and Research
1400 Tenth Street, Room 121
Sacramento, CA 95814

☒ County Clerk
County of El Dorado
360 Fair Ln
Placerville, CA 95667

From: El Dorado County Air Quality Management
330 Fair Ln
Placerville, CA 95667

Project Title: Revision of Rule 215 – ARCHITECTURAL COATINGS

Project Location: El Dorado Air Quality Management District

Project description: The District is proposing to amend Rule 239, Natural Fired Water Heaters. The District is proposing to amend the rule to fulfill the commitment the District made in the federal 8-hour 1997 Ozone State Implementation Plan.

Name of Public Agency Approving Project: El Dorado County Air Quality Management District

Name of Person or Agency Carrying Out Project: El Dorado County Air Quality Management District Exempt Status:

- ☐ Ministerial
☐ Emergency Project
☒ Categorical Exemption (CEQA Guidelines Section 15308, Action by Regulatory Agency for Protection of the Environment)
☐ Statutory Exemption

Reason why project is exempt: The revision of Rule 239 is an action taken to maintain and protect the environment and is therefore exempt from CEQA because it constitutes a Class 8 categorical exemption pursuant to CEQA Guidelines 15308.

Lead Agency Contact Person: Rania Serieh, Air Pollution Control Officer
Telephone Number: (530) 621-7509

Signature: _____ **Date:** _____ **Title:** _____