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**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION IX AIR DIVISION**

Technical Support Document  
for  
EPA's Rulemaking  
for the  
California State Implementation Plan

Bay Area Air Quality Management District

Rule 9-4, Nitrogen Oxides from Natural Gas-Fired Furnaces

Rule 9-6, Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters

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**RULE IDENTIFICATION**

<b>Agency</b>	Bay Area Air Quality Management District (BAAQMD)
<b>SIP Approved Rule</b>	<p>Rule 9-4 – Nitrogen Oxides from Fan Type Residential Central Furnaces</p> <p>Adopted – December 7, 1983</p> <p>Submitted – April 19, 1984</p> <p>EPA Approved – January 7, 1986</p>
<b>Subject of this TSD</b>	<p><b>Rule 9-4 – Nitrogen Oxides from Natural Gas-Fired Furnaces</b></p> <p>Amended – March 15, 2023</p> <p>Submitted – January 10, 2024</p> <p><b>Rule 9-6 – Nitrogen Oxides from Natural Gas-Fired Boilers and Water Heaters</b></p> <p>Adopted – March 15, 2023</p> <p>Submitted – January 10, 2024</p>
<b>Completeness Finding</b>	Complete by operation of law: July 10, 2024

**BACKGROUND**

The Bay Area Air Quality Management District (BAAQMD or “District”) regulates stationary sources of air pollution in the San Francisco Bay Area nonattainment area, which includes the entirety of San Francisco, Alameda, Contra Costa, Marin, Napa, San Mateo, and Santa Clara Counties, and portions of Solano and Sonoma Counties. The EPA has designated BAAQMD as “Marginal” nonattainment for the 2015, 2008, and 1997 8-hour ozone standards.<sup>1</sup> The San Francisco Bay Area was designated as “Moderate” nonattainment for the 2006 24-hour PM<sub>2.5</sub> National Ambient Air Quality Standard (NAAQS) in 2014. In 2017, for the 2006 24-hour PM<sub>2.5</sub> standard, the EPA made a determination of attainment by the attainment date (December 31, 2015) for the San Francisco Bay Area nonattainment area based on air monitoring data.<sup>2</sup> Clean Air Act (CAA) sections 172(c)(1) and 182 require areas that are classified at “Moderate” or above for ozone nonattainment to implement reasonably available control technology (RACT) for specific types of sources. CAA section 189 requires areas classified “Moderate” or above for particulate matter nonattainment to assure that reasonably available control measures (RACM) are implemented in the District.

<sup>1</sup> 40 CFR 81.305. See 83 FR 25776 (June 04, 2018); 77 FR 30088 (May 21, 2012); 69 FR 23858 (June 15, 2004)

<sup>2</sup> See 74 FR 58688 (June 02, 2014); 82 FR 21711 (May 10, 2017).

As a Marginal ozone nonattainment area, which is a classification less severe than “Moderate,” the BAAQMD is not required to implement the RACT requirements in CAA section 182(b)(2). Further, compliance with the PM<sub>2.5</sub> RACM requirement is generally evaluated in attainment plan rulemaking actions that examine the area’s control strategy as a whole. Rules 9-4 and 9-6 are therefore not being evaluated against the RACT or RACM standards in this rulemaking.

## **RULE SUMMARY**

Rule 9-4 was amended to further limit emissions of nitrogen oxides from natural gas-fired furnaces. Rule 9-6 limits emissions of nitrogen oxides from natural gas-fired water heaters and boilers. BAAQMD rules 9-4 and 9-6 are point-of-sale rules that prohibit the sale or installation of natural gas-fired furnaces, water heaters and boilers, respectively, unless they meet certain NO<sub>x</sub> emission limits based on the manufactured date of the appliances. Rule 9-4 applies to sellers and installers of natural gas-fired furnaces with a heat input rating less than 175,000 British thermal units (Btu) per hour and to manufacturers who intend to offer for sale or distribution such equipment within the District. Rule 9-6 applies to sellers and installers of natural gas-fired water heaters and boilers with a heat input rating less than 2,000,000 Btu per hour and to manufacturers who intend to offer for sale or distribution such equipment within the District. More details about the specific manufacturing dates and their corresponding emission limits are discussed below.

### **Revisions to Rule 9-4 include:**

#### Section 100 - General

- An applicability section was added to clarify who must comply with the rule.

#### Section 200 – Definitions

- Five definitions were added
  - BTU
  - Natural gas-fired furnace
  - Heat input
  - Natural gas
  - Nitrogen oxides (NO<sub>x</sub>)

#### Section 300 – Standards

- Added two new emission standards.
  - Appliances manufactured after 1/1/2024 cannot be offered for sale or installed within the District if they emit more than 14.0 ng/J of nitrogen oxides.

- Appliances manufactured after 1/1/2029 cannot be offered for sale or installed if they emit more than 0.0 ng/J of nitrogen oxides.<sup>3</sup>
- All furnaces subject to the requirements of Rule 9-4 must be certified in accordance with the certification requirements in the rule.

#### Section 400 – Administrative Requirements

- Certification methods are expanded upon and now specifically reference EPA test methods.
- Another option for a compliance statement is added allowing manufacturers to use a valid certification from the South Coast Air Quality Management District (SCAQMD) to demonstrate compliance.
- A provision is added where the air pollution control officer (APCO) will present an interim report 2 years before the January 1, 2029 compliance date to the Air District board.

#### Section 600 – Manual of Procedures

- A section was added to clarify the test methods necessary for certification.

**Rule 9-6 has not been previously approved into the SIP. Rule 9-6 is summarized as follows:**

#### Section 100 - General

- Rule 9-6 is applicable to anyone who sells, installs or offers for sale a natural gas-fired water heaters or boiler for use within the District.
- Boilers and water heaters with a rated input capacity over 2,000,000 BTU/hour are exempt.
- Water heaters used in recreational vehicles are exempt.
- Water heaters that use fuels other than natural gas are exempt.
- Pool and spa heaters with less than 400,000 BTU/hour input capacity are exempt.

#### Section 200 – Definitions

- 14 definitions are included, which are as follows:
  - Boilers and water heaters
  - BTU
  - Direct-Vent Water Heater
  - Heat Input

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<sup>3</sup> The EPA notes that it interprets the 0.0 ng/J requirement as specifying the number of significant figures in the standard. That is, the requirement is not that the unit emit no NOx at all, but that when applying standard rounding conventions, a unit that emits less than 0.0 ng/J. Accordingly, units emitting under 0.04 ng/J would comply with this standard.

- Heat Output
- Instantaneous Water Heater
- Mobile Home Water Heater
- Natural Gas
- NO<sub>x</sub> Emissions
- Pool/Spa Heater
- Power Direct-Vent Water Heater
- Power-Vent Water Heater
- Rated Heat Input Capacity
- Storage Tank Water Heater

### Section 300 – Standards

- Decreasing NO<sub>x</sub> emission limits as manufactured dates become more recent.
- Smaller appliances (75,000 BTU/hour<) manufactured after 1/1/2027 cannot emit more than 0 ng/J of NO<sub>2</sub>.
- Mid-range and large appliances (75,001 BTU/hour – 2,000,000 BTU/hour) manufactured after 1/1/2031 cannot emit more than 0.0 ng/J of NO<sub>2</sub>.
- Boilers and water heaters subject to rule 9-6 must be certified using the certification methods in Rule 9-6 or SCAQMD certification methods.
- Mobile Home Water Heaters manufactured after January 1, 2008 cannot emit more than 40 ng/J of NO<sub>2</sub>.
- Pool/Spa Heaters manufactured after January 1, 2008 cannot emit more than 40 ng/J, and units manufactured after January 1, 2013 cannot emit more than 14 ng/J.

### Section 400 – Administrative Requirements

- Emissions testing shall be done by an independent laboratory.
- Manufacturers must demonstrate compliance by submitting one of the following:
  - A compliance statement with general information and a test report that demonstrates testing in accordance with cited testing procedures and a statement that the model is compliant.
  - An approved SCAQMD certification that was issued pursuant to SCAQMD Rules 1121 and 1146.2.

### Section 600 – Manual of Procedures

- Natural gas-fired water heaters and boilers applicable to the rule shall be certified based on an emission test of a randomly selected unit.
- Measurement of nitrogen oxide emissions shall be conducted according to EPA Reference Method 7.
- Tested water heaters shall be operated according to Section 2.4 of American National Standards ANSI Z21.10.1-1990.

- An equation for calculating NO<sub>x</sub> emission rate is provided.

**EVALUATION CRITERIA** – As discussed previously, we are not evaluating Rules 9-4 and 9-6 for RACT or RACM- level stringency. However, we have evaluated the rules for enforceability and SIP relaxation using the following criteria:

1. Enforceability – CAA §110(a)(2)(A) requires SIPs to “include enforceable emission limitations and other control measures, means, or techniques . . . as may be necessary or appropriate to meet the applicable requirements of [the CAA].” In addition, CAA §172(c)(6) requires that nonattainment area SIPs “include enforceable emission limitations, and such other control measures means or techniques . . . as well as schedules and timetables for compliance, as may be necessary or appropriate to provide for attainment of such standard in such area by the applicable attainment date . . . .” The District has explained in its submission that it views the implementation of the submitted rules as “necessary to achieve and maintain the ozone NAAQS...in the region as well as necessary to support similar state-wide emissions reduction efforts and to support attainment in areas downwind of the Bay Area air basin.”<sup>4</sup> The District also explained that the rules are part of the District’s strategy for attaining the PM<sub>2.5</sub> NAAQS, including the EPA’s more stringent 2024 PM<sub>2.5</sub> NAAQS.<sup>5</sup> The EPA agrees with the State’s determination that the submitted rules are necessary or appropriate to meet the applicable requirements of the Act. The Bluebook<sup>6</sup> (*Issues Relating to VOC Regulation Cutpoints, Deficiencies, and Deviations*, EPA, May 25, 1988) and the Little Bluebook<sup>7</sup> (*Guidance Document for Correcting Common VOC & Other Rule Deficiencies*, EPA Region 9, August 21, 2001) were used to help evaluate compliance with the CAA §110(a)(2)(A) requirement for enforceability.
2. SIP Revisions – CAA §110(l) prohibits EPA from approving any SIP revision that would interfere with any applicable requirement concerning attainment or reasonable further progress (RFP) or any other applicable requirement of the CAA.

**EPA EVALUATION** – A summary of our evaluation of the two criteria follows.

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<sup>4</sup> Staff Report at p. 19.

<sup>5</sup> See Staff Report at p. 25. The 2024 PM<sub>2.5</sub> NAAQS was under development at the time of the adoption of the BAAQMD rules, but has since been finalized (89 FR 16202, March 6, 2024).

<sup>6</sup> “Issues Relating to VOC Regulation Cutpoints, Deficiencies, and Deviations,” (a.k.a., Bluebook) EPA OAQPS, May 25, 1988.

<sup>7</sup> “Guidance Document for Correcting Common VOC & Other Rule Deficiencies,” (a.k.a., Little Bluebook), EPA Region 9, August 21, 2001.

1. Enforceability – To help ensure enforceability, the rule requirements and applicability are generally clear. However, some of the monitoring, recordkeeping, and reporting provisions are insufficient for ensuring that compliance can consistently be evaluated and determined.
2. SIP Revisions – We propose to determine that our approval of the submittal would comply with CAA §110(l) because the proposed SIP revision would not interfere with any CAA requirements, including requirements for RFP and attainment of the NAAQS. In addition, the emission limits in the submitted rule 9-4 are more stringent than the existing SIP-approved control requirements that they would replace and 9-6 is a new rule being introduced into the Bay Area portion of the SIP that would introduce additional NO<sub>x</sub> emissions regulations that were not previously included in the SIP.

## **RULE DEFICIENCIES**

Rule deficiencies pursuant to CAA section 110(a)(2)(A):

1. 9-4 section 201 contains an outdated reference to Title 10 of the Code of Federal Regulations. “Section 4.2.35 of the Code of Federal Regulations, Title 10, Part 430, Subpart B, Appendix N” is intended to define “Annual Fuel Utilization Efficiency (AFUE).” It is unclear what exactly is referenced since section 4.2.35 does not exist in the current CFR or the 1983 version of the CFR. Part 430 of Title 10 contains multiple definitions and equations for Annual Fuel Utilization. To address this deficiency, we recommend clarifying the definition and updating the reference since the definition of AFUE is used to calculate the emissions of NO<sub>x</sub>.
2. Rule 9-4 section 401 contains an outdated reference to “Section 3.1 of the Code of Federal Regulations, Title 10, Part 430, Subpart B, Appendix N.” This reference does not exist in the current Code of Federal Regulations and as a result, Rule 9-4 does not contain any test procedures to verify compliance. Rule 9-4 section 402.2 references South Coast Air Quality Management District (SCAQMD) Rule 1111 certification methods for compliance determination purposes. These certification methods have not been submitted for approval into the SIP and Rule 9-4 does not reference an EPA approved version of the rule. As a result, the certification methods in section 402.2 cannot be utilized to ensure enforceability under the CAA.
3. Rule 9-4 is not sufficiently enforceable because Section 402 does not require emissions test reports used for certifications to be reported to the Air Pollution Control Officer when certification takes place through the District. The rule also allows for the use of South Coast AQMD’s certification method, but that method already requires submittal of the test reports. Rule 9-6 also requires the test report to be submitted when using the District’s certification method.

4. Rule 9-4 Section 601.3 and 601.4 contain references to Method ST-5 and Method ST-14 from the Bay Area Manual of Procedures. These procedures and test methods have not previously been EPA-approved.
5. Rule 9-6 section 205 contains an outdated reference to “Section 6.1.3 of the Code of Federal Regulation, Title 10, Part 430, Subpart B, Appendix E.” Section 6.1.3 does not exist in the current version of the CFR.
6. Rule 9-6 is not enforceable because Section 402.2 references certification methods from SCAQMD Rule 1121 and 1146.2. These certification methods have not been approved into the California SIP and do not reference an EPA approved version of the rules. This does not ensure enforceability under CAA section 110(a)(2)(A).

### **COMMITMENTS TO RULE REVISIONS**

The BAAQMD has committed to revising rules 9-4 and 9-6. In a letter dated October 2, 2024, BAAQMD committed to addressing the deficiencies identified above and to transmit these rules to CARB no later than 11 months from the effective date of the EPA’s final action.

The District’s commitment letter contains an attachment with proposed text addressing the identified deficiencies. The updated text addresses the outdated CFR references, removes the references to BAAQMD Manual of Procedures test methods, specifies that any use of SCAQMD certifications must also demonstrate compliance with the requirements of the submitted BAAQMD rules, and requires that emission test results be included in the certification materials submitted to the APCO.

Section 110(k)(4) of the Clean Air Act allows the EPA to conditionally approve SIP revisions based on a commitment from the State to adopt and submit specific, enforceable measures to cure the identified deficiencies no later than 1 year after the date of approval of the plan revision. The commitment letter received from BAAQMD details revisions that are clear and enforceable, address the identified deficiencies, and fulfill the CAA requirements for a conditional approval.

**ADDITIONAL RECOMMENDATIONS FOR THE NEXT RULE REVISION** – The following revisions are not currently the basis for rule disapproval but are recommended for the next time the rule is amended.

1. Rule 9-6 defines “boilers and water heaters” in a single definition. Although it is clear from the definition, and the structure of the rule (which, in section 9-6-303, sets standards for natural gas-fired boilers and water heaters with a rated heat input capacity of 75,001 to 2,000,000 BTU/hour) that the rule regulates both water heaters and boilers, the rule title and section 9-6-102 mentions only water



heaters. We recommend that the District review the use of these terms in the rule to ensure clarity and consistency of use.

2. Rule 9-6, Section 211 and 212 contain identical definitions. We recommend differentiating the two definitions for clarity.
3. Rule 9-6, Section 401 contains the term “independent testing laboratory”. We recommend defining this term to establish criteria or provide further clarity.

#### **EPA ACTION**

For the reasons discussed in this TSD and pursuant to CAA Section 110(k)(4), we are proposing to conditionally approve the District’s submission of Rules 9-4 and 9-6 into the SIP.

#### **REFERENCES –**

1. “Issues Relating to VOC Regulation Cutpoints, Deficiencies, and Deviations,” (a.k.a., Bluebook) EPA OAQPS, May 25, 1988.
2. “Guidance Document for Correcting Common VOC & Other Rule Deficiencies,” (a.k.a., Little Bluebook), EPA Region 9, August 21, 2001.
3. Letter dated October 2, 2024, from Jennifer Lam, BAAQMD, Philip M. Fine, Air Pollution Control Officer, to Michael Benjamin, Chief of Air Quality Planning and Science Division, CARB, and Lisa Beckham, Manager, Control Measures Office, EPA Region IX, Subject: “BAAQMD Letter of Commitment for 9-4 and 9-6 SIP Amendments.”
4. Letter dated October 30, 2024, from Dr. Michael Benjamin, Chief of Air Quality Planning and Science Division, CARB, to Marth Guzman, Regional Administrator, EPA Region IX, Forwarding Commitment Letter from BAAQMD to revise rules 9-4 and 9-6.