

# SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT

## FINAL DRAFT STAFF REPORT

### Amendments to Rule 4905 (Natural Gas-fired, Fan-Type Central Furnaces)

March 20, 2018

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#### I. SUMMARY

In 2015, the District amended Rule 4905 to fulfill the commitments in the 2008 PM<sub>2.5</sub> Plan, 2012 PM<sub>2.5</sub> Plan, and 2013 Plan for the Revoked 1-Hour Ozone Standard to further reduce NO<sub>x</sub> emissions. The amendments included lowering the NO<sub>x</sub> emission limit to 14 nanograms of NO<sub>x</sub> per joule of heat output (ng/J) and allowing the sale of non-compliant units during the initial implementation period (36-months) in exchange for the payment of an emissions fee for each non-compliant unit sold.

These lower NO<sub>x</sub> limits were guided by the South Coast Air Quality Management District (SCAQMD) and the San Joaquin Valley Air Pollution Control District (District) co-funded technology assessment to evaluate the performance of ultra-low NO<sub>x</sub> furnace technologies.<sup>1</sup> The technology assessment resulted in the successful demonstration of several low-NO<sub>x</sub> furnace designs, which were expected to be commercially available by the compliance dates as established in the current Rule 4905. For those manufacturers that are not able to respond to increased demand for new compliant units by the compliance dates, the emissions fee option would allow them to continue selling units in the San Joaquin Valley (Valley).

The 36-month implementation periods allowing the use of emission fees in lieu of complying with the lower NO<sub>x</sub> limit are now coming to an end, with the first category expiring in April 2018. Although progress has been made with some product lines that are now commercially available and certified at the lower NO<sub>x</sub> levels, the full product line

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<sup>1</sup> SCAQMD. (2014, September 5). *Governing Board Agenda Item, September 5, 2014: Amend Rule 1111 – Reduction of NO<sub>x</sub> Emissions from Natural-gas-fired, Fan-type Central Furnaces*. Retrieved 9/9/14 from <http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2014/2014-sep5-032.pdf?sfvrsn=2>.

availability is still limited, as manufacturers continue to develop, test, and certify additional product lines. Multiple manufacturers and distributors have contacted both the District and SCAQMD to express concern regarding the commercial availability of compliant units by the given timeframe. Currently, manufacturers are still using the fee option for the majority of the condensing, non-condensing, and weatherized units in their product line.

Due to the limited number of certified compliant units that will be available by the deadline dates, the purpose of this rule amendment is to extend the implementation period to allow the use of emissions fees in lieu of complying with the 14 ng/J limit. The proposed amendment would allow an additional period of time necessary to continue technology development and certification process while providing strong incentive for accelerated deployment of compliant units.

Due to the lack of certified compliant units, SCAQMD also amended their furnace rule (Rule 1111 - NO<sub>x</sub> Emissions from Natural Gas-fired, Fan type Central Furnaces) on March 2, 2018 to extend the fee option period and provide an exemption for natural gas units with propane kits. The proposed amendments are analogous to SCAQMD's Rule 1111 and will provide for regulatory consistency in California.

## **II. BACKGROUND**

### **A. Source Category**

Rule 4905 is a point-of-sale rule that applies to any person who supplies, sells, offers for sale, installs, or solicits the installation of natural-gas-fired, fan-type residential central furnaces with a rated heat input capacity of less than 175,000 Btu/hr and a rated cooling capacity of less than 65,000 Btu/hr for combination heating and cooling units. Affected parties include furnace manufacturers, residential heating wholesalers, supply stores, contractors and end-users. The point-of-sale approach has allowed the District to achieve NO<sub>x</sub> reductions without placing an undue financial burden on the residents, operators and businesses that sell these units in the Valley.

The most common residential and commercial heat sources are boilers and furnaces; other heating options include heat pumps, active solar heating, electric heating, wood or pellet stoves, portable and direct vent wall heaters, and fireplaces.<sup>2</sup> Heat distribution systems are either central heating, meaning heat is generated in a central location and distributed throughout the building, or point-of-use or space heating, meaning supplemental heat is provided to a specific room. Types of central heating systems include forced air, steam radiant, radiant, hot water baseboards, and electric baseboards. Types of space heaters include wood or pellet stoves, portable and direct

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<sup>2</sup> Department of Energy. (2013, December 16). *Energy Saver 101: Everything You Need to Know About Home Heating*. Retrieved 12/17/13 from <http://energy.gov/articles/energy-saver-101-infographic-home-heating>.

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vent wall heaters, and fireplaces. Fuel types include natural gas, propane, heating oil, electricity, and solid fuels such as wood or pellets.

All heating systems have three basic components: a heat source, a heat distribution system, and a control system. The control system is usually a programmable thermostat. The heat source, which generally determines the type of distribution system used, is selected based on many factors. The most important factor is geographical location, which determines the climate and types of available fuel. Most commercial and residential buildings in the Valley have access to natural gas, which is typically the cheapest and most convenient fuel source in areas where it is available.

Rule 4905 applies to furnaces fueled by natural gas that use forced air distribution, the most common type of heating system for residential and commercial buildings. Central furnaces are controlled by a thermostat, which sends signals to turn the device on or off when the building temperature does not match a chosen set point. A valve then opens to send natural gas to the burners, which combust the gas directly into the heat exchangers. A blower pulls air from outside the building through a filter, across the heat exchanger, and through a series of ducts and vents to different areas of the building. Exhaust from the combustion exits the building through a separate duct. Condensing units use an additional heat exchanger to extract the latent heat in the flue (exhaust) gas by cooling the combustion gasses to near ambient temperature and thereby increase the heating efficiency by up to 10%. The water vapor in the flue gas is condensed, collected, and drained.

Units installed in manufactured homes utilize the same types of materials and operating principles as commercial and residential units; however, significant differences exist. Furnaces installed in manufactured homes use sealed combustion, meaning all of the combustion air is taken from outside the building. These units also pre-heat the air, typically to 50-60°F, using a concentric vent where the combustion air is drawn in through the outer ring, while exhaust gases are vented through the inside core of the vent pipe. The air is pre-heated because the cold outside air does not mix well with the fuel, while pre-heated air blends well and allows for quieter ignition and combustion.

## **B. Current Rule 4905**

Rule 4905 was most recently amended in 2015 to satisfy commitments in District attainment plans and reduce NO<sub>x</sub> emission rates for new units sold in the Valley. Current District Rule 4905 limits NO<sub>x</sub> emissions from natural gas-fired, fan-type central furnaces with rated heat inputs less than 175,000 Btu/hr and for combination heating and cooling units rated at a cooling capacity less than 65,000 Btu/hr. Unit types include condensing furnaces, non-condensing furnaces, weatherized furnaces, and furnaces installed in manufactured homes.

The rule requires units comply with a 14 ng/J NO<sub>x</sub> emission limit, and requires units be certified through the District's certification program, the SCAQMD certification process

for SCAQMD Rule 1111, or another emission certification program approved by the United States Environmental Protection Agency (EPA) and District's Air Pollution Control Officer (APCO). Manufacturers are also required to display the model number of the unit on the shipping container and rating plate. If requested by the APCO, each manufacturer must submit a statement confirming the unit is in compliance, including a source test report verifying compliance with the emission limit.

Manufacturers are allowed to sell non-compliant units during the initial implementation period of 36-months after the compliance date specified in the rule, in exchange for the payment of an emissions fee for each non-compliant unit sold. The 36-month implementation periods allowing the use of emission fees in lieu of complying with the lower NOx limit are now coming to an end, with the first category expiring in April 2018.

### **C. South Coast AQMD Rule 1111**

SCAQMD amended Rule 1111 (Reduction of NOx Emissions from Natural-Gas-Fired, Fan-type Central Furnaces) in November 2009 to lower the NOx emission limit for applicable units from 40 ng/J to 14 ng/J.<sup>3</sup>

In 2009, because no compliant units for the new lower NOx limit were commercially available, SCAQMD and the District co-funded a technology assessment to evaluate the performance of ultra-low NOx furnace technologies.<sup>4</sup> The technology assessment resulted in the successful demonstration of several low-NOx furnace designs, which were expected to be commercially available by the compliance dates. For those manufacturers that were not able to respond to increased demand for new units by the compliance dates, the emissions fee option allowed them the option to continue selling units.

SCAQMD amended Rule 1111 again in September 2014 to extend the compliance date for condensing furnaces and add an emissions fee option due to lack of commercially available compliant units.<sup>5</sup> The alternate compliance option allowed manufacturers to pay a per unit fee in lieu of meeting the 14 ng/J NOx limit.

At the request of furnace manufacturers, on March 2, 2018, SCAQMD amended Rule 1111 to extend the fee period by up to 1.5 years and increase the fee amounts.

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<sup>3</sup> SCAQMD. (2009, November 6). *Final Staff Report with Socioeconomic Impact Assessment*. Retrieved 9/16/14 from <http://www3.aqmd.gov/hb/2009/November/091130a.htm>.

<sup>4</sup> SCAQMD. (2014, September 5). *Governing Board Agenda Item, September 5, 2014: Amend Rule 1111 – Reduction of NOx Emissions from Natural-gas-fired, Fan-type Central Furnaces*. Retrieved 9/9/14 from <http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2014/2014-sep5-032.pdf?sfvrsn=2>.

<sup>5</sup> SCAQMD. (2014, September 5). *Governing Board Agenda Item, September 5, 2014: Amend Rule 1111 – Reduction of NOx Emissions from Natural-gas-fired, Fan-type Central Furnaces*. Retrieved 9/9/14 from <http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2014/2014-sep5-032.pdf?sfvrsn=2>.

**D. Control Technology**

At this time, the District has confirmed at least three furnace manufacturers who sell units in the Valley will have compliant units by the end of the current fee period. Lennox/Allied air, Goodman, and Rheem have developed and certified compliant SKUs satisfying the 14 ng/J NOx emission limit. Based on input received from furnace manufacturers, additional models that will comply with Rule 4905 are currently under development and commercialization, with certification forthcoming in the near future.

- On September 19, 2017, Lennox’s four base Models SL280UH060NV36A-, SL280UH080NV48B-, SL280UH080NV60C-, and SL280UH100NV60C- were certified by SCAQMD. These are certified non-condensing furnaces with maximum input rates of 60,000, 80,000, and 100,000 btu/hr. According to SCAQMD on December 4, 2017, Lennox launched their line of certified compliant products and made them commercially available for sale. Lennox clarified at the March 8, 2018 public workshop that they now have South Coast AQMD certifications for 14 ng/J compliant furnaces for 8 SKUs in the noncondensing furnace category and 16 SKUs in the condensing furnace category.
- On August 15, 2017, Goodman’s natural gas fired furnace base Models GMES960403BU\*\*, GMES960603BU\*\*, and GMES960805CU\*\* were issued NOx certifications by SCAQMD. The certified furnace models cover condensing furnaces with maximum input rates of 40,000, 60,000, and 80,000 btu/hr.
- On September 20, 2016, Rheem’s natural gas fired furnace Model \*801TA070317UUA was certified by the SCAQMD. This unit is a non-condensing furnace with a maximum input rate about 70,000 btu/hr.

**III. PROPOSED AMENDMENTS TO RULE 4905**

**Exemptions (Section 4.0)**

*Section 4.1 – Furnaces to be installed with a propane conversion kit for propane firing only*

The manufacturer of any natural gas furnace that is not certified to meet 14 ng/J of NO<sub>x</sub> emissions and is to be installed with a propane conversion kit for propane firing only in the Valley is exempt provided the unit does not emit more than 40 ng/J NO<sub>x</sub> and all other requirements in Section 4.1 are met.

Some manufacturers and distributors sell 40 ng/J natural gas fired furnaces with propane conversion kits in the Valley to Valley residents who do not have access to natural gas. The manufacturers comply with Rule 4905 requirements by paying the current applicable fee for a 40 ng/J limit. However, this fee option will end pursuant to schedules in Rule 4905.

Additionally, consistent with amendments adopted by South Coast AQMD to address potential feasibility and cost issues associated with propane fired units, the District is adding an exemption allowing the sale or installation of a natural gas-fired furnace meeting a 40 ng/J NO<sub>x</sub> emission with a propane conversion kit provided the shipping carton or the name plate of the furnace clearly displays: “This furnace is to be installed for propane firing only. Operating in natural gas mode is in violation of District Rule 4905,” and additional documents and information shall be provided to the APCO as specified in Section 4.1 of Rule 4905.

**Requirements (Section 5.0)**

Section 5.0 would be amended to remove redundant and expired language to improve clarity of rule requirements.

*Section 5.3 – Emissions Fee Option*

As discussed above, manufacturers have yet to develop, certify, and mass produce sufficient numbers of compliant units to meet Valley consumer demands. In response to the lack of compliant units available, the District recommends amending Rule 4905 to expand the emissions fee option period with an increased fee to allow an additional period of time necessary to continue technology development and certification while providing strong incentive for accelerated deployment of compliant units. To ensure regulatory consistency in California and ensure continued incentive for the deployment of compliant units, the fees and timelines for each furnace category below are identical to South Coast AQMD’s latest rule.

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Table 3 Emissions Fee Option						
Size Range (Btu/hr)	Furnace Category	Phase One		Phase Two		
		Fee Start Date	Fee Amount (\$/unit)	Fee Start Date	Fee Amount (\$/unit)	Fee End Date
≤ 60,000	All non-weatherized condensing units except those installed in manufactured homes	April 1, 2018	\$275	October 1, 2018	\$350	September 30, 2019
	All non-weatherized, non-condensing units except those installed in manufactured homes	October 1, 2018	\$225	April 1, 2019	\$300	September 30, 2019
	Weatherized units	October 1, 2018	\$225	April 1, 2019	\$300	September 30, 2020
	Units installed in manufactured homes (for certified 40 ng/J units)	October 1, 2018	\$150	April 1, 2019	\$150	September 30, 2021
> 60,000 and ≤ 90,000	All non-weatherized condensing units except those installed in manufactured homes	April 1, 2018	\$300	October 1, 2018	\$400	September 30, 2019
	All non-weatherized, non-condensing units except those installed in manufactured homes	October 1, 2018	\$250	April 1, 2019	\$350	September 30, 2019
	Weatherized units	October 1, 2018	\$250	April 1, 2019	\$350	September 30, 2020
	Units installed in manufactured homes (for certified 40 ng/J units)	October 1, 2018	\$150	April 1, 2019	\$150	September 30, 2021
> 90,000	All non-weatherized condensing units except those installed in manufactured homes	April 1, 2018	\$325	October 1, 2018	\$450	September 30, 2019
	All non-weatherized, non-condensing units except those installed in manufactured homes	October 1, 2018	\$275	April 1, 2019	\$400	September 30, 2019

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	Weatherized units	October 1, 2018	\$275	April 1, 2019	\$400	September 30, 2020
	Units installed in manufactured homes (for certified 40 ng/J units)	October 1, 2018	\$150	April 1, 2019	\$150	September 30, 2021

## *Section 5.4 – Furnaces encumbered in a contractual agreement*

A provision has been added to allow the sale of furnaces that have been encumbered in a contractual agreement, signed prior to January 1, 2018 by a furnace manufacturer or distributor for future or planned construction, in the Valley at the previous emission fee rate of \$290 for each condensing furnace and \$225 for each non-condensing furnace distributed or sold in the Valley. This will ensure that businesses that have already committed to specific pricing are not impacted by the emission fee changes.

## **Administrative Requirements (Section 6.0)**

New sections 6.3.2 and 6.3.3 have been added to require additional recordkeeping to ensure enforcement of the rule as follows:

- *Any manufacturer, distributor, or contractor who supplies, distributes, sells, or offers for sale a fan-type central furnace shall maintain the records of the model number, serial number, and purchaser for a period of five years and make it available to the APCO upon request.*
- *Any distributor or contractor who installs a fan-type central furnace shall maintain the records of the model number, serial number, purchaser, and zip code of installation for a period of five years and make it available to the APCO upon request.*

In addition, labeling requirements have been added to ensure that non-compliant units are properly labeled and the public is well informed as follows:

- *Any furnace manufactured after October 1, 2018, using the emissions fee option shall have a label with APCO-approved language on the furnace and the shipping container that clearly displays that the unit(s) do not comply with the NOx limits in Table 1 of this rule.*



**IV. ANALYSES**

**A. Emission Reduction Analysis**

The 2015 amendments to Rule 4905 lowered the NO<sub>x</sub> emission limit for residential units and added NO<sub>x</sub> emission limits for units installed in commercial buildings (commercial units) and units installed in manufactured homes. Because Rule 4905 is a point-of-sale rule, the emissions reduced from the 2015 amendments of 2.10 tons per day are achieved gradually as older units are replaced over the 20 year turnover period. Annual NO<sub>x</sub> emission reductions were determined to be 0.105 tpd.

The 2018 amendments provides additional time necessary to continue technology development and the certification process while providing strong incentive for accelerated deployment of compliant units. As such, the amendment will not result in any emission increases.

**B. Cost Effectiveness Analysis**

The proposed amendments do not impose additional requirements on manufacturers of compliant furnaces. While a fee increase is recommended, it is only for manufacturers of non-compliant units through the emission fee option. Therefore, a cost effectiveness analysis is not required.

**C. Socioeconomic Analysis**

Pursuant to California Health and Safety Code (CH&SC) Section 40728.5, the District conducts a socioeconomic analysis of a proposed rule or rule amendment that will significantly affect air quality or emission limitations prior to rule adoption. A socioeconomic analysis examines how a rule project may impact industries, businesses, employment rates, and the economy in the Valley. Draft amendments would extend the emission fee option by up to 1.5 years, with no significant impact on air quality or emissions limits. In addition, the higher initial capital cost of compliant units are offset by the energy cost savings these newer and more efficient units will provide throughout the life of the unit. A socioeconomic analysis is not required for this rule amendment project.

**D. Rule Consistency Analysis**

Pursuant to CH&SC §40727.2, prior to adopting, amending, or repealing a rule or regulation, the District is required to perform a written analysis that identifies and compares the air pollution control elements of the rule or regulation with corresponding elements of existing or proposed District and EPA rules, regulations, and guidelines that apply to the same source category. The elements analyzed are emission standards, monitoring and testing requirements, and recordkeeping and reporting requirements.

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Based on the following analysis, District staff found that the draft amendments to Rule 4905 would not conflict with any District or federal rules, regulations, or policies covering similar stationary sources.

## *District Rules*

There is no other District prohibitory rule or regulation tailored specifically for natural gas-fired, fan-type central furnaces. Sources could be subject to other District rules including:

- Rule 1020 Definitions
- Rule 1140 Applicability of Emissions Limits
- Rule 4301 Fuel Burning Equipment
- Rule 6150 Enforcement

The requirements of the rules listed above are not in conflict with, nor are they inconsistent with the requirements of Draft Rule 4905.

## *Federal Rules, Regulations, and Policies*

There are no applicable Control Technique Guidelines (CTG), Alternative Control Techniques (ACT), New Source Performance Standards (NSPS), National Emission Standards for Hazardous Air Pollutants (NESHAP), Best Available Control Technology (BACT), or Maximum Achievable Control Technology (MACT) guidelines for natural gas-fired, fan-type central furnaces with a rated heat input capacity less than 175,000 Btu/hr or, for combination heating and cooling units, a rated cooling capacity less than 65,000 Btu/hr.

EPA Policy on Recordkeeping: EPA has a policy that mandates stationary sources keep and maintain records for at least five years; however, as a point-of-sale rule, natural gas-fired, fan-type commercial and residential central furnaces of this size are not permitted sources and are thus not required to follow specific recordkeeping guidelines. Therefore, units subject to Rule 4905 are not subject to EPA's Policy on Recordkeeping.

## **E. Environmental Impact Analysis**

California Environmental Quality Act (CEQA) Guidelines §15308 (Actions by Regulatory Agencies for Protection of the Environment), provides a categorical exemption for "actions taken by regulatory agencies, as authorized by state or local ordinance, to assure the maintenance, restoration, enhancement, or protection of the environment where the regulatory process involves procedures for protection of the environment. Construction activities and relaxation of standards allowing environmental degradation are not included in this exemption."

The amendments to District Rule 4905 is an action taken by a regulatory agency, the San Joaquin Valley Air District, as authorized by state law to assure the maintenance, restoration, enhancement, or protection of air quality in the San Joaquin Valley where the regulatory process involves procedures for protection of air quality. No construction activities or relaxation of standards are included in this project. Therefore, the rule amendment project is exempt from CEQA.

In addition, according to Section 15061-(b)(3) of the CEQA Guidelines, a project is exempt from CEQA if, “(t)he activity is covered by the general rule that CEQA applies only to projects which have the potential for causing a significant effect on the environment. Where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA.”

The amendments proposed to District Rule 4905 extends the existing emissions fee option to allow equipment manufacturers additional time to bring sufficient units to the marketplace and include additional administrative requirements to ensure enforcement of the regulation. There are no other actions or rule requirements associated with this project. Based on the District’s investigation and lack of evidence to the contrary, the District has concluded that the project will not have any significant adverse effects on the environment. As such, the District finds that the rule amendment project is exempt from CEQA.

## **V. RULE DEVELOPMENT PROCESS**

### **A. Public Workshop for Rule 4905**

The District hosted a public workshop to present draft amendments and receive public comments on March 8, 2018, followed by a public comment period ending at 5:00 PM on March 18, 2018. All significant comments received before the comment period deadline have been reviewed and incorporated into the proposed rule and staff report.

### **B. Public Hearing for Rule 4905**

In accordance with CH&SC Section (§) 40725, the proposed amendments to Rule 4905 and the final draft staff report will be publicly notice and made available prior to the April 19, 2018 Governing Board public hearing to consider adoption of the proposed rule amendments. The public is encouraged to provide comments to the District Governing Board members during the public hearing.