

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Draft Staff Report Proposed Amended Rule 1111 – Reduction of NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Rule 1111 reduces emissions of nitrogen oxides (NO_x) from residential and commercial gas-fired fan-type space heating furnaces with a rated heat input capacity of less than 175,000 BTU per hour or, for combination heating and cooling units, a cooling rate of less than 65,000 BTU per hour. The rule applies to manufacturers, distributors, and installers of such furnaces.

The furnaces are categorized into four types by Rule 1111: 1) Non-condensing (standard); 2) Condensing (high efficiency); 3) Weatherized (e.g., outdoor); and 4) Mobile home furnaces. The compliance dates to meet the emission limit are different depending on the furnace type. The furnaces for installation at the high elevation regions can be any type but are most commonly non-condensing and condensing furnaces.

Rule 1111 was adopted by the South Coast AQMD Governing Board in December 1978 and amended in 1983, 2009, 2014, 2018, 2019, and 2020. The significant changes included:

- The 2009 amendment lowering the NO_x emissions from 40 to 14 nanograms per Joule (ng/J);
- The 2014 amendment providing an alternate compliance option that allows the manufacturer to pay a per-unit mitigation fee, in lieu of meeting the new lower NO_x emission limit, for up to 36 months past the applicable compliance date;
- The March 2018 amendment extending the mitigation fee alternate compliance option and increasing the mitigation fee;
- The December 2019 amendment providing a temporary exemption from the 14 ng/J emission limit for condensing and non-condensing furnace installations at elevations greater than or equal to 4,200 feet above sea level (high-altitude installation); and
- The September 2020 amendment extending both the high-altitude installation exemption and weatherized furnace mitigation fee option to September 30, 2021

The mitigation fee alternate compliance option for condensing and non-condensing furnaces for installation at elevations below 4,200 feet ended on September 30, 2019; thus, all condensing and non-condensing furnaces installed below 4,200 feet have been required to comply with the 14 ng/J NO_x limit after that date. Similarly, the mitigation fee alternate compliance option for all other furnaces regulated under this rule will end on September 30, 2021; therefore, all weatherized furnaces, mobile home furnaces, and high-altitude installations will be required to comply with the 14 ng/J NO_x emission limit after that date.

Weatherized furnaces are developed for both residential and commercial applications. All seven manufacturers expect to meet the October 1, 2021 final compliance date for residential applications, and only one manufacturer projects a potential two-month delay for commercial applications. Staff is working with this manufacturer to identify a potential compliance option.

Mobile home furnaces are designed specifically and solely for installation to heat mobile homes (also known as manufactured homes). New manufactured home gas furnaces must be approved by the U.S. Department of Housing and Urban Development (HUD). Manufacturers are required to develop propane kits for compliant split systems to meet HUD requirement for propane compatibility. The manufacturers are also required to meet the Department of Energy standards energy efficiency standards by January 1, 2023. Currently none of the manufacturers have made any progress on the development of mobile home furnaces. Manufacturers suggested that more

time is needed for the development. Consequently, Proposed Amended Rule 1111 would extend mitigation fee alternate compliance option, and therefore the final compliance date, for mobile home furnaces to October 1, 2023. Manufacturers would continue to be subject to the mitigation fee, recordkeeping, and reporting requirements.

With regards to high-altitude furnace installations, all manufacturers have made progress in testing and providing condensing and non-condensing furnaces for high-altitude installations. Four manufacturers expect to have compliant furnaces available by October 1, 2021, for elevations up to 7,500-7,800 feet, three of which expect to have all their certified compliant units capable for high-altitude use with or without modification kits.

A concern was raised regarding niche products such as downflow configurations and large-sized ($\geq 100,000$ btu/hr) models. There are no compliant downflow models for altitudes higher than 5,400 feet. While two manufacturers expect to provide models with 100,000 btu/hr heat input capacity, there will be no models with higher heat input capacity for elevations up to 7,500-7,800 feet. A suggestion was made that staff should consider exempting all furnaces in high-altitude areas if the emission reductions are minor. The emission reductions forgone would be permanent and accumulate over time if providing a broad high-altitude installation exemption. With 0.001 tons per day emission reductions forgone adding up each year, staff estimates up to 0.03 tons per day in 30 years. On the other hand, manufacturers with compliant products for high-altitude installations oppose a broad exemption. Manufacturers have invested time, money, and resources in high-altitude testing. All manufacturers have made progress and have developed a variety of products at different elevations; and as with new technology, more models and product lines become available over time. A broad exemption for the high-altitude community would raise concerns of equity among manufacturers and would disadvantage those manufacturers who have worked to develop compliant products for the high-altitude areas. On this basis, Proposed Amended Rule 1111 expects to address the concern by providing a niche exemption for high-altitude downflow and large-sized models. This exemption is for replacement units only, as alternative options (e.g., heat pump and twinning furnaces¹) are feasible for new constructions. Proposed Amended Rule 1111 will also allow furnaces certified at 40 ng/J to be installed in high-altitude areas beyond the October 1, 2021 compliance date for a limited time to ensure that adequate compliant products would be commercially available for installers. Staff does not recommend permanently exempting all furnaces for high-altitude areas.

In summary, Proposed Amended Rule 1111 (PAR 1111) would: (1) extend the mobile home furnace mitigation fee end date by two years until September 30, 2023; (2) extend the high-altitude exemption by three months, allowing furnaces certified at 40 ng/J to be installed in high-altitude areas until December 31, 2021; and (3) provide an exemption for replacement downflow and large-sized ($\geq 100,000$ btu/hr) condensing or non-condensing furnaces in high-altitude areas. Staff will continue to meet with manufacturers, distributors, and installers to resolve any remaining issues.

¹ Twinning means using a twinning kit to pair two furnaces to achieve larger space heating capacity

CHAPTER 1: BACKGROUND

INTRODUCTION
REGULATORY HISTORY
EQUIPMENT AND PROCESS
REQUIREMENT AND TESTS FOR NEW TECHNOLOGY
AFFECTED INDUSTRIES
PRODUCT AVAILABILITY
PUBLIC PROCESS

INTRODUCTION

The purpose of Rule 1111 – Reduction of NO_x Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces is to reduce NO_x emissions from residential and commercial gas-fired fan-type space heating furnaces with a rated heat input capacity of less than 175,000 BTU per hour or, for combination heating and cooling units, a cooling rate of less than 65,000 BTU per hour. The rule applies to manufacturers, distributors, and installers of such furnaces. It requires manufacturers to certify that each furnace model offered for sale in the South Coast AQMD complies with the emission limit using the test methods approved by the South Coast AQMD and U.S. EPA. In lieu of meeting the lower emission limit, Rule 1111 has provided manufacturers an alternate compliance option of paying a per-unit mitigation fee for up to 4 to 5 years past the applicable compliance date, depending on the furnace type, which includes non-condensing, condensing, weatherized, and mobile home furnaces. Most single-family homes, many multi-unit residences, and some light commercial building in the South Coast AQMD use this type of space heating equipment.

REGULATORY HISTORY

Rule 1111 was adopted by the South Coast AQMD Governing Board in December 1978. The original rule required residential and commercial space heating furnaces to meet a NO_x emission limit of 40 nanograms per Joule (ng/J) of heat output (equivalent to 61 ppm at a reference level of 3% oxygen and 80% Annual Fuel Utilization Efficiency (AFUE)) beginning January 1, 1984.

New Lower NO_x Emission Limit of 14 ng/J Established

In November 2009, Rule 1111 was amended to implement the 2007 Air Quality Management Plan (AQMP) Control Measure CMB-03. The 2009 amendment established a new lower NO_x emission limit of 14 ng/J (equivalent to 22 ppm at a reference level of 3% oxygen and 80% AFUE), and required the three major categories of residential furnaces – condensing (high efficiency), non-condensing (standard), and weatherized furnaces to meet the new limit by October 1, 2014, October 1, 2015, and October 1, 2016, respectively. Furthermore, new mobile home heating units, which were unregulated prior to the 2009 amendment, were required to meet a NO_x limit of 40 ng/J by October 1, 2012 and 14 ng/J by October 1, 2018. To facilitate the depletion of existing inventories and to ensure a smooth transition to the new limits, Rule 1111 also provided a temporary 10-month exemption (a sell-through period) for units manufactured and delivered into the South Coast Air Basin prior to the compliance date.

Mitigation Fee to Delay Compliance of 14 ng/J Furnaces

Rule 1111 was later amended in September 2014 to delay the compliance date for condensing furnaces and to provide an alternate compliance option. The alternate compliance option allowed OEMs to pay a per unit mitigation fee of \$200 for each condensing furnace and \$150 for each other type of furnace distributed or sold in South Coast AQMD, in lieu of meeting the 14 ng/J NO_x emission limit. The mitigation fee end date was based on the furnace type which phased in the NO_x limit of 14 ng/J over the period from April 1, 2018, to October 1, 2021.

Extension and Increase of the Mitigation Fee

Based on the lack of 14 ng/J furnaces that were commercialized in early 2018, Rule 1111 was amended in March 2018 to increase the mitigation fee in two phases to a range of \$300 to \$450, depending on the furnace type and heat input capacity, and extend the mitigation fee compliance option by 1.5 years for condensing furnaces, and one year for non-condensing and weatherized

furnaces. Rule 1111 was also amended to provide an exemption from the mitigation fee increase for units encumbered in a contractual agreement by OEMs and distributors for new construction, if contracts were signed prior to January 1, 2018, and included provisions to address propane conversion kits for propane firing only furnaces.

Clean Air Furnace Rebate Program

In March 2018, a rebate program for consumers who purchase and install compliant 14 ng/J furnaces in the South Coast AQMD was initiated. The purpose of the rebate program was to help commercialize and incentivize consumers to purchase 14 ng/J furnaces. On May 4, 2018, the South Coast AQMD executed the contract with Electric & Gas Industries Association (EGIA) to administer the Clean Air Furnace Rebate Program. On June 28, 2018, the rebate website was launched (www.cleanairfurnacerebate.com). The South Coast AQMD Governing Board initially approved funding of \$3,000,000 for the furnace rebate program, specifying a \$500 rebate for each compliant furnace. In September 2020, the Board approved additional funding of \$3.5 million, modifying the program to specify a \$500 rebate for up to 600 compliant weatherized furnaces, a \$500 rebate for up to 200 high-altitude compliant condensing or non-condensing furnace installations, and a \$1500 rebate for each all-electric heat pump for central ducted space heating. Rebates for weatherized and high-altitude condensing non-condensing furnaces will end on September 30, 2021, when any remaining funds for those categories will be reallocated for all-electric heat pump systems. Rebates for all-electric heat pump systems will conclude once rebate funds are exhausted. The 25% set aside for disadvantaged communities can only be redeemed for units installed in those geographic locations.

High-altitude Furnaces Temporary Exemption and Extension

Rule 1111 was amended in December 2019 to include a temporary exemption from the 14 ng/J NOx emission limit that applies to manufacturers, distributors, and installers of condensing and non-condensing natural gas furnaces, for furnaces installed at elevations greater than or equal to 4,200 feet above sea level until September 30, 2020. During this interim exemption period, condensing and non-condensing furnaces installed in high-altitude areas were still required to meet the 40 ng/J NOx emission limit. Rule 1111 was again amended in September 2020 to extend this exemption for one year, until September 30, 2021.

Further Extension of the Mitigation Fee Option for Weatherized Furnaces

The September 2020 Rule 1111 amendment also extended the mitigation fee compliance option by one year for weatherized furnaces, until September 30, 2021. As for high-altitude furnaces, the extension was to address the adverse impact of the COVID-19 pandemic on their development and commercialization.

EQUIPMENT AND PROCESS

Fan-type gas-fired furnaces heat a building by circulating air from inside the building (office, home, apartment, etc.) through the furnace. In a fan-type furnace, air is heated when it passes through a heat exchanger. Combustion gases heat up the inside of the heat exchanger, and air from the building that is moving past the outside of the heat exchanger removes heat from the outside surface. A blower (fan) pulls air through one or more intake ducts and pushes the air past the heat exchanger and through another set of ducts, which direct the heated air to different parts of the building. The heated air circulates through the building before it is again pulled into the intake ducts and re-heated. This process continues until a specific temperature is detected by a thermostat in the building, which then shuts off the furnace. When the temperature at the thermostat goes below a set point, the thermostat sends a signal for the furnace to turn on.

Rule 1111 categorizes furnaces into four types: non-condensing, condensing, weatherized, and mobile home furnaces. Condensing furnaces, also called high-efficiency furnaces, utilize a second heat exchanger to recover the latent heat in the flue gas, achieving 90 to 98 percent fuel efficiency. Non-condensing furnaces only use one heat exchanger, with a typical fuel efficiency of about 80 percent. Weatherized furnaces are designed for installation outside of a building, equipped with a protective jacket and integral venting, and labeled for outdoor installation. A weatherized furnace is often referenced as package units by the heating, ventilation, and air conditioning (HVAC) industry as the furnace is packaged with an air conditioning condensing unit. A mobile home furnace means a furnace designed specifically and solely for installation to heat a mobile home.

REQUIREMENTS AND TESTS FOR NEW TECHNOLOGY

Gas furnaces in the United States must meet the ANSI Z21.47/CSA 2.3 standard referred as CSA certification, mainly to ensure safety. To be sold and installed in the South Coast AQMD's jurisdiction, they must also be certified by the South Coast AQMD for Rule 1111 NO_x emission limit compliance by specific test methods approved by the South Coast AQMD and U.S. EPA. OEMs could also be subject to other regulations, such as ANSI/ASHRAE/IES 90.1-2013, Energy Standard for Buildings Except Low-Rise Residential building required by the U.S. Department of Energy (DOE), and AHRI certification program for verification test of output heating capacity and annual fuel utilization efficiency. For furnace installation, manufacturers provide extensive training programs and instruction material for the contractors and installers.

AFFECTED INDUSTRIES

Proposed Amended Rule 1111 affects manufacturers (NAICS 333), distributors and wholesalers (NAICS 423), and retailers and dealers (NAICS 444) of residential furnaces. Because heating units regulated by the rule are used in most residential and many commercial settings for heating small buildings, construction and building contractors and installers (NAICS 238 and 811) related to residential furnaces are also affected by PAR 1111. The Air Conditioning Heating and Refrigeration Institute (AHRI), the major manufacturer's trade organization, indicates that there are no manufacturers of fan-type gas-fired residential furnaces in the South Coast AQMD. However, these companies do maintain regional sales offices and distribution centers in the South Coast AQMD and there are manufacturers of other types of heating furnaces in the South Coast AQMD.

PRODUCT AVAILABILITY

As part of the implementation status monitoring, staff has been regularly reaching out to manufacturers for their progress on developing and commercializing compliant weatherized furnaces, mobile home furnaces, and furnaces for installation at high-altitude areas.

Availability of Weatherized Furnaces

For weatherized furnaces, all seven manufacturers expect to meet the October 1, 2021 compliance date for residential applications, and only one manufacturer projects a potential two-month delay for commercial applications. Staff is working with this manufacturer to identify potential compliance options. It is not recommended to extend the weatherized furnace compliance date for one manufacturer when all other manufacturers have compliant furnaces.

Availability of Mobile Home Furnaces

In the South Coast AQMD residential space heating market, about four percent are mobile home furnaces, currently supplied by four manufacturers. Mobile home furnaces are specifically and solely for installation to heat mobile homes (also known as manufactured homes). A mobile home furnace may be a split system in which the furnace and air conditioner are separated as indoor and outdoor units, respectively. It can also be a weatherized system in which the furnace and air conditioner are packaged and installed as one outdoor system.

New manufactured home gas furnaces must be approved by the U.S. Department of Housing and Urban Development (HUD). The manufacturers will need to develop propane kits for compliant split systems to meet HUD requirement for propane compatibility. The manufacturers will also need to meet the Department of Energy standards upcoming energy efficiency standards by January 1, 2023.

The mitigation fee period for mobile home furnaces ends on September 30, 2021, after which the 14 ng/J NO_x limit will be applicable. Currently none of the four mobile home manufacturers have made progress on the development of mobile home furnaces. Manufacturers may consider electric heating such as heat pumps, but also suggested that more time is needed for natural gas furnace development.

Furnace Availability for High-altitude Installations

The furnaces installed at high-altitudes (equal to or above 4,200 feet above sea level) are mostly non-condensing and condensing furnaces. For installations at high-altitude, minor modifications to the furnaces are needed to accommodate different air density and oxygen levels to ensure an optimal air/fuel ratio for burner combustion. The modification involves a high-altitude kit or a built-in manifold adjustment on the 14 ng/J furnace. The compliance date for high-altitude condensing and condensing furnaces has been delayed for two years through two rule amendments in 2019 and 2020. The end date for the mitigation fee alternate compliance option, and therefore the final compliance date for condensing and non-condensing furnaces installed at high-altitudes to meet the 14 ng/J NO_x limit, will be October 1, 2021.

All manufacturers have made progress in testing to provide condensing and non-condensing furnaces for high-altitude installations. By the October 1, 2021 final compliance date, four manufacturers expect to have compliant furnaces available for elevations up to 7,500-7,800 feet, three of which expect to have all their certified compliant units capable for high-altitude use with or without the need for high-altitude kits. Installers for high-altitude areas expressed the need of assurance that the aforementioned products would be available to installers by the compliance date.

Coverage of Niche Markets in High-altitudes

Stakeholders raised an issue as to niche market products, including downflow and large-size models ($\geq 100,000$ btu/hr). By the October 1, 2021 compliance date, there will be no downflow furnaces available for altitudes higher than 5,400 feet, and no manufacturers expect to have models with heat input capacity greater than 100,000 btu/hr available for elevations up to 7,500-7,800 feet. Only two manufacturers will provide models rated at 100,000 btu/hr. Both the markets for downflow and large-size models are very small in the South Coast AQMD. Therefore, their developments did not have as much priority by the manufacturers. Manufacturers have stated that they are not expecting to develop these models in the near future. Consequently, a special consideration is needed for downflow and large-sized furnaces. This consideration would be solely for replacement units for existing buildings. For new buildings, technologies such as heat pumps,

hybrid systems pairing a heat pump and furnace together, twinning kits to pair two furnaces for combined heating, and zoning design can be used as viable alternatives.

PUBLIC PROCESS

Staff has been holding ongoing individual meetings with the seven manufacturers to monitor the rule implementation status. The discussions at these meetings included rule implementation status for compliant 14 ng/J weatherized and mobile home furnaces, as well as compliance furnaces for high-altitude installations.

The implementation status and staff recommendation for the proposed amendment were discussed with the working groups on April 14, 2021 and June 3, 2021. Focused discussions on high-altitude installations were conducted on April 29, 2021 and June 9, 2021 with interested stakeholders. A Public Workshop was held on July 7, 2021.

CHAPTER 2: SUMMARY OF PROPOSED AMENDED RULE 1111

PROPOSED AMENDED RULE REQUIREMENTS

INTRODUCTION

Staff has been closely monitoring the progress of development and commercialization of compliant weatherized furnaces, mobile home furnaces, and furnaces for installation in high-altitude areas. Based on discussions with manufacturers, distributors, and installers, PAR 1111 will extend the compliance date for mobile home furnaces by two years, extend the temporary high-altitude exemption by three months, and provide an exemption for downflow and large-sized furnaces installed as replacement units in high-altitude areas.

PROPOSED AMENDED RULE REQUIREMENTS**Rule 1111 Definitions**

A new definition for “DOWNFLOW FURNACE” was added to Rule 1111 to provide an exemption for a specified category.

DOWNFLOW FURNACE means a condensing or non-condensing furnace installed in a configuration in which the furnace takes in cool air from the top, warms it, then releases the warm air through the ductwork below.

Rule 1111 Requirements**Extending the mitigation fee alternative compliance option for mobile home furnaces until September 30, 2023**

PAR 1111 proposes to extend the mitigation fee period for mobile home furnaces from September 30, 2021 to September 30, 2023 (see Table 2). This proposal does not change the requirements for the mitigation fee or the recordkeeping and reporting requirements.

Table 2 – Rule 1111 Table 2 – Alternate Compliance Plan with the Phase One and Phase Two Mitigation Fee Schedules

Furnace		Phase One Mitigation Fee		Phase Two Mitigation Fee		Phase Two Mitigation Fee Option End Date
Size Range	Furnace Category	Phase One Mitigation Fee Start Date	Phase One Mitigation Fee (\$/Unit)	Phase Two Mitigation Fee Start Date	Phase Two Mitigation Fee (\$/Unit)	
≤ 60,000 BTU/hr	Condensing	May 1, 2018	\$275	October 1, 2018	\$350	September 30, 2019
	Non-condensing	October 1, 2018	\$225	April 1, 2019	\$300	September 30, 2019
	Weatherized	October 1, 2018	\$225	April 1, 2019	\$300	September 30, 2021
	Mobile Home	October 1, 2018	\$150	April 1, 2019	\$150	September 30, <u>2021-2023</u>

Furnace		Phase One Mitigation Fee		Phase Two Mitigation Fee		Phase Two Mitigation Fee Option End Date
Size Range	Furnace Category	Phase One Mitigation Fee Start Date	Phase One Mitigation Fee (\$/Unit)	Phase Two Mitigation Fee Start Date	Phase Two Mitigation Fee (\$/Unit)	
> 60,000 Btu/hr and ≤ 90,000 BTU/hr	Condensing	May 1, 2018	\$300	October 1, 2018	\$400	September 30, 2019
	Non-condensing	October 1, 2018	\$250	April 1, 2019	\$350	September 30, 2019
	Weatherized	October 1, 2018	\$250	April 1, 2019	\$350	September 30, 2021
	Mobile Home	October 1, 2018	\$150	April 1, 2019	\$150	September 30, 2021 <u>2023</u>
> 90,000 BTU/hr	Condensing	May 1, 2018	\$325	October 1, 2018	\$450	September 30, 2019
	Non-condensing	October 1, 2018	\$275	April 1, 2019	\$400	September 30, 2019
	Weatherized	October 1, 2018	\$275	April 1, 2019	\$400	September 30, 2021
	Mobile Home	October 1, 2018	\$150	April 1, 2019	\$150	September 30, 2021 <u>2023</u>

Rule 1111 Exemptions

Extend the temporary high-altitude exemption by three months until December 31, 2021

PAR 1111 proposes to extend the temporary high-altitude exemption by three months as below. This is to allow furnaces certified at 40 ng/J to be installed in high-altitude areas on or before December 31, 2021. This additional three months would provide more certainty for compliant production distribution.

Condensing or non-condensing furnaces that are certified to meet the 40 ng/J NOx limit and are installed at or above 4,200 feet above sea level are exempt from paragraph (c)(4), if that unit is installed on or before December 31, 2021.

Providing an exemption for downflow and large-sized replacement furnaces in high-altitude areas

PAR 1111 proposes to incorporate an exemption at elevations greater than or equal to 4,200 feet, as listed below, for installing condensing and non-condensing furnaces replacing existing units either in a downflow configuration or with heat input capacity at or greater than 100,000 btu/hr. The recordkeeping requirements would be applicable for the exemption of both types of furnaces.

Effective January 1, 2022, downflow furnaces rated less than 175,000 BTU per hour in heat input capacity and condensing or non-condensing furnaces with rated heat input at or greater than 100,000 BTU per hour, either of which are installed at elevations at or above 4,200 feet above sea level as a replacement for an existing furnace are exempt from paragraph (c)(4), provided that:

- (A) *The downflow furnace is certified to meet the 40 ng/J NOx limit, is replacing an existing furnace, and the shipping carton or name plate of the furnace clearly displays: "This furnace must be installed only as a replacement in a downflow configuration at or above 4,200 feet above sea level in the South Coast AQMD. Installation of this furnace for new construction, in any other configuration, or at a lower elevation will be a violation of South Coast AQMD Rule 1111."; or*
- (B) *The condensing or non-condensing furnace rated at or greater than 100,000 BTU per hour in heat input capacity is certified to meet 40 ng/J NOx limit, is replacing an existing furnace, and the shipping carton or name plate of the furnace clearly displays: "This furnace must be installed only as a replacement at or above 4,200 feet above sea level in the South Coast AQMD. Installation of this furnace for new construction or at a lower elevation will be a violation of South Coast AQMD Rule 1111."*

CHAPTER 3: IMPACT ASSESSMENT

INTRODUCTION

EMISSION REDUCTIONS

COST EFFECTIVENESS

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) ANALYSIS

SOCIOECONOMIC IMPACT ASSESSMENT

**DRAFT FINDINGS UNDER CALIFORNIA HEALTH AND SAFETY CODE
SECTION 40727**

INCREMENTAL COST-EFFECTIVENESS

COMPARATIVE ANALYSIS

INTRODUCTION

Rule 1111 reduces emissions of nitrogen oxides (NO_x) from residential and commercial gas-fired fan-type space heating furnaces. This rule is applicable to manufacturers, distributors, and installers of those type of furnaces.

EMISSION REDUCTIONS

Based on the 2016 AQMP emission inventory for fuel consumption, the annual average NO_x emissions from residential heating using natural gas was 9.51 tons per day in 2012. Staff estimates that there are about four million residential type heating furnaces in the South Coast AQMD. Based on a furnace life of 25 years, a typical furnace emits 1.5 to 2.0 pounds of NO_x per year. The emission rate reduction from 40 ng/J to 14 ng/J results in more than one pound per year of NO_x emissions reductions for each furnace.

Total mobile home furnace annual sales are estimated at 6,000 units in the South Coast AQMD. A two-year delay in compliance would result in about 0.016 tons per day emission reduction delay for the next 25 years [calculated as: $(2 \times 6,000 \times 1.0)/(2,000 \times 365)$].

Staff tracked furnace sales to be approximately 50 units for high-altitude installations during the two-month period of October and November 2019. Based on this information, total annual high-altitude installation are estimated at 400 units. Downflow and large-sized ($\geq 100,000$ btu/hr) furnaces comprise a small portion of the total installation. Extending the exemption for all installations in high-altitude areas by three months, and permanently exempting high altitude replacement installations of downflow furnaces and large-sized furnaces would result in a negligible amount (near zero tons per day) of emission reductions forgone.

Consequently, the NO_x emissions reduction delay of 0.016 tons per day by this proposal is not significant. The proposed amendments do not result in any significant effect on air quality or significant changes to emissions reductions.

The overall NO_x emissions reductions remain unchanged. However, the final year (which was 2046 initially, based on a 25-year useful life expectancy) to achieve the overall emission reductions for this rule will now be 2048, as the proposed compliance date for mobile home furnace is delayed for two years.

COST-EFFECTIVENESS

A cost effectiveness analysis is not required for PAR 1111. The proposed amendment does not impose additional requirements on manufacturers of compliant residential furnaces meeting the 14 ng/J NO_x emission limit.

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) ANALYSIS

Pursuant to the California Environmental Quality Act (CEQA) and South Coast AQMD's certified regulatory program (Public Resources Code Section 21080.5, CEQA Guidelines Section 15251(l) and South Coast AQMD Rule 110), the South Coast AQMD, as lead agency, is reviewing the proposed project to determine if it will result in any potential adverse environmental impacts. Appropriate CEQA documentation will be prepared based on the analysis.

SOCIOECONOMIC IMPACT ASSESSMENT

The proposed amendments to Rule 1111 do not impose any additional requirements and will have no adverse socioeconomic impacts.

DRAFT FINDINGS UNDER CALIFORNIA HEALTH AND SAFETY CODE SECTION 40727

California Health and Safety Code Section 40727 requires that prior to adopting, amending, or repealing a rule or regulation, the South Coast AQMD Governing Board shall make findings of necessity, authority, clarity, consistency, non-duplication, and reference based on relevant information presented at the public hearing and in the staff report. In order to determine compliance with section 40727, 40727.2 requires a written analysis comparing the proposed amended rule with existing regulations, if the rule meets certain requirements.

The following provides the draft findings.

Necessity: A need exists to amend Rule 1111 to extend the mitigation fee alternative compliance option for mobile home furnaces and provide an exemption for condensing and non-condensing furnaces installed in a downflow configuration in high-altitude areas to ensure there are sufficient units available to consumers.

Authority: The South Coast AQMD obtains its authority to adopt, amend, or repeal rules and regulations from California Health and Safety Code Sections 39002, 40000, 40001, 40440, 40702, 40725 through 40728, 41508, and 41700.

Clarity: PAR 1111 has been written or displayed so that its meaning can be easily understood by the persons affected by the rule.

Consistency: PAR 1111 is in harmony with, and not in conflict with or contradictory to, existing federal or state statutes, court decisions, or federal regulations.

Non-Duplication: PAR 1111 does not impose the same requirement as any existing state or federal regulation and is necessary and proper to execute the powers and duties granted to, and imposed upon, the South Coast AQMD.

Reference: In amending this rule, the South Coast AQMD hereby implements, interprets, or makes specific reference to the following statutes: Health and Safety Code sections 39002, 40001, 40702, 40440(a), and 40725 through 40728.5.

INCREMENTAL COST-EFFECTIVENESS

Health and Safety Code section 40920.6 requires an incremental cost-effectiveness analysis for Best Available Retrofit Control Technology (BARCT) rules or emission reduction strategies when there is more than one control option that would achieve the emission reduction objective of the proposed amendments, relative to ozone, CO, SO_x, NO_x, and their precursors. The proposed amendment does not include new BARCT requirements; therefore, this provision does not apply to the proposed amendment.

COMPARATIVE ANALYSIS

Health & Safety Code section 40727.2(g) for comparative analysis is applicable when the proposed amended rules or regulations impose, or have the potential to impose, a new emissions limit or standard, or increased monitoring, recordkeeping, or reporting requirements. In this case, a comparative analysis is not required because the amendments do not impose such requirements.

CHAPTER 4: APPENDICES

APPENDIX A: REFERENCES

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South Coast AQMD, 2009. *Staff Report: Proposed Amended Rule 1111 – NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces*. South Coast Air Quality Management District, November 2009.

South Coast AQMD, 2014. *Rule 1111 Technology Assessment for Residential Furnaces*. South Coast Air Quality Management District, January 2014.

South Coast AQMD, 2014. *Staff Report: Proposed Amended Rule 1111 – NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces*. South Coast Air Quality Management District, September 2014.

South Coast AQMD, 2017. *Final 2016 Air Quality Management Plan*. South Coast Air Quality Management District, March 2017.

South Coast AQMD, March 2018. *Staff Report: Proposed Amended Rule 1111 – NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces*. South Coast Air Quality Management District, March 2018.

South Coast AQMD, December 2019. *Board letter: Determine That Proposed Amendments to Rule 1111 – Reduction of NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces, Are Exempt from CEQA and Amend Rule 1111*

South Coast AQMD, 2020. *Staff Report: Proposed Amended Rule 1111 – NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces*. South Coast Air Quality Management District, September 2020.