

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Preliminary Draft Staff Report Proposed Amended Rule 445 – Wood-Burning Devices

May 2025

Deputy Executive Officer

Planning, Rule Development, and Implementation
Sarah L. Rees, Ph.D.

Assistant Deputy Executive Officer

Planning, Rule Development, and Implementation
Michael Krause

Planning and Rules Manager

Planning, Rule Development, and Implementation
Kalam Cheung, Ph.D.

Author: Ashley Dang – Air Quality Specialist

Contributors: Mojtaba Moghani, Ph.D. – Program Supervisor
Melissa Maestas, Ph.D. – Air Quality Specialist
Sang-Mi Lee, Ph.D. – Planning and Rules Manager
Marc Carreras Sospedra, Ph.D. – Program Supervisor
Eric Praske, Ph.D. – Program Supervisor
Scott Epstein, Ph.D. – Planning and Rules Manager
Nico Schulte, Ph.D. – Program Supervisor
Eugene Kang – Planning and Rules Manager
Jennifer Moore – Administrative Assistant
David De Boer – Senior Enforcement Manager
Bradley McClung – Program Supervisor
Kamal Brenner – Supervising Air Quality Inspector
Sina Taghvae, Ph.D. – Air Quality Specialist

Reviewed By: Neil Fujiwara – Program Supervisor
Kathryn Roberts – Principal Deputy District Counsel
Daphne Hsu – Principal Deputy District Counsel
Barbara Radlein – Planning and Rules Manager
Kevin Ni – Program Supervisor

**SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
GOVERNING BOARD**

Chair: VANESSA DELGADO
Senator (Ret.)
Senate Rules Committee Appointee

Vice Chair: MICHAEL A. CACCIOTTI
Councilmember, South Pasadena
Cities of Los Angeles County/Eastern Region

MEMBERS:

CURT HAGMAN
Supervisor, Fourth District
County of San Bernardino

VACANT
Governor's Appointee

PATRICIA LOCK DAWSON
Mayor, Riverside
Cities of Riverside County Representative

LARRY MCCALLON
Mayor Pro Tem, Highland
Cities of San Bernardino County

HOLLY J. MITCHELL
Supervisor, Second District
County of Los Angeles

JANET NGUYEN
Supervisor, First District
County of Orange

BRENDA OLMOS
Councilmember, City of Paramount
Cities of Los Angeles County/Western Region

VERONICA PADILLA-CAMPOS
Speaker of the Assembly Appointee

V. MANUEL PEREZ
Supervisor, Fourth District
County of Riverside

NITHYA RAMAN
Councilmember, Fourth District
City of Los Angeles Representative

CARLOS RODRIGUEZ
Mayor Pro Tem, Yorba Linda
Cities of Orange County

EXECUTIVE OFFICER:

WAYNE NASTRI

TABLE OF CONTENTS

EXECUTIVE SUMMARY	i
CHAPTER 1 – BACKGROUND	
INTRODUCTION	1-1
CLEAN AIR ACT REQUIREMENTS	1-2
SOUTH COAST AIR BASIN ATTAINMENT PLAN FOR 2012 ANNUAL PM2.5 STANDARD (2024 PM2.5 PLAN).....	1-3
CONTROL MEASURE BCM-18: FURTHER EMISSION REDUCTIONS FROM WOOD- BURNING FIREPLACES AND WOOD STOVES	1-4
REGULATORY HISTORY	1-5
NEED FOR PROPOSED AMENDED RULE 445	1-7
AFFECTED INDUSTRY	1-7
PUBLIC PROCESS	1-7
CHAPTER 2 - SUMMARY OF PROPOSED AMENDED RULE 445	
OVERALL APPROACH.....	2-2
CHAPTER 3 - IMPACT ASSESSMENT	
EMISSIONS AND EMISSION REDUCTIONS.....	3-1
COST AND COST EFFECTIVENESS.....	3-2
CALIFORNIA ENVIRONMENTAL QUALITY ACT.....	3-3
SOCIOECONOMIC IMPACT ASSESSMENT	3-3
DRAFT FINDINGS UNDER HEALTH AND SAFETY CODE SECTION 40727	3-3
COMPARATIVE ANALYSIS	3-4

EXECUTIVE SUMMARY

PM2.5 (particulate matter less than 2.5 microns in aerodynamic diameter) is an air pollutant that is either directly emitted into the atmosphere or formed in the atmosphere through chemical reactions. PM2.5 is the main cause of reduced visibility and can penetrate deep into lung tissues. Wood smoke and biomass burning contains harmful air pollutants, including PM2.5, that can cause a variety of adverse health effects even with short-term exposure. Residential wood-burning is a significant source of PM2.5 emissions.

South Coast Air Quality Management District (South Coast AQMD or District) Rule 445 – Wood-Burning Devices (Rule 445) was first adopted in March 2008 to reduce PM2.5 emissions from residential wood combustion. Rule 445 prohibits burning of products not intended for use as fuel, prohibits sale of unseasoned wood, and mandates curtailment of wood-burning on “No Burn” days during the wood-burning season. Each year the wood-burning season begins from the beginning of November through the end of February. Wood-burning curtailment is mandatory on No Burn days where ambient PM2.5 concentration is forecast to exceed a threshold limit, currently set at 29 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). If ozone contingency measure provisions specified in subdivision (g) of the current rule are triggered, the curtailment program will be expanded to include the months of September, October, March, and April when the daily maximum ozone levels are forecasted to be higher than 80 parts per billion.

Although the South Coast Air Basin (Basin) is in attainment with the 1997 PM2.5 National Ambient Air Quality Standard (NAAQS) and meets the 2006 PM2.5 NAAQS, it is a “serious” nonattainment area for the 2012 PM2.5 NAAQS. Proposed Amended Rule 445 (PAR 445) focuses on reducing PM2.5 emissions from residential wood-burning to comply with the federal Clean Air Act Most Stringent Measure (MSM) requirements for the 2012 PM2.5 NAAQS. PAR 445 implements control measure BCM-18: Further Emission Reductions from Wood-Burning Fireplaces and Wood Stoves, from the 2024 PM2.5 Attainment Plan by lowering the mandatory PM2.5 curtailment thresholds and removing the existing low-income exemption that allows operation of a wood-burning device during an active No Burn Day. Due to a large number of residential properties in the Basin that have been destroyed due to large scale natural disasters, including wildfires and earthquakes, the addition of a narrow, limited exemption allows for previously installed, lawful wood-burning devices to be rebuilt or replaced during instances of damage or destruction due to natural disasters declared as a State of Emergency under Rule 118. Minor editorial changes and removal of obsolete information are made to improve rule clarity and conform with District practice. PAR 445 is anticipated to have minimal cost impacts associated with the lowering of the curtailment threshold and the removal of the low-income exemption as wood-burning in the Basin is mainly for aesthetic and ambiance purposes. As the rule does not propose any new requirements resulting in changes to wood-burning devices, no new costs are anticipated. Emission reductions from the removal of the low-income exemption are not quantified due to high level of uncertainty. It is estimated that lowering the curtailment threshold will reduce PM2.5 emissions by 0.25 tons per day.

CHAPTER 1 – BACKGROUND

INTRODUCTION

PM_{2.5} (particulate matter less than 2.5 microns in aerodynamic diameter) is an air pollutant that is either directly emitted into the atmosphere (primary particles) or formed in the atmosphere through chemical reactions (secondary particles). Primary PM_{2.5} includes road dust, diesel soot, combustion products, and other sources of fine particles. Secondary PM_{2.5} products, such as sulfates, nitrates, and complex organic compounds, are formed from reactions with oxides of sulfur (SO_x), oxides of nitrogen (NO_x), volatile organic compounds (VOC), and ammonia (see Figure 1-1). PM_{2.5} is the main cause of reduced visibility. Numerous studies have linked high levels of particulate air pollution with detrimental health effects such as respiratory and cardiovascular disease and premature death as smaller particles in the PM_{2.5} range can penetrate and deposit deep in lung tissues. The South Coast Air Basin (Basin) is among the most polluted PM_{2.5} regions in the United States.

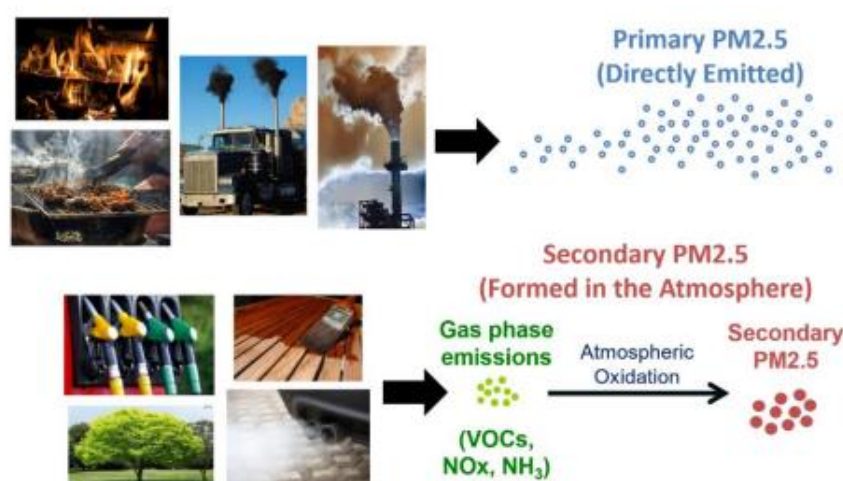


Figure 1-1: PM_{2.5} Formation Mechanisms

Emissions from residential wood-burning devices are caused primarily by incomplete combustion and include PM, CO, NO_x, SO_x, and VOC. Residential wood-burning is a significant source of PM emissions. Studies indicate that the vast majority of particulate emissions from residential wood combustion is PM_{2.5}.¹ The type of devices used to burn wood in a typical residential household are fireplaces and wood stoves. Fireplaces and any similar permanently installed indoor or outdoor wood-burning devices are very inefficient heat sources. Given the temperate climate in the Basin, fireplaces and comparable wood-burning devices are used primarily for aesthetic and ambiance purposes. The Basin includes densely populated areas where residential chimneys could be affixed near neighboring properties. The close proximity of neighboring chimneys increases the likelihood that individuals may inhale harmful smoke from nearby wood-burning.

Multiple Air Toxics Exposure Study V (MATES V) is a monitoring and evaluation study conducted in the Basin. Monitoring data collected as part of MATES V were used to provide information on the levels and risks associated with air toxics. Particulate species, including

¹ South Coast Air Basin Attainment Plan for the 2012 Annual PM_{2.5} Standard. APPENDIX IV-A South Coast AQMD's Stationary and Mobile Source Measures. <https://www.aqmd.gov/docs/default-source/clean-air-plans/pm2.5-plans/final-pm2.5-plan/appendix-iv-a-control-measures.pdf>

levoglucosan, were measured during sampling for MATES V. Levoglucosan is a widely used tracer of biomass burning contributions to atmospheric particulate loading. Levoglucosan has been historically shown to be present at very high concentrations in PM_{2.5} emissions from both residential wood combustion and wildland biomass combustion, making it a robust indicator for key biomass burning processes in the Basin. MATES V showed the highest levels of wood smoke during the wintertime, from November through February.²

CLEAN AIR ACT REQUIREMENTS

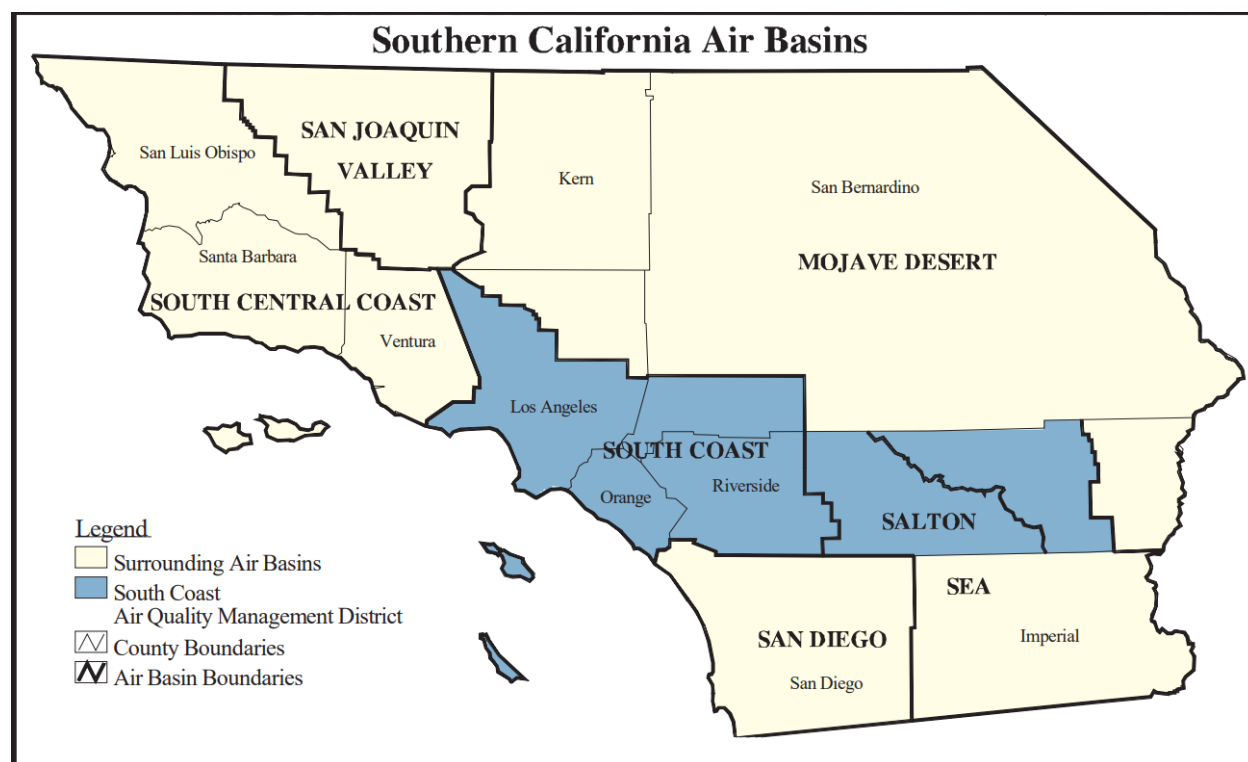


Figure 1-2: Map of South Coast AQMD Jurisdiction

The federal Clean Air Act requires areas that do not meet a National Ambient Air Quality Standard (NAAQS) to develop and implement strategies to reduce emissions so that healthy levels of air quality can be achieved in a timely manner. The Basin's region, highlighted as the "South Coast" portion, in Figure 1-2 above, is in nonattainment of the 2012 annual PM_{2.5} NAAQS. The strategy or attainment plan, along with other supporting elements, must be submitted to the United States Environmental Protection Agency (U.S. EPA) for its review and approval into the State Implementation Plan (SIP). Regions must develop SIPs to attain a NAAQS by specific dates or face the possibility of sanctions by the federal government and other consequences under the federal Clean Air Act. California also has air quality standards for PM_{2.5} and under state law, the region is required to attain those standards as expeditiously as practicable.

In 1997, the U.S. EPA promulgated the NAAQS for PM_{2.5} by setting an annual standard at 15 micrograms per cubic meter (µg/m³) and a 24-hour standard at 65 µg/m³. In 2006, the U.S. EPA

² South Coast AQMD. *Appendix XII mates V final report biomass burning ... MATES V Final Report*. http://www.aqmd.gov/docs/default-source/planning/mates-v/appendixxii_final.pdf

strengthened the 24-hour PM_{2.5} NAAQS from 65 µg/m³ to 35 µg/m³. In 2012, the U.S. EPA revised the annual PM_{2.5} NAAQS, lowering it to 12 µg/m³ and further to 9 µg/m³ in 2024.

As of May 2025, the Basin is in attainment with both the 24-hour and annual 1997 PM_{2.5} NAAQS of 65 µg/m³ and 15 µg/m³, respectively. In addition, the Basin meets the 24-hour 2006 PM_{2.5} NAAQS based on monitoring data collected over the past several years. For the 2012 annual PM_{2.5} NAAQS, the Basin is designated as a “serious” nonattainment area, with an attainment date of 2025.

Clean Air Act section 172(c)(9) requires contingency measures in the event that an area fails to meet reasonable further progress milestones or to attain the NAAQS by the specified attainment deadline. U.S. EPA, implementing regulations for particulate matter (40 CFR § 51.1014(a)), requires that these contingency measures take effect with minimal further action following a determination by the U.S. EPA that the area has failed: (1) to meet any approved reasonable further progress requirement, (2) to meet any approved quantitative milestone, (3) to submit a required quantitative milestone report, or (4) to attain the standard by the applicable attainment date.

Areas classified as “serious” nonattainment where an extension was requested for the area are required to demonstrate that the attainment plan includes the Most Stringent Measure (MSM) requirements under Clean Air Act section 188(e). MSM is defined as³:

“The maximum degree of emission reduction that has been required or achieved from a source or source category in any other attainment plans or in practice in any other states and that can feasibly be implemented in the area seeking the extension.”

SOUTH COAST AIR BASIN ATTAINMENT PLAN FOR 2012 ANNUAL PM_{2.5} STANDARD (2024 PM_{2.5} PLAN)

Effective April 15, 2015, the U.S. EPA designated the Basin as a “moderate” nonattainment area for the 2012 annual PM_{2.5} NAAQS with an attainment date of December 31, 2021.⁴ In response, South Coast AQMD adopted the 2016 Air Quality Management Plan (AQMP) which concluded that meeting the 2021 deadline was impractical, and included a plan to attain the 2012 PM_{2.5} NAAQS by 2025 as a “serious” nonattainment area. The 2016 AQMP was submitted to U.S. EPA in 2017, but U.S. EPA delayed acting on the plan. Meanwhile, near-road air quality monitoring data became eligible for inclusion in attainment demonstrations and the “serious” area plan was withdrawn in 2023 to account for this new data and to satisfy other planning requirements. Since adopting the 2016 AQMP, South Coast AQMD has implemented control measures and achieved emission reductions. However, due to unforeseen challenges, including unfavorable meteorology, wildfires, increases in emissions in the goods movement sector during the COVID-19 pandemic, and the addition of the near-road monitors, the South Coast AQMD requested an extension of the attainment date under Clean Air Act section 188(e).

The federal Clean Air Act requires areas designated as being in nonattainment with the NAAQS to develop and implement an emissions reduction strategy that will bring the area into attainment at the soonest practicable time. For the South Coast AQMD, the strategies and underlying technical

³ *Fine Particulate Matter National Ambient Air Quality Standards: State Implementation Plan Requirements*. Federal Register. <https://www.federalregister.gov/d/2016-18768/p-1655>

⁴ Air Quality Designations for the 2012 Primary Annual Fine Particle (PM_{2.5}) National Ambient Air Quality Standards (NAAQS), 80 Fed. Reg. 2206 (Jan. 15, 2015)

analysis for how the Basin will meet the 2012 annual PM_{2.5} NAAQS as expeditiously as practicable is set forth in the South Coast Air Basin Attainment Plan for the 2012 Annual PM_{2.5} NAAQS (2024 PM_{2.5} Plan) since the Basin has been redesignated as a “serious” PM_{2.5} nonattainment area for the 2012 annual PM_{2.5} NAAQS and has not yet met attainment. The 2024 PM_{2.5} Plan included:

- An attainment date extension request until 2030 for the 2012 annual PM_{2.5} NAAQS;
- A demonstration of the proposed control strategy for implementation of the MSM that meets requirements of the federal Clean Air Act; and
- The anticipated annual emission reductions for certain proposed control strategies.⁵

The South Coast AQMD Governing Board adopted the 2024 PM_{2.5} Plan in June 2024 to demonstrate how the Basin will meet the 2012 annual PM_{2.5} NAAQS as expeditiously as practicable, but no later than December 31, 2030.

CONTROL MEASURE BCM-18: FURTHER EMISSION REDUCTIONS FROM WOOD-BURNING FIREPLACES AND WOOD STOVES

Appendix IV-A of the 2024 PM_{2.5} Plan⁶ identifies the South Coast AQMD’s stationary source attainment strategy through source-specific control measures. Control measure BCM-18: Further Emission Reductions from Wood-Burning Fireplaces and Wood Stoves (BCM-18), identified in the 2024 PM_{2.5} Plan, describes the strategy to seek further PM_{2.5} emissions reductions from residential wood-burning activities. The control strategy is based on the 2024 PM_{2.5} Plan MSM analysis that identified California air districts with wood-burning regulations that include more stringent measures than Rule 445. Table 1-2 includes a general comparison of California air district PM_{2.5} wood-burning curtailment thresholds and exemptions to the respective rules. As noted in the table, other air districts such as San Joaquin Valley APCD Rule 4901 have more stringent measures than South Coast AQMD Rule 445 (lower PM_{2.5} curtailment thresholds resulting in higher amounts of emission reductions). Therefore, Rule 445 is required to be amended to lower the PM_{2.5} curtailment thresholds to be as stringent as other adopted regulations to meet federal Clean Air Act requirements to adopt the MSM.

In addition to lowering the Rule 445 PM_{2.5} curtailment threshold, control measure BCM-18 proposes to remove the low-income exemption in Rule 445. A low-income household is identified as any household that receives financial assistance through reduced electric or gas bills from an electric or natural gas utility based on household income levels. Rule 445 currently allows low-income households to be exempt from the Basin-wide mandatory PM_{2.5} curtailment. This would allow an exempted household to operate a wood-burning device during an active No Burn Day. The removal of the low-income exemption in Rule 445 does not affect the other remaining exemptions. Households with no other source of heating than wood-burning are exempt from Rule 445 under the ‘sole source of heat’ exemption (located in subparagraph (i)(7)(A)).

⁵ *South Coast Air Basin Attainment Plan for the 2012 Annual PM_{2.5} Standard*. APPENDIX III South Coast AQMD’s Stationary and Mobile Source BACM/MSM. https://www.aqmd.gov/docs/default-source/clean-air-plans/pm2.5-plans/final-pm2.5-plan/appendix-iii---bacm_msm.pdf

⁶ *South Coast Air Basin Attainment Plan for the 2012 Annual PM_{2.5} Standard*. APPENDIX IV-A South Coast AQMD’s Stationary and Mobile Source Measures. <https://www.aqmd.gov/docs/default-source/clean-air-plans/pm2.5-plans/final-pm2.5-plan/appendix-iv-a-control-measures.pdf>

Table 1-1: Comparison of Most Stringent Measures

Agency/ Rule	Applicability	Curtailment Threshold	Exemptions
South Coast AQMD 445	All counties and wood-burning device types	29 $\mu\text{g}/\text{m}^3$	<ul style="list-style-type: none"> • Ceremonial Fires Exempt Under South Coast AQMD Rule 444 • Geographical Location $\geq 3,000$ ft Above Mean Sea Level • No Natural Gas Service Within 150 ft • Sole Source of Heat • Low-Income Household
San Joaquin Valley APCD 4901	Counties of Madera, Fresno, and Kern Level 1 for all wood-burning device types except registered devices; Level 2 for all wood-burning device types	Level 1: 12 $\mu\text{g}/\text{m}^3$ Level 2: 35 $\mu\text{g}/\text{m}^3$	<ul style="list-style-type: none"> • Cookstoves Described in Code of Federal Regulations 60.531 • Exclusively Gaseous-Fueled Devices • Open Burning on the Ground Under San Joaquin Valley APCD Rule 4103 • Sole Source of Heat
	Counties of San Joaquin, Stanislaus, Merced, Kings, and Tulare Level 1 for all wood-burning device types except registered devices; Level 2 for all wood-burning device types	Level 1: 20 $\mu\text{g}/\text{m}^3$ Level 2: 65 $\mu\text{g}/\text{m}^3$	
Bay Area AQMD Reg. 6 Rule 3	All counties and wood-burning device types	35 $\mu\text{g}/\text{m}^3$	<ul style="list-style-type: none"> • Non-functional, permanently installed heater • Loss of natural gas and/or electric power • Sole Source of Heat

REGULATORY HISTORY

Rule 445 – Wood-Burning Devices

Rule 445 – Wood-Burning Devices was first adopted in March 2008 to implement BCM-03 of the 2007 AQMP. Rule 445 aimed to reduce PM_{2.5} emissions from residential wood combustion. Rule provisions apply to manufacturers, vendors, commercial firewood sellers, and any persons owning or operating a wood-burning device.

The rule was first amended in May 2013 to implement control measures from the 2012 AQMP that would further reduce PM_{2.5} emissions from wood-burning devices. The 2013 amendments expanded the wood-burning curtailment restrictions by lowering the curtailment threshold from 35 to 30 $\mu\text{g}/\text{m}^3$, establishing criteria for Basin-wide curtailment, and setting labeling standards for commercially sold solid-fuel.

In 2020, South Coast AQMD amended Rule 445 twice to extend the No Burn Day requirement by mandating a Basin-wide curtailment in all cases where any source receptor area⁷ exceeds a daily PM_{2.5} air quality forecast of 30 µg/m³. Ozone and PM contingency measures were also added, including the establishment of new curtailment thresholds. Under the Rule 445 provisions, only gaseous-fueled hearth devices are allowed to be installed in new developments. For additions or modifications to existing developments, Rule 445 allows any gaseous-fueled device, but any wood-burning devices sold or installed must be U.S. EPA Phase II-certified or equivalent.

Rule 445 prohibits the burning of any product not intended for use as fuel (e.g., trash) in a wood-burning device and requires commercial firewood facilities to only sell seasoned (20 percent or less moisture content) firewood from July through February. Rule 445 also established a mandatory wood burning curtailment program extending from November 1 through the end of February each winter season. During a wood-burning curtailment period, the public is required to refrain from both indoor and outdoor solid fuel burning in specific areas when PM_{2.5} air quality is forecasted to exceed 30 µg/m³. The no burn provisions apply to the entire Basin whenever a PM_{2.5} level of greater than 30 µg/m³ is forecasted for any area of the Basin. In 2021, the no burn threshold was reduced to 29 µg/m³, when the first contingency measure in the rule was triggered due to a failure to attain the PM_{2.5} 24-hour NAAQS by the due date. Lastly, Rule 445 requires commercial firewood or other wood-based fuel sellers to notify the public of the Check Before You Burn wood-burning curtailment program through a labeling requirement. Commercial firewood sellers are to attach a permanently affixed indelible label to each package of firewood advising consumers that there are times during the year when there may be a restriction on product usage (referring to No Burn days during the wood-burning season).

To ensure that the public and other stakeholders are aware of the wood-burning curtailment requirements, extensive outreach is conducted each year through the following efforts:

- South Coast AQMD Check Before You Burn web page with program information including links, videos, and the Check Before You Burn map
- Advisories on No Burn days
- text and email notifications
- toll-free number (866)966-3293
- news pitches to local news desks
- press interviews
- official National Weather Service notifications
- social media (Facebook, X, and Instagram)

Households that qualify for one or more of the Rule 445 exemptions may operate a wood-burning device during an active No Burn Day. Exemptions are included for low-income households, where the wood-burning device is the sole source of heating or no natural gas service is available within 150 feet of the property line, geographic elevations 3,000 feet or higher above mean sea level, and for ceremonial fires that are defined in Rule 444 – Open-Burning.

⁷ Source Receptor Areas are geographical areas in the South Coast Air Basin used for forecasting air quality conditions.

NEED FOR PROPOSED AMENDED RULE 445

As the South Coast Air Basin is in “serious” nonattainment for the 2012 annual PM_{2.5} NAAQS and seeks an extension of attainment deadline, the Basin is required to meet the MSM requirement. Four source categories, including residential wood-burning, were identified in the 2024 PM_{2.5} Plan where rule amendments are needed to meet MSM.⁸ Control measure BCM-18 seeks additional emission reductions through reducing the Basin-wide curtailment threshold in Rule 445 from 29 µg/m³ to 25 µg/m³ on any day during the wood-burning season. To satisfy contingency measure requirements, South Coast AQMD proposes to further reduce the curtailment threshold to 23 µg/m³ and 21 µg/m³ upon any of the aforementioned applicable triggering events. Also as discussed earlier in this chapter, control measure BCM-18 proposes to remove the low-income exemption in Rule 445 due to a MSM analysis. The MSM analysis identified other air districts include more stringent measures than Rule 445 by achieving a greater emission reduction due to curtailment and not exempting low-income households.

AFFECTED INDUSTRY

Rule 445 applies to any person that manufactures, sells, offers for sale, or supplies a wood-burning device; any commercial firewood seller that sells, offers for sale, or supplies wood or other wood-based fuels intended for burning in a wood-burning device; and any property owner or tenant that operates a wood-burning device. An estimated 1.4 million⁹ wood-burning devices are subject to the provisions of Rule 445. While the number of affected sources is not anticipated to change greatly since wood-burning devices have lengthy useful lifetimes and since Rule 445 prohibits the installation of wood-burning devices in new developments, emission reductions will be achieved by decreasing the number of days that the devices can be operated. Households that are categorized as low-income and which are currently exempted from Rule 445 may be affected by the removal of the low-income exemption; however, some low-income households may qualify for a different exemption instead (e.g., the ‘sole source of heat’ exemption).

PUBLIC PROCESS

The development of PAR 445 has been conducted through a public process. A PAR 445 Working Group was formed to allow the public and stakeholders to discuss details of the proposed rule amendment and provide South Coast AQMD staff with input during the rule development process. South Coast AQMD has held two Working Group Meetings via Zoom videoconference and teleconference. The meetings were held on December 17, 2024 and April 2, 2025. A Public Workshop is scheduled for May 20, 2025, via Zoom to present the preliminary draft rule language for PAR 445 and receive public comment.

⁸ South Coast Air Quality Management District, South Coast Air Basin Attainment Plan for the 2012 Annual PM_{2.5} Standard, June 2024. Available <https://www.aqmd.gov/docs/default-source/clean-air-plans/pm2.5-plans/final-pm2.5-plan/2012-annual-pm2.5-plan.pdf>

⁹ James E. Houck and Brian N. Eagle, “Residential Wood Combustion Emission Inventory South Coast Air Basin and Coachella Valley Portion of Salton Sea Air Basin 2002 Base Year”. October 24, 2006. <http://www.omni-test.com/publications/SCAQMD-RWC4.pdf>

CHAPTER 2 - SUMMARY OF PROPOSED AMENDED RULE 445

OVERALL APPROACH

PAR 445 addresses the federal Clean Air Act’s MSM requirements by removing the low-income household exemption and lowering the mandatory wood-burning curtailment threshold and respective contingency measures. The sole source of heat definition will be clarified. For this chapter, when referring to PAR 445-specific terms that are defined in the rule language, the terminology will be capitalized.

The following is a summary for the proposed amendments to Rule 445.

Definitions – Subdivision (b)

Low-Income Household

The definition of low-income household will be removed.

Sole Source of Heat

PAR 445 will clarify the definition of a household that uses a wood-burning device as a sole source of heat. A wood-burning device that is used as a Sole Source Of Heat during the wood-burning season includes when the wood-burning device is used during temporary service outages as determined by the gas or electrical utility service. When a Notice of Violation is sent to a noncompliant residential household, the respondent may provide a screenshot, email, or copy of the temporary service outage from the gas or electrical utility provider as evidence of the Wood-Burning Device being used as a Sole Source Of Heat during the noncompliant occurrence. If the respondent is unable to provide such evidence themselves, the claim investigator will request an inquiry about past service outages from the respective gas or electrical utility provider.

Wood-Based Fuel

PAR 445 will clarify that the exclusion of charcoal as a Wood-Based Fuel would be limited to when it is used in a Wood-Fired Cooking Device. If charcoal is used in other devices (e.g., Portable Outdoor Wood-Burning Device, Wood-Burning Device, Wood-Burning Heater), it would be considered a Wood-Based Fuel and the respective device would be subject to the requirements of this rule. Charcoal, commonly used for cooking in the Basin, was intended to be excluded as emissions from a charcoal-based cooking fire are lower than those from wood-based cooking fire. This is due to charcoal being previously burned wood that has already been subject to the initial high emission wood burn rate.¹⁰ The amendment aligns the exclusion to be limited to cooking instead of being a broad exclusion. A household that uses charcoal for heat would be subject to the same requirements and exemptions as a household burning wood.

The definition of Wood-Fired Cooking Device was revised to align with the revisions of Wood-Based Fuel and to be consistent with other devices that burn Wood-Based Fuel.

¹⁰ *South Coast Air Quality Management District, Final Staff Report Proposed Amended Rule 445 - Wood-Burning Devices Proposed Amended Rule 444 - Open Burning (May 2013) A-4-A-5 (2013).*

Wood-Burning Season PM2.5 Mandatory Burning Curtailment – Subdivision (e)

Paragraph (e)(1) will lower the mandatory wood-burning curtailment threshold from 29 $\mu\text{g}/\text{m}^3$ to 25 $\mu\text{g}/\text{m}^3$. As discussed in Chapter 1, this amendment is required to satisfy the MSM requirements and meet the NAAQS as expeditiously as practicable, but no later than December 31, 2030. Lowering the curtailment threshold will allow for additional emission reductions in the Basin, which are discussed in Chapter 3.

PM2.5 Contingency Measures – Subdivision (f)

This subdivision establishes requirements for applicable households to comply with the Basin-wide, mandatory wood-burning curtailment contingency measures. Subparagraph (f)(2)(A) will lower the contingency curtailment threshold from 29 $\mu\text{g}/\text{m}^3$ to 23 $\mu\text{g}/\text{m}^3$. Subparagraph (f)(2)(B) will lower the contingency curtailment threshold from 28 $\mu\text{g}/\text{m}^3$ to 21 $\mu\text{g}/\text{m}^3$.

Exemptions – Subdivision (i)

The exemption from the mandatory PM2.5 and ozone wood-burning curtailments applicable to low-income households in subparagraph (i)(8)(B) will be removed as it does not adhere to the MSM requirements. Although low-income households will no longer be eligible for an exemption from the mandatory curtailments, several other exemptions will remain in the rule. In particular, many households which would previously qualify for the low-income exemption may also qualify for the Sole Source Of Heat exemption.

A large number of residential properties in the Basin have been destroyed due to large scale natural disasters, including wildfires and earthquakes. To allow property owners a limited opportunity to replace or rebuild a Wood-Burning Device that was initially installed consistent with Rule 445, but lost due to extraordinary circumstances beyond their control, paragraph (i)(4) will exempt a Wood-Burning Device from the provisions of paragraphs (d)(1) and (d)(2), provided the previously installed Wood-Burning Device at the property had been damaged or destroyed by a natural disaster declared as a State of Emergency as defined in Rule 118. Only Wood-Burning Devices that were lawfully built, including installation prior to Rule 445's New Development prohibition, prior to the occurrence of the natural disaster are eligible to be replaced or rebuilt.

Property owners may choose to reconstruct their Wood-Burning Device in a development that is a like-for-like rebuild or replacement, provided the reconstruction of the New Wood-Burning Device is developed meeting the requirements established by applicable local government entities, including Public Works and Fire Departments. A like-for-like rebuild or replacement have quicker permitting review and approval times as the structures are for generally the same size, in the same general location, and for the same purpose as the previous structures.¹¹ A like-for-like rebuild or replacement of the development will limit the expansion or increase in dimension of the Wood-Burning Device.

In the event the property is not required to be re-built, but the Wood-Burning Device was damaged requiring rebuild or replacement, the replacement Wood-Burning Device would be limited to the size of the previously installed Wood-Burning Device. This would be determined by the remains of the previously installed Wood-Burning Device.

¹¹ Like-For-Like Rebuild – LA County Recovers, <https://recovery.lacounty.gov/rebuilding/like-for-like-rebuild/>

As the size of the Wood-Burning Device increases, the emission potential increases due to an increased throughput potential. By restricting the size of the Wood-Burning Device or restricting the replacement to like-for-like rebuilds only, the emission potential is not expected to increase. These developments would still be subject to other requirements of Rule 445, including but not limited to, a mandatory wood-burning curtailment being called.

CHAPTER 3 - IMPACT ASSESSMENT

EMISSIONS AND EMISSION REDUCTIONS

According to the 2016 AQMP, emissions from stationary sources were 4.9 tons per annual average day. Since 69% of emissions occurred during the wood-burning season, emissions during that period were estimated at 12.99 tons per wood-burning season day. Annual average day is a term that refers to the number of wood-burning days occurring within 365 days (e.g., within the entire calendar year). Wood-burning season day is a term which refers to the number of wood-burning days occurring within the 120-day wood-burning season. Following the adoption of the 2016 AQMP, the 2020 amendments to Rule 445 led to further emission reductions of 0.07 and 0.13 tons per annual average day. As such, the baseline emissions relied upon for this analysis are 4.7 tons per annual average day.

Lower Curtailment Threshold

A detailed methodology¹² based on a statistical analysis of relevant historical daily PM_{2.5} concentrations in the Basin is used to estimate PM_{2.5} emission reductions from the proposed rule amendment. The emissions from the 2020 rule amendments were used as a baseline for PAR 445. The methodology evaluates the additional PM_{2.5} emission reductions associated with the Basin-wide curtailment as well as the increased number of No Burn days when the curtailment threshold is lowered. Table 3-1 shows the additional emission reductions that would occur if the curtailment threshold is reduced to 25 µg/m³ and for each of the subsequent proposed reductions in the curtailment threshold. Under the proposed amendments, the curtailment will be implemented Basin-wide when the daily PM_{2.5} air quality forecast for any area of the Basin exceeds 25 µg/m³.

Table 3-1: Expected PM_{2.5} Emission Reductions Due to Lower Curtailment Threshold

Category	Curtailment Threshold (µg/m ³)	Curtailed Emissions (tons per year)	Estimated Emission Reductions (tons per year)	Estimated Emission Reductions With 75% Rule Effectiveness	
				(tons per annual average day)	(tons per wood-burning season day)
Current Rule	29	342.0	-	-	-
PAR 445	25	462.0	120.0	0.25	0.75
	23	578.1	236.1	0.49	1.48
	21	645.2	303.2	0.62	1.90

Based on historical data from 2019 to 2023, decreasing the existing Rule 445 curtailment threshold from 29 µg/m³ to 25 µg/m³ could result in an approximate 38% increase in the number of No Burn days (approximately 10 additional days)¹³ during the wood-burning season. Lowering the mandatory Basin-wide curtailment threshold could potentially reduce Basin-wide ambient PM_{2.5} emissions on these No Burn days by about 0.25 tons per annual average day, assuming a 75% rule effectiveness, which is consistent with prior Rule 445 developments. When the first contingency

¹² South Coast Air Basin Attainment Plan for the 2012 Annual PM_{2.5} Standard. APPENDIX III South Coast AQMD's Stationary and Mobile Source BACM/MSM. https://www.aqmd.gov/docs/default-source/clean-air-plans/pm2.5-plans/final-pm2.5-plan/appendix-iii---bacm_msm.pdf

¹³ South Coast Air Basin Attainment Plan for the 2012 Annual PM_{2.5} Standard. APPENDIX III South Coast AQMD's Stationary and Mobile Source BACM/MSM. https://www.aqmd.gov/docs/default-source/clean-air-plans/pm2.5-plans/final-pm2.5-plan/appendix-iii---bacm_msm.pdf

measure is triggered, the curtailment threshold will automatically decrease from 25 to 23 $\mu\text{g}/\text{m}^3$ resulting in an estimated additional emission reduction of 0.24 ton per annual average day and approximately 9 additional No Burn Days. While it is not anticipated that any additional contingency measures will be triggered, if that occurs, additional emission reductions are anticipated as the curtailment threshold is lowered, as shown in Table 3-1. It should be noted that while limiting residential wood-burning activities is primarily intended to reduce PM_{2.5} emissions, there is an added co-benefit of reducing emissions of CO, VOC, NO_x, SO_x, and hazardous air pollutants and further reducing ambient levels of ozone.

Removal of Low-Income Exemption

Among approximately 17 million¹⁴ residents in the Basin, approximately 1.3 million¹⁵ households in the Basin participate in a program that considers household income levels, such as CARE or FERA, to receive financial assistance through reduced electric or gas bills from an electric or natural gas utility. However, the number of households in the Basin that actually utilize the low-income exemption during an episodic No Burn day is unknown. Due to the high levels of uncertainty, emission reductions for the removal of the low-income exemption cannot be accurately quantified at this time and will be updated in future emission inventories.

Addition of Natural Disaster Exemption

The reconstruction of a previously standing or existing wood-burning device that has been destroyed or damaged due to a natural disaster declared as a state of emergency is not expected to produce additional PM_{2.5} emissions nor emission reductions. Only properties that previously had an existing wood-burning device prior to the event of the natural disaster would be eligible for this exemption. Additionally, this exemption limits the size of the replacement device to prevent an increase of emissions due to increase throughput.

COST AND COST EFFECTIVENESS

Compliance Costs

The proposed amendments to Rule 445 would increase the number of No Burn days in the Basin and could potentially result in the loss of sales by affected firewood sellers. The majority of commercial firewood sellers are expected to be small businesses. A lack of data on the number of employees and gross annual sales of the affected commercial firewood sellers precludes staff from determining their small business status. However, the increase in number of No Burn days is expected to be very small (approximately 10 days) and is anticipated to decrease as PM_{2.5} air quality improves. As a result, the cost impacts of curtailment on firewood sellers are expected to be minimal. No additional cost impacts to the general public are expected to be incurred as residential wood-burning in the Basin is done mainly for ambiance and aesthetic purposes. Additionally, there are cost-effective alternatives to wood-burning for space heating purposes. Eligible residents could use incentives provided by the South Coast AQMD and switch existing wood-burning devices to less polluting, cost-effective alternatives such as gaseous-fueled or electrical heating devices. Incentives through South Coast AQMD's Wood Stove and Fireplace Changeout Incentive Program are available for eligible residents residing in the Boyle Heights

¹⁴ 2023: ACS 1-year Estimates Subject Table. United States Census Bureau.
<https://data.census.gov/table/ACSST1Y2023.S0101?g=050XX00US06037,06059,06065,06071&y=2023>

¹⁵ Annual Report of Southern California Gas Company (U 904 G) on Low Income Assistance Programs for 2022. Energy Savings Assistance Program and California Alternate Rates for Energy Program Annual Report. <https://liob.cpuc.ca.gov/wp-content/uploads/sites/14/2023/06/SoCalGas-PY2022-Low-Income-Annual-Report.pdf>

area, Norco/Corona area, Chino/Ontario/Corona area, City of San Bernardino area, and City of Riverside area. Wood-burning devices that are the sole source of heat for a dwelling or structure are specifically exempted from the No Burn mandate.

Cost Effectiveness

Cost-effectiveness is the cost to benefit analysis comparing the relative cost to the outcomes. The cost effectiveness of PAR 445 has not been determined. Increasing the number of Rule 445 curtailment days would result in relatively minimal cost impacts to the affected communities as there are cost-effective alternatives to burning wood such as gaseous-fueled or electrical heating devices. Additionally, the proposed amendments do not change existing mandatory curtailment exemptions provided for households that utilize the wood-burning device as a sole source of heat.

Incremental Cost Effectiveness

Health and Safety Code Section 40920.6(a)(3) requires the South Coast AQMD to perform an incremental cost effectiveness analysis prior to adopting rules to meet the requirements for a Best Available Retrofit Control Technology (BARCT) rule, or to implement feasible measures pursuant to use of an alternative emission reduction strategy under Health and Safety Code Section 40914. This Section does not apply to particulate matter. (Health and Safety Code Section 40910.) PAR 445 is not being adopted to meet a BARCT requirement nor is it being adopted as a feasible measure pursuant to an alternative reduction strategy under Health and Safety Code Section 40914. Therefore, an incremental cost-effectiveness analysis is not needed.

CALIFORNIA ENVIRONMENTAL QUALITY ACT

Pursuant to the California Environmental Quality Act (CEQA) and South Coast AQMD's certified regulatory program (Public Resources Code Section 21080.5 and CEQA Guidelines Section 15251(l); codified in South Coast AQMD Rule 110), the South Coast AQMD, as lead agency, is reviewing the proposed project (PAR 445) 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

A socioeconomic impact assessment will be prepared and released for public review and comment at least 30 days prior to the South Coast AQMD Governing Board Hearing for PAR 445, which is scheduled for September 5, 2025 (subject to change).

DRAFT FINDINGS UNDER HEALTH AND SAFETY CODE SECTION 40727

Requirements to Make Findings

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.

Necessity

PAR 445 is needed to reduce PM_{2.5} emissions by implementing control measure BCM-18: Further Emission Reductions from Wood-Burning Fireplaces and Wood Stoves from the 2024 South Coast Air Basin PM_{2.5} Attainment Plan for the 2012 Annual PM_{2.5} Standard.

Authority

The South Coast AQMD Governing Board has authority to adopt PAR 445 pursuant to the Health and Safety Code Sections 39002, 40000, 40001, 40440, 40702, 40725 through 40728, and 41508.

Clarity

PAR 445 is written or displayed so that its meaning can be easily understood by the persons directly affected by it.

Consistency

PAR 445 is in harmony with and not in conflict with or contradictory to, existing statutes, court decisions, or state or federal regulations.

Non-Duplication

PAR 445 will not impose the same requirements as any existing state or federal regulations. The proposed amended rule is necessary and proper to execute the powers and duties granted to, and imposed upon, South Coast AQMD.

Reference

By adopting PAR 445, the South Coast AQMD Governing Board will be implementing, interpreting, and making specific provisions of the Health and Safety Code Section 40001 (rules to achieve ambient air quality standards) and 40440(a) (rules to carry out the AQMP).

COMPARATIVE ANALYSIS

Under Health and Safety Code Section 40727.2, South Coast AQMD is required to perform a comparative written analysis when adopting, amending, or repealing a rule or regulation. The comparative analysis is relative to existing federal requirements, existing or proposed South Coast AQMD rules and air pollution control requirements and guidelines which are applicable to wood-burning devices. The proposed amendments to Rule 445 would not conflict or overlap with existing federal requirements for PM_{2.5} for wood-burning devices in U.S. EPA's New Source Performance Standards, 40 CFR Part 60, Subpart AAA. The only other South Coast AQMD rule pertaining to burning, Rule 444, regulates open burning and does not conflict with or have any overlapping requirements with the proposed amendments to Rule 445. See Table 3-2 for the comparative analysis by rule element.

Table 3-2: PAR 445 Comparative Analysis

Rule Element	PAR 445	U.S. EPA NSPS 40 CFR Part 60, Subpart AAA
Purpose	To reduce the emission of particulate matter from wood-burning devices.	To establish the best system of emission reduction for new residential wood heaters.
Applicability	Manufacturers, sellers, installers of wood-burning devices; commercial firewood sellers;	Manufacturers, sellers, testers, owners, installers and operators of wood heaters.

	owners or operators of wood-burning devices.	
New Installations	Prohibits permanent installation of wood-burning devices into any new development.	None
Proposed Changes	<p>Lowers the curtailment threshold; Removes the low-income exemption; Exempts wood-burning devices reconstructed due to damages from a natural disaster declared as a State of Emergency as defined in Rule 118.</p>	None
Wood-Burning Devices Offered For Sale / Manufactured / Installed	<p>Prohibits sale, offer, supply, or offer to install indoor or outdoor wood-burning device unless:</p> <ul style="list-style-type: none"> • A U.S. EPA Certified wood-burning heater; or • A pellet-fueled woodburning heater; or • A masonry heater; or • A dedicated gaseous fueled fireplace. 	Establishes manufacturer certification; requires certified manufacture in some instances.

<p>Prohibited Fuel</p>	<p>Prohibits burning any product not intended for use as fuel in a wood-burning device including, but not limited to:</p> <ul style="list-style-type: none"> • garbage • treated wood • particle board • plastic products • rubber products • waste petroleum products • paints coatings or solvents • coal 	<p>Prohibits burning in an affected wood heater:</p> <ul style="list-style-type: none"> • Residential or commercial garbage; • Lawn clippings or yard waste; • Materials containing rubber, including tires; • Materials containing plastic; • Waste petroleum products, paints or paint thinners, or asphalt products; • Materials containing asbestos; • Construction or demolition debris; • Paper products, cardboard, plywood, or particleboard. The prohibition against burning these materials does not prohibit the use of fire starters made from paper, cardboard, sawdust, wax and similar substances for the purpose of starting a fire in an affected wood heater; • Railroad ties, pressure treated wood or pallets; • Manure or animal remains; • Salt water driftwood or other previously salt water saturated materials; • Unseasoned wood; • Any materials that are not included in the warranty and owner's manual for the subject wood heater; or • Any materials that were not included in the certification tests for the subject wood heater.
<p>Operating Parameters</p>	<p>Wood-burning devices may not be used when a No Burn day is declared.</p>	<p>The user of an affected residential wood heater must operate in a manner consistent with the owner's manual. The owner's manual must clearly specify that operation in a manner inconsistent with the owner's manual would avoid the warranty.</p>
<p>Monitoring, Reporting, Recordkeeping</p>	<p>None</p>	<p>None</p>