

# SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

## Preliminary Draft Staff Report

**Proposed Rule 444.1 – Particulate Matter Emission Reductions from Forestry and Agricultural Waste**

**Proposed Amended Rule 401 – Visible Emissions**

**Proposed Amended Rule 404 – Particulate Matter - Concentration**

**Proposed Amended Rule 405 – Solid Particulate Matter - Weight**

**Proposed Amended Rule 219 – Equipment Not Requiring a Written Permit Pursuant to Regulation II**

**Proposed Amended Rule 222 – Filing Requirements for Specific Emission Sources Not Requiring a Written Permit Pursuant to Regulation II**

**March 2026**

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## EXECUTIVE SUMMARY

Implementing fuel reduction strategies is crucial for effective wildfire prevention and particulate matter (PM) reduction. Currently, the majority of forestry and agricultural waste is disposed of through open burning or left in place as a source of fuel for wildfires. Both of which are highly emissive and generate elevated levels of PM and other pollutants. Providing a pathway for the use of alternative vegetative fuel reduction strategies and/or technologies, such as air curtain incinerators (ACIs) and prescribed fire vehicles, will help reduce PM emissions from forestry and agricultural waste management operations.

South Coast AQMD staff received interest from local government agencies to operate vegetative fuel reduction technologies for wildfire prevention. Currently, ACIs and prescribed fire vehicles are not operated within South Coast AQMD, as they have not demonstrated compliance with PM limits in Rule 404 – Particulate Matter - Concentration (Rule 404) and Rule 405 – Solid Particulate Matter - Weight (Rule 405). Additionally, ACIs and prescribed fire vehicles have not demonstrated compliance with visible emissions requirements in Rule 401 – Visible Emissions (Rule 401).

Proposed Rule 444.1 – Particulate Matter Emission Reductions from Forestry and Agricultural Waste (PR 444.1) will establish requirements for ACIs and prescribed fire vehicles used to reduce vegetative waste and will help reduce PM emissions from forestry and agricultural waste management practices. Proposed Amended Rule 401 – Visible Emissions (PAR 401), Proposed Amended Rule 404 – Particulate Matter - Concentration (PAR 404), and Proposed Amended Rule 405 – Solid Particulate Matter - Weight (PAR 405) will include an exemption for ACIs and prescribed fire vehicles to allow the use of these technologies regulated under PR 444.1. Proposed Amended Rule 219 – Equipment Not Requiring a Written Permit Pursuant to Regulation II (PAR 219) will exempt ACIs and prescribed fire vehicles not subject to Title V from South Coast AQMD permitting requirements. Proposed Amended Rule 222 – Filing Requirements for Specific Emission Sources Not Requiring a Written Permit Pursuant to Regulation II (PAR 222) will require ACIs and prescribed fire vehicles exempt from permitting to be registered with the South Coast AQMD.

The proposed rules are needed to partially implement Best Control Measure 20: Application of All Feasible Measures (BCM-20) from the 2024 South Coast Air Basin Attainment Plan for the 2012 Annual PM<sub>2.5</sub> Standard (PM<sub>2.5</sub> Plan) and implement objectives in Chapter 5e of the Eastern Coachella Valley (ECV) Community Emission Reduction Plan (CERP).

As part of this rule development effort, a technology assessment was conducted for vegetative fuel reduction technologies. Due to limited or unavailable emission data for the technologies reviewed, staff conducted a partial BARCT assessment. Although more robust emission data is necessary to establish an emission limit in PR 444.1, PM emissions will be reduced by an estimated 60 to 90% compared to open burning. PR 444.1 will not require the use of ACIs or prescribed fire vehicles and therefore, there will be no additional costs to adopting PR 444.1, PAR 401, PAR 404, PAR 405, PAR 219, and PAR 222.

PR 444.1, PAR 401, PAR 404, PAR 405, PAR 219, and PAR 222 were developed through a public process. Two Working Group meetings were held on August 20, 2025, and January 7, 2026. A Public Workshop will be held on March 25, 2026.

## **CHAPTER 1: BACKGROUND**

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**INTRODUCTION**

**BACKGROUND**

**REGULATORY HISTORY**

**AFFECTED FACILITIES AND EQUIPMENT**

**PUBLIC PROCESS**

## INTRODUCTION

The purpose of PR 444.1, PAR 401, PAR 404, PAR 405, PAR 219, and PAR 222 is to reduce PM emissions from forestry and agricultural waste and to provide a pathway for ACIs and prescribed fire vehicles to be used for wildfire prevention. The proposed rules are needed to partially implement Best Control Measure 20: Application of All Feasible Measures (BCM-20) from the 2024 South Coast Air Basin Attainment Plan for the 2012 Annual PM<sub>2.5</sub> Standard (PM<sub>2.5</sub> Plan) and implement objectives in Chapter 5e of the Eastern Coachella Valley (ECV) Community Emission Reduction Plan (CERP)<sup>1</sup>.

## BACKGROUND

Dead trees and dry vegetation act as fuel, increasing the likelihood of wildfires. About 243 million trees died in California between 2010 and 2024. Droughts exacerbated by climate change result in negative impacts to forests.<sup>2</sup> Drought-stressed trees are more vulnerable to diseases and pests, such as bark beetles, which can lead to tree mortality. Bark beetles are tiny insects that live underneath tree bark. They damage trees by tunneling into the bark and creating channels called galleries, where they reproduce. California hosts over 200 species of bark beetles, of which twenty are invasive, non-native species, including invasive shot hole borers (ISHB).<sup>3</sup> ISHB introduce a fungus that causes a disease called Fusarium dieback (FD) that further weakens the tree by disrupting the flow of water and nutrients.<sup>4</sup> The disease can cause wilted/brown leaves, branch dieback, tree decline, and death. ISHB-FD is present in all four counties within South Coast AQMD.<sup>5</sup> Figure 1-1 indicates areas in red where ISHB-FD was found by either visual assessment of the trees or through screen traps. Presence of ISHB-FD was not found in areas of the map indicated in blue. Invasive beetles exacerbated by drought conditions have killed millions of trees in Southern California and continue to be an ongoing threat to our urban and natural forests.

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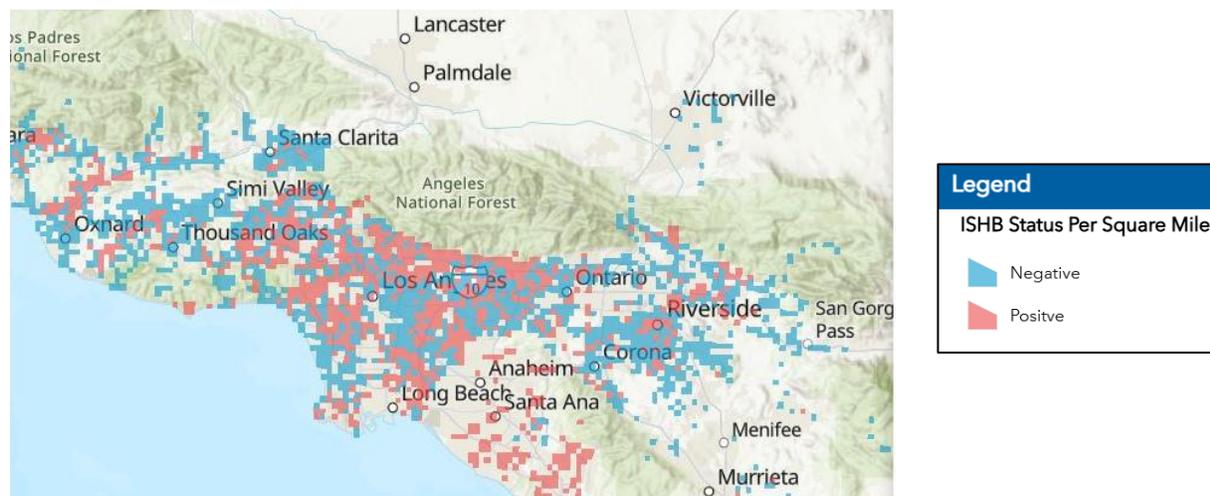
<sup>1</sup> ECV CERP, [https://www.aqmd.gov/docs/default-source/ab-617-ab-134/steering-committees/eastern-coachella-valley/final-cerp/final-cerp-july-2021.pdf?sfvrsn=ae03ae61\\_9](https://www.aqmd.gov/docs/default-source/ab-617-ab-134/steering-committees/eastern-coachella-valley/final-cerp/final-cerp-july-2021.pdf?sfvrsn=ae03ae61_9)

<sup>2</sup> <https://oehha.ca.gov/climate-change/epic-2022/impacts-vegetation-and-wildlife/forest-tree-mortality>

<sup>3</sup> <https://ipm.ucanr.edu/PMG/PESTNOTES/pn7421.html>

<sup>4</sup> <https://ucanr.edu/site/invasive-shothole-borers/pest-overview>

<sup>5</sup> <https://ucanr.edu/site/invasive-shothole-borers/ishb-fd-distribution-california>

**Figure 1-1: ISHB Distribution in South Coast AQMD<sup>6</sup>**

In 2003, a prolonged drought and bark beetle infestation affected trees across more than 150,000 acres in South Coast AQMD jurisdiction. The affected trees presented a wildfire risk to homes in San Bernardino and Riverside Counties, particularly impacting the communities of Lake Arrowhead and Idyllwild. Both counties declared fire emergencies and a task force was formed. The task force included the United States Forest Service (USFS), the California Department of Forestry, now known as California Department of Forestry and Fire Protection (CAL FIRE), county governments, and elected officials and other representatives of the affected communities. During that time, usable lumber was able to be trucked to a sawmill, but small branches and unmarketable wood waste needed an alternative disposal method. The task force approached South Coast AQMD staff to request use of ACIs to burn an estimated 500,000 tons of wood. As a result, the South Coast AQMD Governing Board authorized the issuance of open burn permits to USFS to operate eight air curtain incinerators in San Bernardino and Riverside Counties for a two year period. These permits would allow wood waste from felled trees to be burned in the ACIs and help abate the fire hazard. The permit was ultimately not utilized by the USFS.

Presently, drought and invasive beetles continue to cause tree mortality. Strategic measures are needed to prevent the spread of destructive beetle infestations. As more residents, homes, and infrastructure are located near forests and other natural areas, known as the wildland-urban interface (WUI), the more vulnerable these communities are to wildfires.

Currently, the majority of forestry and agricultural waste is disposed of through open burning or left in place as a source of fuel for wildfires. Both of which are highly emissive due to uncontrolled combustion that generates elevated levels of PM and other pollutants.

ACIs and prescribed fire vehicles are fuel reduction technologies that can reduce PM<sub>2.5</sub> compared to the emissions generated from open burning. ACIs and prescribed fire vehicles still emit high levels of PM but are an estimated 60% to 90% cleaner alternative to open burning. These technologies help reduce smoke and air pollution, provide faster burn rates, and result in greater

<sup>6</sup> <https://ucanr.edu/site/invasive-shothole-borers/ishb-fd-distribution-california>

control over combustion conditions.<sup>7</sup> In addition, these technologies can be operated closer to WUI areas due to burning being more contained in ACIs and prescribed fire vehicles and thus presenting a lower wildfire risk compared to open burning. Allowing the use of vegetative fuel reduction technologies, such as ACIs and prescribed fire vehicles, mitigates wildfire risk. Chapter 2 of the staff report contains more details related to emissions and alternative technologies to open burning.

### *Federal Clean Air Act Requirements*

The South Coast Air Basin has some of the highest levels of PM in the nation.<sup>8</sup> The United States Environmental Protection Agency (U.S. EPA) establishes National Ambient Air Quality Standards (NAAQS) for six criteria pollutants, including PM. PM is divided into two categories based on the size of the particles. PM<sub>10</sub> are inhalable particles with diameters that are 10 micrometers (µm) or less and PM<sub>2.5</sub> are called fine inhalable particles with diameters that are 2.5 µm or less.<sup>9</sup> There are three NAAQS for PM based on size and averaging time: 1) 24-hour PM<sub>10</sub> standard; 2) 24-hour PM<sub>2.5</sub> standard; and 3) annual PM<sub>2.5</sub> standard. The Federal Clean Air Act requires U.S. EPA to designate areas as either in attainment by meeting the applicable standard or in nonattainment by failing to meet the applicable standard.<sup>10</sup> South Coast AQMD has three NAAQS attainment regions, consisting of the South Coast Air Basin, the Riverside County portions of the Salton Sea Air Basin (Coachella Valley), and the Mojave Desert Air Basin.

On December 14, 2012, the U.S. EPA lowered the primary annual standard for PM<sub>2.5</sub> to 12 micrograms per cubic meter (µg/m<sup>3</sup>). The Clean Air Act classifies areas as in nonattainment for the PM<sub>2.5</sub> standards based on the levels of PM<sub>2.5</sub> in the attainment region. Nonattainment areas that fail to meet the PM<sub>2.5</sub> standards are designated as either “moderate” or “serious”. The U.S. EPA requires areas that do not meet a NAAQS to develop and implement an emission reduction strategy to meet the standard. On December 9, 2020, U.S. EPA designated the South Coast Air Basin as a “serious” nonattainment area for the 2012 annual PM<sub>2.5</sub> Standard, with an attainment date of December 31, 2025. South Coast AQMD is still awaiting determination of attainment for the 2012 annual PM<sub>2.5</sub> standard.<sup>11</sup>

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<sup>7</sup> <https://www.fs.usda.gov/t-d/pubs/html/05511303/05511303.html>

<sup>8</sup> [https://www.aqmd.gov/docs/default-source/clean-air-plans/pm2.5-plans/final-pm2.5-plan/chapter-1---introduction.pdf?sfvrsn=c7518a61\\_10](https://www.aqmd.gov/docs/default-source/clean-air-plans/pm2.5-plans/final-pm2.5-plan/chapter-1---introduction.pdf?sfvrsn=c7518a61_10)

<sup>9</sup> <https://www.epa.gov/pm-pollution/particulate-matter-pm-basics>

<sup>10</sup> <https://www.epa.gov/ozone-designations/learn-about-ozone-designations#process>

<sup>11</sup> [https://www.aqmd.gov/home/air-quality/air-quality-management-plans/other-state-implementation-plan-\(sip\)-revisions/2012-annual-pm2-5-plan](https://www.aqmd.gov/home/air-quality/air-quality-management-plans/other-state-implementation-plan-(sip)-revisions/2012-annual-pm2-5-plan)

**Figure 1-2: South Coast AQMD NAAQS Attainment Regions**

### *South Coast Air Basin Attainment Plan for the 2012 Annual PM<sub>2.5</sub> Standard (PM<sub>2.5</sub> Plan)*

The PM<sub>2.5</sub> Plan was adopted by the South Coast AQMD Governing Board on June 7, 2024. The PM<sub>2.5</sub> plan included a request for a 5-year extension to demonstrate attainment of the 2012 annual PM<sub>2.5</sub> standard by December 31, 2030. Under the Clean Act Section 188(e), the extension was requested due to unforeseen challenges such as increased emissions in the goods movement sector during the COVID-19 pandemic, unfavorable meteorology, wildfires, and the addition of near-road monitors. The PM<sub>2.5</sub> Plan contains BCM-20, which seeks to reduce direct PM<sub>2.5</sub> emissions from combustion and non-combustion sources. PR 444.1, PAR 401, PAR 404, and PAR 405 will partially implement BCM-20 in the 2012 PM<sub>2.5</sub> Plan, by allowing and regulating the use of alternative, lower emitting, vegetative fuel reduction technologies when compared to the open burning of forestry and agricultural waste.<sup>12</sup>

### *Community Emissions Reductions Plan (CERP) - Eastern Coachella Valley (ECV)*

In 2017, California Assembly Bill 617 (AB 617) was signed into law to develop a program to address local air pollution in disproportionately impacted communities. AB 617 directs California Resources Board (CARB) and local air districts, including South Coast AQMD, to enact measures to obtain more focused monitoring and emission reductions in environmental justice communities. In 2018, CARB designated ten AB 617 communities statewide, including three within South Coast AQMD. In 2019, CARB designated two additional AB 617 communities within South Coast AQMD, including the Eastern Coachella Valley. Local air districts are responsible for developing and implementing CERPs and Community Air Monitoring Plans (CAMPs) in partnership with residents and stakeholders. The CAMP includes actions to enhance the understanding of air pollution in the community and to support effective implementation of the CERP. The CERP is developed to achieve air pollution emission and exposure reductions and address the respective community's primary air quality concerns.

The ECV community is located in Riverside County and includes the city of Coachella and the unincorporated areas of Indio, Thermal, Oasis, Mecca, and North Shore. The main sources of air

<sup>12</sup>[https://www.aqmd.gov/home/air-quality/air-quality-management-plans/other-state-implementation-plan-\(sip\)-revisions/2012-annual-pm2-5-plan](https://www.aqmd.gov/home/air-quality/air-quality-management-plans/other-state-implementation-plan-(sip)-revisions/2012-annual-pm2-5-plan)

pollution affecting the community include fugitive dust from construction activities, unpaved roads and parking lots; and agricultural activities, including pesticide application and agricultural burning. During development of the ECV CERP<sup>13</sup>, community members expressed concern about the health effects from open burning and about the air quality impacts from open burning near schools, childcare centers, homes, and impacts to farmworkers. Community members also expressed interest in exploring alternatives to open burning. Examples of alternatives to traditional open burning include composting, using heavy-duty equipment (e.g. chipper or grinder), or using an ACI. Chapter 5e Table 2 in the ECV CERP, discusses pursuing funding opportunities for equipment or services to be used as alternatives to agricultural open burning. Rule development for PR 444.1, PAR 401, PAR 404, PAR 405, PAR 219, and PAR 222 was not identified as a course of action within the ECV CERP; however, this rule development will help reduce PM emissions from agricultural waste disposal operations by allowing the use of alternatives to traditional open burning, i.e., ACIs and prescribed fire vehicles.

## REGULATORY HISTORY

Rule 404 and Rule 405 established PM emission limits applicable to any source, including ACIs and prescribed fire vehicles. Rules 404 and 405 were both adopted in May 1976. Rule 404 was amended in 1979 and 1986, while Rule 405 was amended once in 1986. Prior to the formation of South Coast AQMD in 1977, each of the four counties – Los Angeles, Orange, Riverside, and San Bernardino – had their own air pollution control district (APCD). Rule 404 was first amended in October 1979 due to concern from U.S. EPA that Rule 404 was less stringent than the respective county APCD rules it replaced because liquid sulfur compounds were excluded from PM emission limits. Rule 1119 – Petroleum Coke Calcinating Operations - Oxides of Sulfur was adopted in March 1979, which required coke calciners to reduce SO<sub>2</sub> emissions by 80 percent and ensure compliance with Rule 404. As a result, Rule 404 was amended to remove the exemption for liquid sulfur compounds discharged from petroleum coke calcining operations. Rules 404 and 405 were last amended in February 1986 alongside the adoption of Rule 1112.1. Rule 1112.1 establishes limits for particulate emissions from cement kilns and clinker coolers; consequently, Rules 404 and 405 were amended to include an exemption for equipment which complies with the emission limits specified in Rule 1112.1.

Rule 401 regulates visible emissions from any source, including ACIs and prescribed fire vehicles. Rule 401 was adopted in February 1977 and subsequently amended eleven times to provide exemptions for various types of equipment or operations. The rule was last amended in November 2001 to extend the less stringent state visibility standard for four additional years for specific under-fired charbroilers, excluding chain-driven charbroilers and those with control equipment, to allow for cost-effective control technology to be identified.

Rule 219 exempts specific equipment, processes, or operations from South Coast AQMD permitting requirements. The rule has been amended 22 times to address specific types of equipment. Rule 219 was last amended in April 2023 to include enhanced recordkeeping, clarify

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<sup>13</sup>[https://www.aqmd.gov/docs/default-source/ab-617-ab-134/steering-committees/eastern-coachella-valley/final-cerp/final-cerp-july-2021.pdf?sfvrsn=ae03ae61\\_9](https://www.aqmd.gov/docs/default-source/ab-617-ab-134/steering-committees/eastern-coachella-valley/final-cerp/final-cerp-july-2021.pdf?sfvrsn=ae03ae61_9)

equipment replacement requirements at federal major sources, and update emission thresholds for non-Title V agricultural sources.

Rule 222 requires owners or operators to register specified equipment by submitting information regarding the source, including information to determine whether the equipment is operating in compliance with applicable District, state, and federal rules and regulations. In addition to an initial filing fee, affected equipment are subject to annual renewal fees. Rule 222 was adopted in September 1998 and has subsequently been amended six times. Rule 222 was last amended in April 2023 to update existing references to Rule 219 provisions, including exemptions for residential dwelling units of no more than four families and for small food ovens.

## **AFFECTED FACILITIES AND EQUIPMENT**

Currently, ACIs and prescribed fire vehicles are not operated within South Coast AQMD's jurisdiction, as they have not demonstrated compliance with the PM limits in Rule 404 and 405, nor the visible emissions requirements in Rule 401. The types of facilities expected to operate ACIs and prescribed fire vehicles include government agencies that specialize in forest protection, fire protection, and transportation; as well as agricultural operations. Staff is aware of four ACIs owned and/or operated by government agencies that will be used within South Coast AQMD jurisdiction after rule adoption; all four ACIs are equipped with engines rated less than 50 HP. However, staff anticipates the number of ACIs and prescribed fire vehicles used by government agencies and their contractors to increase in the future.

## **PUBLIC PROCESS**

The development of PR 444.1, PAR 401, PAR 404, PAR 405, PAR 219, and PAR 222 was conducted through a public process. Two Working Group meetings were held on August 20, 2025 and January 7, 2026. The Working Group is composed of representatives from public agencies, consultants, manufacturers, environmental and community representatives, and other interested parties. The purpose of the Working Group meetings is to discuss details of proposed rules and to listen to concerns with the objective to build consensus and resolve key issues. Additionally, a Public Workshop will be held on March 25, 2026. The purpose of the Public Workshop is to present the proposed rule language to stakeholders and to solicit comment. Staff also conducted multiple site visits as part of this rulemaking process.

## **CHAPTER 2: BARCT ASSESSMENT**

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### **INTRODUCTION**

### **BARCT ANALYSIS APPROACH**

*Assessment of Current South Coast AQMD Regulatory Requirements*

*Assessment of Emission Limits for Existing Units*

*Other Regulatory Requirements*

*Assessment of Pollution Control Technologies*

*Initial BARCT Emission Limits and Other Considerations*

### **SUMMARY**

## INTRODUCTION

Best Available Retrofit Control Technology (BARCT) is defined in the California Health & Safety Code Section 40406 as “an emission limitation that is based on the maximum degree of reduction achievable, taking into account environmental, energy, and economic impacts by each class or category of source”. The purpose of a BARCT assessment is to identify any potential emission reductions from specific equipment or industries and establish an emission limit that is consistent with state law.

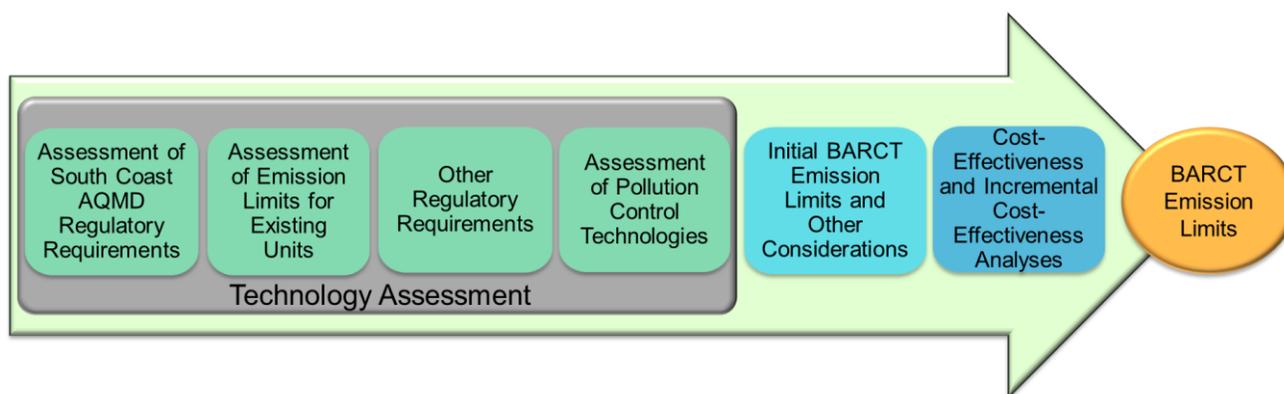
Initially, staff planned on conducting a full BARCT assessment as part of this rule development and establishing BARCT emission limits for PM in PR 444.1. Due to limited or unavailable data for the technologies reviewed as part of the technology assessment, an initial BARCT emission limit could not be determined. The partial BARCT assessment for development of PR 444.1, PAR 401, PAR 404, PAR 405, PAR 219, and PAR 222 includes an assessment of South Coast AQMD regulatory requirements, an assessment of emission limits for existing vegetative fuel reduction technologies, an analysis of rules and regulations of other air pollution control agencies, and an overview of potential vegetative fuel reduction technologies.

## BARCT ANALYSIS APPROACH

The BARCT analysis approach follows a series of steps conducted for each equipment category.

The steps for BARCT analysis consist of:

- Assessment of South Coast AQMD Regulatory Requirements
- Assessment of Emissions Limits for Existing Units
- Other Regulatory Requirements
- Assessment of Pollution Control Technologies
- Initial BARCT Emission Limits and Other Considerations
- Cost-Effectiveness and Incremental Cost-Effectiveness Analyses
- BARCT Emission Limits



*Assessment of South Coast AQMD Regulatory Requirements*

As part of the BARCT assessment, staff reviewed existing South Coast AQMD regulatory requirements which reduce PM emissions from forestry and agricultural waste management operations. Forestry and agricultural waste is primarily disposed of through open burning. Rule 444 – Open Burning (Rule 444) regulates open burning activities by specifying conditions and requirements for open burning but does not establish PM emission limits. Rule 444 defines open burning combustion/open detonation as “outside of a combustion chamber”. However, ACIs and prescribed fire vehicles, include a combustion chamber and therefore, do not meet the definition of open burning.



Figure 2-1- Example of Pile Burning

Rule 444 allows open burning to dispose of forestry and agricultural waste. Prescribed burning, agricultural burning, and fire hazard removal are some of the open burning activities subject to Rule 444. Prescribed burning is planned open burning conducted by a public agency, and the two main types are broadcast burning and pile burning. Broadcast burning is controlled burning of brush and understory vegetation that is confined to a predetermined area. Pile burning is controlled burning of debris, such as brush, in a consolidated pile. Pile burning is a common practice to dispose of forestry and agricultural waste within South Coast AQMD.

Open burning is not subject to Rule 404 and Rule 405, as open burning is not considered to be a point source of emissions, which involves equipment typically requiring a permit to operate. Rule 404 and Rule 405 apply to any source (i.e., equipment), including ACIs and prescribed fire vehicles. Rule 404 limits the grain loading of PM in a cubic foot of air that is discharged to the atmosphere. Rule 405 limits the amount of PM that may be discharged into the atmosphere from an operation based upon the weight of material processed. Open burning is also not subject to Rule 401. Rule 401 applies to vegetative fuel reduction technologies, including ACIs and prescribed fire vehicles and limits visible emissions from any single source of emission. Rule 401 specifies an opacity limit no darker than number one on the Ringelmann Chart, representing 20% opacity, for a period aggregating more than three minutes in any one hour.

Rule 1133.1 – Chipping and Grinding Operations (Rule 1133.1) applies to owners and operators of chipping and grinding operations and is meant to prevent inadvertent decomposition during such operations. Rule 1133.1 applies to chipped and ground woodwaste, greenwaste, and foodwaste used for purposes other than composting (Rule 1133.3 – Emission Reductions from Composting Operations) or co-compositing (Rule 1133.2 – Emission Reductions from Co-Composting Operations). Chipping and grinding can be used as a method to process forestry and agricultural waste and is considered to be a vegetative fuel reduction technology.

### *Assessment of Emissions Limits for Existing Units*

The majority of forestry and agricultural waste is disposed of through open burning. South Coast AQMD rules do not have established emission limits for open burning or vegetative fuel reduction technologies; Rule 1133.1 does not contain emission limits. However, South Coast AQMD permits for chipping and grinding have varying emission limits for process emissions and engines associated with the respective equipment.

### *Other Regulatory Requirements*

As part of the BARCT assessment, staff reviewed other California air district regulations and found that the following include emission limits in permits rather than rules for vegetative fuel reduction technologies: Bay Area Air Quality Management District, San Luis Obispo County Air Pollution Control District, Monterey Bay Air Resources District, North Coast Unified Air Quality Management District, and San Diego County Air Pollution Control District. San Joaquin Valley Air Pollution Control District includes ACI emission limits in Rule 2280 – Portable Equipment Registration (Rule 2280) as well as in their permits.

**Table 2-1: Rule 2280 Emission Limits for Air Curtain Burn Box<sup>14</sup>**

Pollutant	Emission Limit (lb/ton)*
PM10	1.3
NO <sub>x</sub>	1
SO <sub>x</sub>	0.1
CO	2.6
VOC	0.9

\*(in pounds per ton of agricultural waste material)

U.S. EPA formerly required Title V permits for all ACIs due to high levels of PM emissions. On April 17, 2024, U.S. EPA removed Title V requirements for ACIs that burn less than 35 tons per day and only burn wood waste, clean lumber, yard waste, or a combination of the three. In most cases, burning agricultural waste in an ACI requires a Title V permit. U.S. EPA 40 Code of Federal Regulations (CFR) Part 60 Subpart EEEE establishes performance standards for other solid waste incineration (OSWI) units, which includes ACIs, pyrolysis, and gasification units. Subpart EEEE contains emission limitations, operating limitations, compliance requirements, and recordkeeping and reporting requirements.

ACIs that burn only wood waste, clean lumber, and yard waste are subject only to requirements in Section 60.2970 through 60.2973, rather than all the requirements in Subpart EEEE. ACIs that

<sup>14</sup> <https://www.valleyair.org/media/d14hbnox/rule-2280.pdf>

burn only those three materials are subject to an opacity limitation of 35% (6 minute average) during the 30 minute start-up period and an opacity limitation of 10% (6 minute average) thereafter using EPA Method 9. Section 60.2970 through 60.2973 also includes recordkeeping and reporting requirements for ACIs. Table 2-2 applies to OWSI units that burn materials other than wood waste, clean lumber, and yard waste, including ACIs that burn non-woody agricultural waste.

**Table 2-2: PM Emission Limitations for OWSI Units in 40 CFR Part 60 Subpart EEEE<sup>15</sup>**

Unit Type	PM Emission Limit	Averaging Time	EPA Method
OSWI units that commenced construction on or before August 31, 2020	0.013 grains per dry standard cubic foot (dscf)	Using 3-run average (1 hour minimum sample time per run)	Method 5 or 29 of Appendix A
OSWI units with capacities >10 tons/day that commenced construction after August 31, 2020 or commenced reconstruction or modification on or after December 29, 2025	0.013 grains per dscf		
OSWI Units With Capacities ≤10 tons/day that commenced construction after August 31, 2020 or commenced reconstruction or modification on or after December 29, 2025	210 milligrams per dry standard cubic meter		

<sup>15</sup> <https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-60/subpart-EEEE>

### *Assessment of Pollution Control Technologies*

As part of the BARCT assessment, staff conducted a technology assessment of different vegetative fuel reduction technologies. The technologies evaluated were chipping and grinding, gasification, pyrolysis systems, prescribed fire vehicles, and ACIs.



Figure 2-2 — Chipping and Grinding



Figure 2-3 — Gasification



Figure 2-4 — Pyrolysis System



Figure 2-5 — Prescribed Fire Vehicle



Figure 2-6 — Air Curtain Incinerator

### Chipping and Grinding

Vegetative waste can be processed through chipping and grinding. Equipment used for chipping and grinding include wood chippers, tub grinders, or horizontal grinders. Chipping and grinding mechanically reduces the size of the waste material. Vegetative waste can be chipped and ground for use as land cover, a soil amendment, or feedstock. PM emissions are directly associated with chipping and grinding. There is also high fuel consumption associated with chipping and grinding and with transporting the waste from one site to another.<sup>16</sup>

### Gasification Technology

Thermo-catalytic gasification technology can convert vegetative waste into a pipeline quality renewable gas called syngas. Converting vegetative waste into syngas helps divert material from landfills while producing fuel that can be used for electricity generation. Gasification is an emerging technology that is not yet mature for widespread end-user application. Successful

<sup>16</sup><https://climate.mit.edu/ask-mit/does-harvesting-wood-contribute-climate-change-even-if-wood-used-permanent-structures#:~:text=Yes:%20the%20tree%20waste%20left,impacts%20on%20land%2Dbased%20ecosystems>

implementation of this technology relies on overcoming certain infrastructure challenges. Gasification requires substantial infrastructure from feedstock supply to energy generation and emission control. It also depends on a reliable supply chain and transportation network for continuous operation.<sup>17</sup> As an emerging technology not ready for widespread user application, there is currently no emission data available.

### Pyrolysis Systems

Pyrolysis is a thermo-chemical process, where vegetative waste is heated in a low-oxygen environment to break down the waste. The benefit of this technology is the production of biochar, which sequesters carbon into a stable form preventing it from decomposing into atmospheric carbon dioxide. Biochar is also a beneficial soil amendment, improving soil health by retaining water and nutrients. In addition to emissions related to operation of this technology, there are emissions associated with transporting materials to the equipment site. This technology also requires supporting infrastructure such as access to water and electricity.<sup>18</sup> There are no permitted pyrolysis systems used for vegetative waste within South Coast AQMD and thus no related emission data is available.

### Prescribed Fire Vehicle

Prescribed fire vehicles are used to burn grasses and low-growth brush and can be operated on relatively wet or dry grass. This technology is not intended for reducing tall or dense vegetation, shrubs, or tree waste. Prescribed fire vehicles use an array of high temperature, high oxygen torches to burn vegetation directly below the vehicle. They also use large fans to draw air in along the bottom of the burn chamber. The added oxygen inside the burn chamber produces cleaner combustion and less smoke than traditional open burning. The primary function of this technology is to support fire mitigation efforts by establishing fuel breaks. Prescribed fire vehicles can precisely burn areas at tree lines adjacent to homes and other properties and can be used along highways.<sup>19</sup> Prescribed fire vehicles are an emerging technology and there is currently no available emission data.

### Air Curtain Incinerators

ACIs can be used to burn vegetative waste and produce biochar depending on operating conditions. ACIs operate by projecting a high-velocity curtain of air across an open burn chamber, promoting cleaner combustion compared to open burning. The equipment is either above or below ground and can contain refractory walls and a floor. The high-velocity air curtain ensures a constant supply of oxygen to the fire, promoting a more complete combustion process.<sup>20</sup> Table 2-3 summarizes available emission data for ACIs, which show significant variability. Despite the limited and variable ACI emission data, source test results show burning vegetative waste in an ACI to be 60% to 90%+ cleaner than open pile burning.<sup>21</sup>

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<sup>17</sup><https://www.sciencedirect.com/science/article/pii/S0196890424011543#:~:text=Gasification%20is%20an%20auspicious%20pathway,operational%20efficacy%20of%20the%20plant>

<sup>18</sup><https://www.ars.usda.gov/northeast-area/wyndmoor-pa/eastern-regional-research-center/docs/biomass-pyrolysis-research-1/what-is-pyrolysis/>

<sup>19</sup> <https://burnbot.com/technology/#video>

<sup>20</sup> <https://www.fs.usda.gov/t-d/pubs/html/05511303/05511303.html>

<sup>21</sup> <https://www.oregon.gov/deq/aq/cao/Documents/caoACIresultsSum.pdf>

**Table 2-3: Emissions Test Results for Air Curtain Incinerators<sup>22</sup>**

<b>Material</b>	<b>Year</b>	<b>PM10 (lb/ton)</b>	<b>CO (lb/ton)</b>
Wood/cord wood	1968	13	-
Wood	2000	0.12	1.1
Forest vegetation	2002	1.1	2.6
Wood	2003	1.4	30
Wood	2003	0.13	0.61
Wood	2016	0.0064	4.2
Vegetative material	2016	7.7	6.9
Wood	2023	4.25	14.2

#### *Initial BARCT Emission Limits and Other Considerations*

As part of the BARCT assessment, staff examined emission data from various vegetative fuel reduction technologies. Emission data found was limited or unavailable for the technologies reviewed. Due to the limited emission data found during the technology assessment, only a partial BARCT assessment was conducted. Thus, staff determined that an initial BARCT emission limit could not be established. As a result, PR 444.1 will reduce PM emissions from forestry and agricultural waste management practices by establishing requirements for best management practices, monitoring, and recordkeeping.

<sup>22</sup> <https://www.valleyair.org/media/dpipwseq/criteria-air-incinerator-ef-determination-analysis.pdf>

## **CHAPTER 3: SUMMARY OF PROPOSALS**

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**INTRODUCTION**

**PROPOSED RULE 444.1 STRUCTURE**

**PROPOSED RULE 444.1**

**PROPOSED AMENDED RULE 401, PROPOSED AMENDED RULE 404,  
AND PROPOSED AMENDED RULE 405**

**PROPOSED AMENDED RULE 219 AND PROPOSED AMENDED  
RULE 222**

## INTRODUCTION

PR 444.1 establishes requirements for air curtain incinerators (ACIs) and prescribed fire vehicles used to reduce vegetative waste and reduces PM emissions from forestry and agricultural waste management practices. PAR 401, PAR 404, and PAR 405 will include an exemption for ACIs and prescribed fire vehicles regulated under PR 444.1 to allow their use in South Coast AQMD jurisdiction. PAR 219 will exempt ACIs and prescribed fire vehicles not subject to Title V from South Coast AQMD permitting requirements, but they will be required to be registered pursuant to PAR 222.

## PROPOSED RULE 444.1 STRUCTURE

PR 444.1 will contain the following subdivisions:

- a) Purpose*
- b) Applicability*
- c) Definitions*
- d) General Requirements*
- e) Air Curtain Incinerator Operating Requirements*
- f) Air Curtain Incinerator Monitoring Requirements*
- g) Prohibitions*
- h) Maintenance Requirements*
- i) Source Testing*
- j) Recordkeeping*

### PROPOSED RULE 444.1

#### *Subdivision (a) – Purpose*

The purpose of this rule is to establish requirements for air curtain incinerators and prescribed fire vehicles and to reduce PM emissions from forestry and agricultural waste management practices.

#### *Subdivision (b) – Applicability*

PR 444.1 applies to owners and operators of air curtain incinerators and prescribed fire vehicles. PR 444.1 contains a requirement which limits the use of ACIs and prescribed fire vehicles to solely government agencies and their contractors; this requirement is intended to prevent private use until a future PR 444.1 amendment is made. This will allow South Coast AQMD to work with government agencies to source test equipment, establish emission limits, and evaluate best management practices before allowing private use.

#### *Subdivision (c) – Definitions*

Definitions were added or modified from other South Coast AQMD rules and federal and state regulations to provide clarity for PR 444.1 requirements.

- *AGRICULTURAL OPERATIONS means any business occurring on a ranch or farm directly related to:*
  - (A) *Growing of crops; or*
  - (B) *Conducting agricultural research or instruction by an educational institution.*

This definition is from Rule 444 and modified to remove operations related to the raising of fowl or other animals for the primary purpose of making a profit or for a livelihood, which are not applicable to PR 444.1.

- *AGRICULTURAL WASTE means unwanted or unsalable plant materials produced wholly from Agricultural Operations. Agricultural Wastes do not include items such as metal, wire, plastic, rubber, ornamental or landscape vegetation, chemically treated wood including chemically treated grape stakes, shop wastes, construction and demolition material, material containing asbestos, garbage, oil filters, tires, tar paper, pesticide and fertilizer containers, broken boxes, pallets, sweat boxes, packaging material, packing boxes or any other material produced in the packaging or processing of agricultural products. Orchard or vineyard waste or any other material, generated as a result of land use conversion to nonagricultural purposes is not agricultural waste.*

This definition is from Rule 444 and modified to refer to waste from Agricultural Operations as defined in PR 444.1. The definition was also modified to specify that agricultural waste refers to only plant materials from agricultural operations and does not include items such as metal or wires that are used in agricultural operations such as metal wires used to support grape vines. Waste burned in ACIs and prescribed fire vehicles reach hotter temperatures compared to open burning. Metals burned in ACIs and prescribed fire vehicles can reach temperatures hot enough to release toxic heavy metals into the atmosphere. Grape stakes are commonly pressure-treated with preservatives such as chromated copper arsenate to prevent insect damage and decay, which can cause hazardous air pollutants when burned.

- *AIR CURTAIN INCINERATOR means an incinerator, carbonator, or mechanized burner that operates by forcefully projecting a curtain of air across an open, integrated combustion chamber or open pit or trench in which combustion occurs.*

This definition is from 40 CFR Part 60 Subpart EEEE<sup>23</sup> and was modified to describe different terms or names for ACIs applicable to PR 444.1. ACIs can be constructed above ground in a manufactured steel container which acts as an open combustion chamber. ACIs may or may not have refractory walls and a floor. ACIs can also be constructed below ground in an open pit or trench which serves as the open combustion chamber. The terms incinerator, carbonator, and mechanized burner all refer to the same process of forcing a high-velocity curtain of air across an open combustion chamber used to burn vegetative waste. ACIs can produce ash, biochar, or sometimes both. The term carbonator relates to the production of biochar. Biochar can be produced by applying water to the combusted materials to extinguish burning before turning to ash. As stated in 40 CFR Part 60 Subpart EEEE, ACIs do not include conventional

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<sup>23</sup> <https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-60/subpart-EEEE>

combustion devices with enclosed fireboxes and controlled air technology such as mass burn, modular, and fluidized bed combustors.

- *BURN AUTHORIZATION NUMBER means the number that is assigned to a burn project upon being granted approval by the Executive Officer.*

This definition is from Rule 444. The request for a burn authorization number is the mechanism in which the Executive Officer is notified of planned burning. Under PR 444.1, a burn project refers to the burning of vegetative waste in an ACI or prescribed fire vehicle.

- *CONTRACTOR means a person or company who performs a service for a separate entity under a valid and current contract. Contractor includes government grant recipients.*

This definition was added to describe persons who have established a written contract with government agencies to operate ACIs and prescribed fire vehicles to reduce vegetative waste on their behalf. A contract is valid if it is legally enforceable agreement between two parties. A contract is current if it is active and presently in effect. A current and valid contract is a written agreement between both parties where there is an ongoing agreement for the operational period of the project.

- *CONTROLLED SUBSTANCE means any drug, substance, or immediate precursor which is listed in Schedules I through V of the Uniform Controlled Substances Act, codified in the California Health and Safety Code Division 10.*

This definition is from California Health and Safety Code Section 11007<sup>24</sup> and was added to describe types of vegetative waste prohibited to be burned under PR 444.1. The definition of agricultural waste includes unwanted or unsalable plants which can be inclusive of some controlled substances derived from plants either directly or through chemical processing such as cannabis, opium, and psilocybin mushrooms. The definition is modified from Section 11007 to include the schedule numbers and associated law pertaining to this definition.

- *PRESCRIBED FIRE VEHICLE means a mobile machine designed for wildfire prevention by performing mechanized controlled burns of low-growth vegetation to create fuel breaks.*

This definition was added to describe a type of unit regulated by PR 444.1. This definition is intended to capture an emerging technology that consists of a remote-controlled, tractor sized vehicle that burns grasses and low-growth brush to create lines of burnt materials that act as fuel breaks to reduce wildfire risk. Prescribed fire vehicles are an emerging technology and are currently remote-controlled but may be operated manually in the future. See Chapter 2 of the Staff Report for more details.

- *SCHOOL means any public or private school, including juvenile detention facilities with classrooms, used for the education of more than 12 children at the school in kindergarten*

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<sup>24</sup>[https://leginfo.legislature.ca.gov/faces/codes\\_displayText.xhtml?lawCode=HSC&division=10.&title=&part=&chapter=1.&article=](https://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=HSC&division=10.&title=&part=&chapter=1.&article=)

*through grade 12. School also means an Early Learning and Developmental Program by the U.S. Department of Education or any state or local early learning and development programs such as preschools, Early Head Start, Head Start, First Five, and Child Development Centers. A School does not include any private school in which education is primarily conducted in private homes. The term includes any building or structure, playground, athletic field, or other area of school property.*

This definition is from Rule 1480 — Ambient Air Monitoring and Sampling of Metal Toxic Air Contaminants (Rule 1480).

- *SENSITIVE RECEPTOR means any residence including private homes, condominiums, apartments, and living quarters; Schools as defined in paragraph (c)(8); daycare centers; and health care facilities such as hospitals or retirement and nursing homes. Sensitive receptors include long-term care hospitals, hospices, prisons, and dormitories or similar live-in housing.*

This definition is from Rule 1480. This definition was added to describe the buildings or structures containing more vulnerable populations such as children, the elderly, and the sick.

- *VEGETATIVE WASTE means Wood Waste, Yard Waste, and Agricultural Waste.*

This definition was added to describe the types of waste that can be burned in ACI or prescribed fire vehicle. Vegetative waste can refer individually to either wood waste, yard waste, or agricultural waste. Vegetative waste can also mean any mixture of wood waste, yard waste, and agricultural waste.

- *WOOD WASTE means untreated wood and untreated wood products, including tree stumps (whole or chipped), trees, and tree limbs (whole or chipped). Wood Waste does not include grass, grass clippings, bushes, shrubs, and clippings from bushes and shrubs from residential, commercial/retail, institutional, or industrial sources as part of maintaining yards or other private or public lands, construction, renovation, or demolition wastes.*

This definition is from 40 CFR Part 60 Subpart EEEE. Wood waste is a type of vegetative waste which is allowed to be burned pursuant to PR 444.1. This definition was streamlined to remove examples of treated wood and treated wood products that do not meet the definition of wood waste. This definition was modified from Subpart EEEE to remove bark, sawdust, chips, scraps, slabs, millings, and shavings from the definition of wood waste under PR 444.1. These smaller wood waste materials are not suitable to be used as the primary fuel in an ACI as their use can lead to improper combustion and cause more smoke. Chipped wood waste can however be mixed in with larger wood waste to burn more efficiently in an ACI. These materials are also not suitable to be used in a prescribed fire vehicle as this equipment is solely meant to be used on grasses and low-growth brush. Wood waste can refer to either untreated wood or untreated wood products, or it can refer to any mixture of these types of vegetative waste.

- *YARD WASTE means grass, grass clippings, bushes, shrubs, and clippings from bushes and shrubs. Yard Waste comes from residential, commercial/retail, institutional, or*

*industrial sources as part of maintaining yards or other private or public lands. Yard Waste does include construction, renovation, and demolition wastes.*

This definition is from 40 CFR Part 60 Subpart EEEE. Yard waste is a type of vegetative waste, which is allowed to be burned pursuant to PR 444.1. Yard waste can refer to grass, grass clippings, bushes, shrubs, or clippings from bushes and shrubs. Yard waste can also mean any mixture of these types of vegetative waste. An example of yard waste includes public or private lands that may be burned by the operation of prescribed fire vehicles. The term yard waste is also from 40 CFR Part 60 Subpart EEEE and does not solely include waste from a yard, which is usually associated with a private residence. Any waste that meets the definition of yard waste in PR 444.1 can be burned in an ACI or prescribed vehicles even if the waste is not from a residential yard such as wild grasses or shrubs on public lands near highways.

#### *Subdivision (d) – General Requirements*

##### Vegetative Waste Burning – Paragraph (d)(1)

Paragraph (d)(1) requires that only vegetative waste be burned in ACI or prescribed fire vehicle. ACIs and prescribed fire vehicles are designed to reduce PM emissions from the burning of vegetative waste and are not equipped with air pollution control devices designed to reduce toxic air contaminants, hazardous air pollutants, or other emissions which could pose harm to public health (e.g. burning of controlled substances). Therefore, materials such as metals and treated wood, must not be burned in an ACI or prescribed fire vehicle pursuant to PR 444.1, as more robust emission control devices would be necessary to protect public health if burning these types of materials.

##### Government Agencies and their Contractors – Paragraph (d)(2)

PR 444.1 allows only government agencies and their contractors to operate ACIs and prescribed fire vehicles. This requirement is intended to prevent private use until a future PR 444.1 amendment is made. This will allow South Coast AQMD to work with government agencies to source test equipment, establish emission limits, and evaluate best management practices before allowing private use. Government agencies may partner with communities or agricultural operations to burn vegetative waste to reduce fuels.

##### Minimizing Emissions of Air Contaminants – Paragraph (d)(3)

Paragraph (d)(3) requires the owner or operator of an ACI or prescribed fire vehicle to minimize the amount of air contaminants released into the atmosphere. This includes maintaining the equipment properly and operating equipment in a manner that reduces air contaminants. This provision serves as a substitute for a common permit requirement to ensure equipment is properly maintained and kept in good operating condition at all times.

##### Wind Speed Requirements for ACIs and Prescribed Fire Vehicles – Paragraph (d)(4)

PR 444.1 requires that ACIs or prescribed fire vehicles burn vegetative waste only when wind speeds are less than 20 mph. Operating manuals for ACIs<sup>25</sup> and prescribed fire vehicles<sup>26</sup> both state

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<sup>25</sup> <https://airburners.com/files/operating-manuals/charboss-3axels-v2025.pdf>

<sup>26</sup> [https://burnbot.com/wp-content/uploads/2025/07/2025\\_BurnBot\\_RX\\_Flyer\\_v01.pdf](https://burnbot.com/wp-content/uploads/2025/07/2025_BurnBot_RX_Flyer_v01.pdf)

that operation should not take place above this wind speed. Wind speeds higher than 20 mph can blow embers to nearby buildings or structures and increase wildfire risk.

#### Ash Removal Requirements – Paragraphs (d)(5)

Ash must be handled, stored, and disposed of properly to prevent emissions into the atmosphere. Strong winds have the potential to cause ash to become airborne. Ash contains PM and other pollutants that pose a risk to public health. Ash can be moved carefully using an ash rake, front-end loader, or excavator with a bucket and thumb. An example of improper handling of ash is using a leaf blower to remove ash from filters and allowing them to enter the atmosphere. After removal, ash can be disposed of by being mixed in with soil and used as a soil amendment.

#### Burn Authorization Number for ACIs and Prescribed Fire Vehicles – Paragraph (d)(6)

PR 444.1 requires a daily burn authorization from the Executive Officer for each burn operation at each location. A location is the physical address or legal description such as the coordinates in latitude and longitude. Any time the ACI is moved and there is a cold start to begin operation is considered a new location, including if the equipment is moved to a different part of the same forest. A cold start refers to any time the ACI is starting a new burning activity in which an ignition device is used. The burn authorization must be requested by phone by 4:00 pm on the day prior to burning. This provision is consistent with Rule 444, which requires an owner or operator to obtain a burn authorization number for each open burning event. This requirement will allow the Executive Officer to be notified when burning is taking place and will aid in potential compliance investigations.

#### *Subdivision (e) – Air Curtain Incinerator Operating Requirements*

#### Cold Start Requirements for ACIs – Subparagraphs (e)(1)(A) and (e)(1)(B)

When conducting a cold start of an ACI, the owner or operator must use a propane torch, drip torch, or flare as ignition devices to ignite material inside the combustion chamber. A combustion chamber refers to where combustion of waste occurs, including in an open pit or trench. These ignition devices will help the fire start safely and allow for more control over ignition. Accelerants such as gasoline, diesel fuel, kerosene, and turpentine must not be used to prevent the production of black smoke. A cold start refers to any time the ACI is starting a new burning activity in which an ignition device is used. A cold start does not mean the first time an ACI is ever operated; cold starts can occur multiple times throughout the equipment life of an ACI.

#### Engine and Fuel Requirements for ACIs – Paragraphs (e)(2) and (e)(3)

ACIs containing an internal combustion engine that is used to power the air curtain must meet U.S. EPA Tier 4 emission standards. Any diesel fuel used in an ACI must meet CARB diesel fuel standards.

#### Best Management Practices for ACIs – Paragraphs (e)(4) - (e)(7)

Vegetative waste loaded into the combustion chamber must not remain above the air curtain to ensure proper combustion and to reduce PM emissions. A combustion chamber refers to where combustion occurs, including an open pit or trench. During operation, an ACI must be monitored continuously when there is active burning or when flames are visible to reduce wildfire risk. The high-velocity air curtain must remain in operation and continuously blow air inside the combustion

chamber in accordance with the manufacturer's recommended airflow setting until all waste materials are burned and there are no visible flames present. Ash must be removed when it reaches 1/3 the height of the combustion chamber or when the accumulated ashes impede combustion, whichever occurs first. Ash removal at this height will help ensure the ACI is operating at maximum efficiency.

*Subdivision (f) – Air Curtain Incinerator Monitoring Requirements*

Monitoring Requirements for ACIs – Paragraphs (f)(1) - (f)(6)

PR 444.1 mirrors monitoring requirements in U.S. EPA's 40 CFR 60 Subpart EEEE. Opacity testing requirements include an initial test and subsequent tests every 12 calendar months from the date of initial startup to determine compliance with opacity limitations. Opacity testing must be conducted using U.S. EPA Method 9 by an observer certified in U.S. EPA Method 9. The certification of the observer to perform U.S. EPA Method 9 must be current and valid.

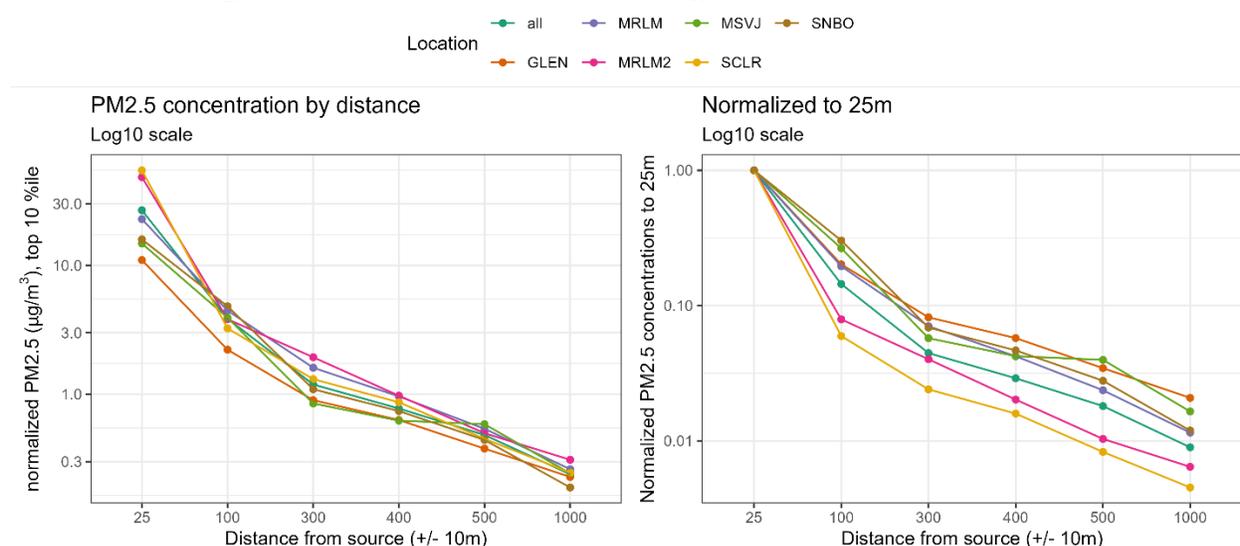
*Subdivision (g) – Prohibitions*

Controlled Substances – Paragraphs (g)(1)

PR 444.1 prohibits owners or operators from burning controlled substances in an ACI or prescribed fire vehicle. Burning controlled substances in an ACI or prescribed fire vehicle can cause the release of air contaminants that pose a risk to public health. ACIs and prescribed fire vehicles do not contain add-on air pollution control devices that would prevent air pollutants from controlled substances from being emitted into the atmosphere.

Sensitive Receptors – Paragraphs (g)(2)

PR 444.1 prohibits the operation of an ACI closer than 1,000 feet from a sensitive receptor. The distance of 1,000 feet was established based on similar requirements in other South Coast AQMD rules, feedback from ACI operators, and modeling support. This provision is intended to protect the health of vulnerable populations such as children, the elderly, and the sick at these locations and is also consistent with agricultural burning requirements in Rule 444. ACIs do not need to be operated near sensitive receptors to obtain vegetative fuel reduction benefits. South Coast AQMD staff also conducted modeling which supports the prohibition of operating an ACI within 1,000 feet of a sensitive receptor. Figure 4-1 shows that PM<sub>2.5</sub> concentrations decrease by more than 90% at 300 meters (~1,000 feet) from an ACI.

**Figure 3-1: PM Concentration Change with Distance from ACIs**

Unlike ACIs, one of the primary purposes of prescribed fire vehicles is to burn vegetative waste near residences and structures to create fuel breaks and reduce wildfire risk near these properties. As a result, paragraph (g)(2) is not applicable to prescribed fire vehicles. However, as prescribed fire vehicles are mobile and are intended to create fuel breaks, time spent at any one location is expected to be limited.

#### *Subdivision (h) – Maintenance Requirements*

##### Maintenance Requirements for ACIs and Prescribed Fire Vehicles – Paragraphs (h)(1) - (h)(2)

PR 444.1 requires an owner or operator of an ACI or prescribed fire vehicle to maintain the equipment as recommended by the manufacturer in the operating and maintenance manual for the equipment. The owner or operator of an ACI or prescribed fire vehicle must keep a copy of the manufacturer's operating and maintenance manual. The owner or operator must also provide a copy of manufacturer's operating and maintenance manual to the Executive Officer with 48 hours of it being requested.

#### *Subdivision (i) – Source Testing*

##### Source Testing for ACIs or Prescribed Fire Vehicles – Subdivision (i)

PR 444.1 requires the owner or operator of an ACI or prescribed fire vehicle to allow the Executive Officer to conduct a source test within 6 months of the initial request by the Executive Officer. The Executive Officer may conduct multiple source tests on an ACI or prescribed fire vehicle; the owner or operator of an ACI or prescribed fire vehicle is required to make the equipment available for source testing within 6 months of each initial request. The source test emission data gathered by the Executive Officer will inform future PR 444.1 amendments.

### *Subdivision (j) – Recordkeeping Requirements*

#### Visible Emissions Records for ACIs and Prescribed Fire Vehicles – Paragraphs (j)(1)

PR 444.1 requires ACI visible emissions records and records of current and valid U.S. EPA Method 9 certification to verify compliance with requirements pursuant to subdivision (f). Written ACI monitoring records must be kept for a minimum of five years and made available when requested by the Executive Officer.

#### Daily Operation Records for ACIs and Prescribed Fire Vehicles – Paragraph (j)(2)

PR 444.1 requires an owner or operator of an ACI or prescribed fire vehicle to maintain a daily operation log. Daily operation records must be kept for a minimum of five years and made available when requested by the Executive Officer.

#### Date and Total Hours of Operation for ACIs and Prescribed Fire Vehicles – Subparagraphs (j)(2)(A)

Contains recordkeeping requirements for the date of operation of an ACI or prescribed fire vehicle and the total hours of operation for each day. The hours of operation will provide the Executive Officer with information necessary to help calculate daily PM emissions and gather emissions data for a future PR 444.1 amendment.

#### Location of each ACI and Prescribed Fire Vehicle – Subparagraph (j)(2)(B)

Contains recordkeeping requirements for the location of operation as ACIs and prescribed fire vehicles can be moved from one location to another. PR 444.1 requires the physical address or legal description such as the coordinates in latitude and longitude. Records for the location of each operation are required to determine compliance with paragraph (g)(2).

#### Records for Materials Burned in an ACI or Prescribed Fire Vehicle – Subparagraph (j)(2)(C) and (j)(2)(D)

Records for the type of materials burned in an ACI or prescribed fire vehicle is required for compliance verification with paragraph (d)(1). The description of the materials burned must be sufficient in detail to determine compliance with PR 444.1 (i.e. determine if the material is agricultural waste, wood waste, or yard waste). Records for the quantity in tons of materials burned will help provide emission data for the Executive Officer. The number of acres cleared of vegetative waste that will be burned in the equipment can be converted into tons of materials to determine compliance with this requirement.

#### Engine Fuel Type for ACIs and Prescribed Fire Vehicles – Subparagraph (j)(2)(E)

Engine fuel type records are required to demonstrate compliance with paragraph (e)(3).

#### Maintenance Log Records for ACIs and Prescribed Fire Vehicles – Paragraph (j)(3)

Maintenance logs are required to demonstrate compliance with paragraph (h)(1). Daily maintenance on equipment can include daily cleaning such as blowing out air filters or removing ash from inside the combustion chamber. Maintenance can also include checking oil levels and refilling the diesel tank. Maintenance records must be kept for a minimum of five years and made available when requested by the Executive Officer.

### Government Contract Records for ACIs and Prescribed Fire Vehicles – Paragraph (j)(4)

Government contract records are required to demonstrate compliance with paragraph (d)(2). These records are only required if a government agency has hired a contractor to burn vegetative waste in an ACI or prescribed fire vehicle on their behalf. Government contract records must be made available when requested by the Executive Officer. The owner or operator must keep a copy of the contract for the entire life of the contract.

### **PROPOSED AMENDED RULE 401, PROPOSED AMENDED RULE 404, AND PROPOSED AMENDED RULE 405**

PAR 401 paragraph (c)(3), PAR 404 subdivision (f), and PAR 405 subdivision (e) each add an exemption from the requirements in Rule 401, Rule 404, and Rule 405 for ACIs and prescribed fire vehicles subject to PR 444.1. The exemptions for ACI and prescribed fire vehicles from PM limits in PAR 404 and PAR 405 and visible emissions requirements in PAR 401 will allow these technologies to be operated within South Coast AQMD's jurisdiction.

### **PROPOSED AMENDED RULE 219 AND PROPOSED AMENDED RULE 222**

Operating an ACI or prescribed fire vehicle will require either a permit to operate or registration with the South Coast AQMD. PAR 219 will exempt ACIs, prescribed fire vehicles, and associated air pollution control equipment from permitting requirements with the South Coast AQMD provided they are: 1) owned or operated by government agencies and/or their contractors; 2) not subject to Title V permitting requirements; 3) burn exclusively wood waste, yard waste, and agricultural waste. Definitions for several terms are included in PAR 219; the definitions are consistent with PR 444.1 and have the same intent. Private entities not contracted by a government agency are not eligible. Burning 35 tons per day or more of wood waste, yard waste, or a mixture of these materials in an ACI requires a Title V permit and thus would not be eligible for exemption. Burning agricultural waste in an ACI currently requires a Title V permit and thus would not be eligible for exemption. The exemption does not apply to engines or other internal combustion equipment having a manufacturer's rating greater than 50 HP.

PAR 222 will require ACIs, prescribed fire vehicles, and their associated air pollution control equipment to be registered with the South Coast AQMD. Definitions for several terms are included in PAR 222; the definitions are consistent with PR 444.1 and have the same intent. Rule 222 contains an existing definition for agricultural operations which differs from the proposed agricultural operations definition in PR 444.1 and PAR 219. The agricultural waste definition in PAR 222 refers to the agricultural operations definition in PR 444.1 for clarity. Registration requires owners or operators of specified emission sources to submit information regarding the source to determine whether the equipment is operating in compliance with applicable South Coast AQMD, state, and federal regulations. Rule 222 registration fees are specified in Rule 301 – Permitting and Associated Fees. There is an initial filing fee (currently \$291.94) and an annual renewal fee of the same amount.

## **CHAPTER 4: IMPACT ASSESSMENTS**

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**INTRODUCTION**

**EMISSION REDUCTIONS**

**COSTS**

**SOCIOECONOMIC IMPACT ASSESSMENT**

**CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) ANALYSIS**

**DRAFT FINDINGS UNDER HEALTH AND SAFETY**

**CODE SECTION 40727**

**COMPARATIVE ANALYSIS**

## INTRODUCTION

Impact assessments were conducted as part of PR 444.1, PAR 401, PAR 404, PAR 405, PAR 219, and PAR 222 rule development to assess the environmental and socioeconomic implications. These impact assessments include costs, emission reductions, socioeconomic impacts, and a California Environmental Quality Act (CEQA) analysis. Staff prepared draft findings and a comparative analysis pursuant to Health and Safety Code Sections 40727 and 40727.2, respectively.

## EMISSION REDUCTIONS

The proposed amendments to PR 444.1, PAR 404, PAR 405, PAR 401, PAR 219, and PAR 222 will reduce PM emissions compared to open burning. Source tests for ACIs demonstrate a 60% to 90%+ reduction in PM compared to open burning<sup>27</sup>. Both ACIs and prescribed fire vehicles increase air flow to promote a more complete combustion process, which results in fewer PM emissions. More robust emission data is necessary to establish emission limits and quantify emission reductions from PR 444.1.

## COSTS

PR 444.1 will not require the use of ACIs or prescribed fire vehicles and therefore, there will be no additional costs to adopting PR 444.1, PAR 401, PAR 404, PAR 405, PAR 219, and PAR 222. However, opting to operate an ACI or prescribed fire vehicle will include some operational costs. Facilities that choose to operate ACIs or prescribed fire vehicles will be required to register the equipment pursuant to PAR 222. There is an initial registration filing fee (currently \$291.94) and an annual renewal fee of the same amount. There are also fuel costs associated with operating ACIs and prescribed fire vehicles.

## SOCIOECONOMIC IMPACT ASSESSMENT

A socioeconomic impact assessment, to be included in the Draft Staff Report, will be prepared and released for public review and comment at least 30 days prior to the South Coast AQMD Governing Board Hearing for PR 444.1, PAR 401, PAR 404, PAR 405, PAR 219, and PAR 222, which is scheduled for June 5, 2026 (subject to change).

## CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

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(1); codified in South Coast AQMD Rule 110), the South Coast AQMD, as lead agency is currently reviewing the proposed project (PR 444.1, PAR 401, PAR 404, PAR 405, PAR 219, and PAR 222) to determine if it will result in any potential adverse environmental impacts. Appropriate CEQA documentation will be prepared based on the analysis.

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<sup>27</sup> <https://www.oregon.gov/deq/aq/cao/Documents/caoACIresultsSum.pdf>

**DRAFT FINDINGS UNDER HEALTH AND SAFETY CODE SECTION 40727***Requirements to Make Findings*

Health and Safety Code Section 40727 requires that the Governing Board 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 Health and Safety Code Section 40727, Health and Safety Code Section 40727.2 requires a written analysis comparing the proposed amended rule with existing regulations, if the rule meets certain requirements.

*Necessity*

A need exists to amend PR 444.1, PAR 401, PAR 404, PAR 405, PAR 219, and PAR 222 to partially implement Best Control Measure 20 from the 2024 PM2.5 Plan and to address objectives in the Eastern Coachella Valley Community Emission Reduction Plan.

*Authority*

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

*Clarity*

PR 444.1, PAR 401, PAR 404, PAR 405, PAR 219, and PAR 222 are written or displayed so that its meaning can be easily understood by the persons directly affected by them.

*Consistency*

PR 444.1, PAR 401, PAR 404, PAR 405, PAR 219, and PAR 222 are in harmony with and not in conflict with or contradictory to existing statutes, court decisions, or state or federal regulations.

*Non-Duplication*

PR 444.1, PAR 401, PAR 404, PAR 405, PAR 219, and PAR 222 will not impose the same requirements as any existing state or federal regulations. The proposed rules are necessary and proper to execute the powers and duties granted to, and imposed upon, the South Coast AQMD.

*Reference*

In amending these rules, the following statutes which the South Coast AQMD hereby implements, interprets or makes specific are referenced: Health and Safety Code Sections 39002, 40001, 40406, 40702, 40440, and 40725 through 40728.5.

## COMPARATIVE ANALYSIS

Under Health and Safety Code Section 40727.2, the 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 the source.

**Table 4-1: PR 444.1, PAR 401, PAR 404, PAR 405 Comparative Analysis**

Rule Element	PR 444.1	Rule 401	Rule 404	Rule 405	40 CFR Part 60, Subpart EEEE	40 CFR Part 60, Subpart CCCC
<b>Applicability</b>	ACIs and prescribed fire vehicles operated by government agencies and their contractors	Any single source of emissions	Any single source of emissions	Any single source of emissions	OSWI units with throughput less than 35 tons/day	<ul style="list-style-type: none"> <li>ACIs burning &gt; 35 tons/day</li> <li>Commercial and industrial solid waste incineration (CISWI) units</li> </ul>
<b>Requirements</b>	<ul style="list-style-type: none"> <li>ACI best management practices</li> <li>ACIs and prescribed fire vehicles can be operated only by government agencies and their contractors</li> </ul>	Limit of 20% opacity limit or No. 1 on Ringelmann Chart for a period greater than 3 minutes in any one hour	Limits grain loading of PM in a cubic foot of air that is discharged to the atmosphere	Rule 405 limits the amount of PM discharged based upon the weight of material processed	<ul style="list-style-type: none"> <li>OSWI units with capacities &gt;10 tons/day commenced after August 31, 2020 or commenced reconstruction or modification on or after December 29, 2025: PM emission limit of 0.013 grains/ dscf at 7% oxygen at dry standard conditions using Method 5 or 29</li> <li>OSWI Units with Capacities ≤10 tons/day that commenced construction after August 31, 2020 or commenced reconstruction or modification on or after December 29, 2025: PM emission limit of 210 mg/dscm at 7% oxygen at dry standard conditions using Method 5 or 29</li> </ul>	<ul style="list-style-type: none"> <li>Incinerators that commenced construction after June 4, 2010: PM (filterable) emission limit of 18 mg/dscm at 7% oxygen at dry standard conditions using Method 5 or 29</li> <li>Small, remote incinerators that commenced after June 4, 2010: PM (filterable) emission limit of 270 mg/dscm at 7% oxygen at dry standard conditions using Method 5 or 29</li> </ul>

<p><b>Monitoring</b></p>	<ul style="list-style-type: none"> <li>• 30 minute startup period: opacity limit of 35% (6-minute average)</li> <li>• Regular operation: 10 percent opacity (6-minute average)</li> </ul>	<p>Same as above</p>	<p>None</p>	<p>None</p>	<p>Within 60 days after ACI reaches the charge rate at which it will operate, but no later than 180 days after its initial startup, ACIs must meet:</p> <ul style="list-style-type: none"> <li>• 10% opacity limit 6-minute average (observe over three 1-hour test runs, i.e., thirty 6-minute averages) using Method 9 of Appendix A</li> <li>• 30 minute startup period: 35% opacity limit (6-minute average) using Method 9 of Appendix A</li> </ul>	<p>Within 60 days after ACI reaches the charge rate at which it will operate, but no later than 180 days after its initial startup, ACIs must meet:</p> <ul style="list-style-type: none"> <li>• 10% opacity limit 6-minute average (observe over three 1-hour test runs, i.e., ten 6-minute average opacity values) using Method 9 of Appendix A</li> <li>• 30 minute startup period: 35% opacity limit (three 1-hour blocks consisting of ten 6-minute average opacity values) using Method 9 of Appendix A</li> </ul>
<p><b>Reporting</b></p>	<ul style="list-style-type: none"> <li>• Burn Authorization Number request</li> </ul>	<p>None</p>	<p>None</p>	<p>None</p>	<ul style="list-style-type: none"> <li>• Initial opacity test records, annual opacity test records</li> <li>• Preconstruction report due prior to commencing construction, startup notification due prior to initial startup, initial test report due no later than 60 days following the initial performance test and annual test report no later than 12 months following the initial test report and subsequent reports no later than 12</li> </ul>	<ul style="list-style-type: none"> <li>• Notification of intent to construct ACI, planned initial startup date, types of materials planned to be burned in ACI,</li> <li>• Initial opacity test records, annual opacity test records,</li> <li>• Preconstruction report due prior to commencing construction</li> <li>• Startup notification due prior to initial startup</li> <li>• Initial test report due no later than 60 days</li> </ul>

					months following previous report	following the initial performance test <ul style="list-style-type: none"> <li>Annual test report no later than 12 months following the initial test report and subsequent reports no later than 12 months following previous report</li> </ul>
<b>Recordkeeping</b>	ACI visible emission records, daily operation logs and maintenance logs for prescribed fire vehicles and ACIs.	None	None	None	<ul style="list-style-type: none"> <li>All records must be kept for a period of 5 years and available onsite in either paper copy</li> </ul>	<ul style="list-style-type: none"> <li>All records must be kept for a period of 5 years and available onsite in either paper copy or computer-readable format</li> </ul>