South Coast AQMD

APPENDIX V

Contingency Measures Infeasibility Justification

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Introduction

The Clean Air Act (CAA) specifies that State Implementation Plans (SIPs) must provide for contingency measures, defined in section 172(c)(9) as "specific measures to be undertaken if the area fails to make reasonable further progress, or to attain the national primary ambient air quality standard by the attainment date." These measures must be in addition to existing measures including those proposed for attainment in this Plan.

Recently, the U.S. EPA released a guidance document, entitled Draft Guidance on the Preparation of State Implementation Plan Provisions that Address the Nonattainment Area Contingency Measure Requirements for Ozone and Particulate Matter[1] (hereafter, "Draft Guidance"). The Draft Guidance clarifies requirements for contingency measures including: (1) revising the quantity of emissions reductions that contingency measures should provide to account for declining emissions inventories over time; (2) allowing for an infeasibility justification if an area is unable to identify feasible contingency measures in sufficient quantities due to a scarcity of available, qualifying measures; and (3) revising the time period within which emission reductions from contingency measures should occur – 60 days to take effect and up to 2 years to achieve emission reductions from a triggering event.

An overview of South Coast AQMD's contingency measure and the amount of reductions anticipated from it are presented in Chapter 6. The contingency measure in place for this standard is anticipated to achieve less than one year's worth (OYW) of reductions, the amount of reductions recommended by the Draft Guidance. Therefore, consistent with the Draft Guidance, this appendix provides an infeasibility justification that no further opportunities for contingency measures or emission reductions exist.

To fulfill CAA requirements for PM2.5 SIP planning requirements, Appendix III of the PM2.5 Plan includes a robust control strategy analysis for Best Available Control Measures (BACM) and Most Stringent Measures (MSM). As part of the BACM/MSM analysis, staff compared rule requirements with those in other jurisdictions, focusing on potential deficiencies in South Coast AQMD's rules. In many ways, this analysis mirrored the evaluation process that U.S. EPA recommends for developing infeasibility justifications. U.S. EPA's Draft Guidance acknowledges the approach taken in this Plan by noting "[w]here the nonattainment plan associated with the [contingency measure] submission contains a robust control strategy analysis, that analysis can serve as a foundation for much of this effort." Therefore, for some categories, staff referenced the BACM/MSM analysis, and associated potential control measures identified, when developing the infeasibility justification.

[1] EPA, Office of Air Quality Planning and Standards, Air Quality Policy Division, "DRAFT: Guidance on the Preparation of State Implementation Plan Provisions that Address the Nonattainment Area Contingency Measure Requirements for Ozone and Particulate Matter" ("Draft Guidance"), March 16, 2023. https://www.epa.gov/system/files/documents/2023-03/CMTF%202022%20guidance%203-17-23.pdf

Control Measure Identification and Evaluation Methodology

South Coast AQMD followed the procedures outlined in the Draft Guidance for the preparation of a reasoned justification for providing contingency measures achieving less than OYW of reductions. These procedures, which involve the identification of existing and potential controls not already included in the PM2.5 Plan and evaluation of the feasibility of such controls, are outlined below:

1. Thoroughly examine the emission sources in the South Coast Air Basin and identify applicable rules.

2. Compare existing rule requirements with those in other jurisdictions and identify potential control measures that were not identified as part of the BACM/MSM analysis in Appendix III and are surplus to the control strategy in Chapter 4.

3. Review each of the measures identified in Step 2 to determine whether it is technologically and economically feasible to implement within 2 years as a contingency measure. If feasible, include the measure in the contingency measure submission.

4. For the remaining infeasible measures from Step 3, document the reason why each measure is infeasible as a contingency measure, including whether the conclusion is based on technological, economic, or other infeasibility considerations.

Reasoned Justification for Proposing Measures Achieving Less than One Year's Worth of RFP

This section contains evaluation of all direct PM2.5, NOx, and ammonia (NH3) source categories in the South Coast Air Basin (Basin) and associated control measures. In order to identify relevant source categories for this evaluation, South Coast AQMD staff began by examining sources of emissions by major source categories (MSCs), then proceeded to examine the in-depth sub-categories in each MSC, and identified rules and controls applicable to each sub-category. Table V-1 lists the Basin's projected PM2.5, NOx, and NH3 baseline emissions in tons per day (tpd) for the 2030 attainment year by three-digit Emission Inventory Code (EIC) and description. For brevity, sub-category level emissions are not included in the table. Percentages of the total emissions for each source category are provided as well.

TABLE V-1
SOUTH COAST AIR BASIN MAJOR SOURCE CATEGORIES AND 2030 BASELINE EMISSIONS INVENTORY OVERVIEW

Major Source Category (EIC – Description)	PM2.5 Emissions (tpd)	% of 2030 PM2.5 Inventory	NOx Emissions (tpd)	% of 2030 NOx Inventory	NH3 Emissions (tpd)	% of 2030 NH3 Inventory
010 – Electric Utilities	0.43	0.80%	2.49	1.18%	0.53	0.67%
020 – Cogeneration	0.01	0.02%	0.02	0.01%	0.17	0.21%
030 – Oil and Gas Production (Combustion)	0.11	0.20%	0.93	0.44%	0.25	0.32%
040 – Petroleum Refining (Combustion)	1.79	3.31%	4.27	2.03%	1.54	1.94%
050 – Manufacturing and Industrial	1.29	2.39%	7.62	3.62%	2.20	2.77%
052 – Food and Agricultural Processing	0.05	0.09%	0.39	0.19%	0.06	0.08%
060 – Service and Commercial	1.11	2.05%	11.26	5.35%	2.21	2.79%
099 – Other (Fuel Combustion)	0.41	0.76%	2.41	1.15%	0.28	0.35%
110 – Sewage Treatment	0.00	0.00%	0.00	0.00%	0.22	0.28%
120 – Landfills	0.21	0.39%	0.39	0.19%	1.26	1.59%
130 – Incineration	0.05	0.09%	1.18	0.56%	0.24	0.30%
140 – Soil Remediation	0.00	0.00%	0.05	0.02%	0.00	0.00%
199 – Other (Waste Disposal)	0.00	0.00%	0.00	0.00%	1.67	2.10%
210 – Laundering	0.00	0.00%	0.00	0.00%	0.00	0.00%
220 – Degreasing	0.02	0.04%	0.00	0.00%	0.01	0.01%
230 – Coatings and Related Processes	1.54	2.85%	0.00	0.00%	0.10	0.13%
240 – Printing	0.00	0.00%	0.00	0.00%	0.04	0.05%
250 – Adhesives and Sealants	0.02	0.04%	0.00	0.00%	0.00	0.00%
299 – Other (Cleaning and Surface Coatings)	0.00	0.00%	0.04	0.02%	0.00	0.00%
310 – Oil and Gas Production	0.02	0.04%	0.01	0.00%	0.00	0.00%
320 – Petroleum Refining	0.88	1.63%	0.59	0.28%	0.07	0.09%
330 – Petroleum Marketing	0.00	0.00%	0.02	0.01%	0.00	0.00%
339 – Other (Petroleum Production and Marketing)	0.00	0.00%	0.01	0.00%	0.00	0.00%
410 – Chemical	0.39	0.72%	0.07	0.03%	0.01	0.01%
420 – Food and Agriculture	0.06	0.11%	0.03	0.01%	0.00	0.00%
430 – Mineral Processes	0.99	1.83%	0.38	0.18%	0.07	0.09%
440 – Metal Processes	0.26	0.48%	0.29	0.14%	0.00	0.00%
450 – Wood and Paper	3.23	5.98%	0.00	0.00%	0.01	0.01%
460 – Glass and Related Products	0.00	0.00%	0.00	0.00%	0.00	0.00%
470 – Electronics	0.00	0.00%	0.00	0.00%	0.00	0.00%
499 – Other (Industrial Processes)	0.48	0.89%	0.02	0.01%	8.59	10.83%
510 – Consumer Products	0.00	0.00%	0.00	0.00%	0.00	0.00%
520 – Architectural Coatings and Related Solvent	0.00	0.00%	0.00	0.00%	0.00	0.00%
530 – Pesticides/Fertilizers	0.00	0.00%	0.00	0.00%	1.17	1.47%
540 – Asphalt Paving/Roofing	0.03	0.06%	0.00	0.00%	0.00	0.00%
610 – Residual Fuel Combustion	6.59	12.19%	15.17	7.21%	0.11	0.14%
620 – Farming Operations	0.13	0.24%	0.00	0.00%	6.13	7.73%

Major Source Category (EIC – Description)	PM2.5 Emissions (tpd)	% of 2030 PM2.5 Inventory	NOx Emissions (tpd)	% of 2030 NOx Inventory	NH3 Emissions (tpd)	% of 2030 NH3 Inventory
630 – Construction and Demolition	2.49	4.61%	0.00	0.00%	0.00	0.00%
640 – Paved Road Dust	9.11	16.85%	0.00	0.00%	0.00	0.00%
645 – Unpaved Road Dust	1.67	3.09%	0.00	0.00%	0.00	0.00%
650 – Fugitive Windblown Dust	0.21	0.39%	0.00	0.00%	0.00	0.00%
660 – Fires	0.41	0.76%	0.08	0.04%	0.00	0.00%
670 – Waste Burning and Disposal	0.28	0.52%	0.09	0.04%	0.03	0.04%
690 – Cooking	12.30	22.76%	0.00	0.00%	0.00	0.00%
699 – Other (Miscellaneous Processes)	0.00	0.00%	0.00	0.00%	28.03	35.33%
710 through 890 (Mobile Source Categories)	7.44	13.77%	162.63	77.30%	21.32	26.87%
Total	**54.05**	**100.00%**	**210.39**	**100.00%**	**79.34**	**100.00%**

Mobile source categories (i.e., MSCs 710 through 890) comprise nearly 77 percent of the 2030 NOx emissions in the Basin. While CARB has unique authority to regulate certain mobile sources by obtaining a waiver from U.S. EPA, significant mobile source categories such as aircraft, ships, locomotives, and interstate trucks lie primarily under federal regulatory authority. It is important to note that U.S. EPA has taken the position that they are not obligated to evaluate contingency measures for sources under its authority. Furthermore, the dominance of mobile source NOx emissions significantly limits the ability for the South Coast AQMD to achieve OYW of NOx reductions from contingency measures.

Fuel Combustion

Fuel combustion emissions are shown in Table V-2 and consist of nine MSCs including 010 – Electric Utilities, 020 – Cogeneration, 030 – Oil and Gas Production (Combustion), 040 – Petroleum Refining (Combustion), 050 – Manufacturing and Industrial, 052 – Food and Agricultural Processing, 060 – Service and Commercial, 099 – Other (Fuel Combustion), and 610 – Residential Fuel Combustion. Staff examined direct PM2.5, NOx, and NH3 emissions by equipment category rather than source category because the analysis of feasible contingency measures is anticipated to be similar across each source category that combusts fuel. That is, the technologies available to minimize emissions from fuel combustion in each source category are predicted to be more dependent on the equipment combusting fuel than on the type of source generating the emissions.

As demonstrated in Table V-2, fuel combustion sources contribute 11.8 tpd of PM2.5, 44.6 tpd of NOx, and 7.36 tpd of NH3 to the 2030 baseline emissions inventory. The analysis of fuel combustion equipment was grouped into five categories: (1) boilers, stream generators, and process heaters; (2) engines; (3) combustion turbines; (4) residential and commercial fuel combustion; and (5) other fuel combustion. Each source group is evaluated separately below.

TABLE V-2
FUEL COMBUSTION SOURCE CATEGORY EMISSIONS BASED ON 2030 BASELINE INVENTORY IN THE SOUTH COAST AIR BASIN

Industry	PM2.5 (tpd)	NOx (tpd)	NH3 (tpd)
010 – Electric Utilities	0.43	2.49	0.53
020 – Cogeneration	0.01	0.02	0.17
030 – Oil and Gas Production (Combustion)	0.11	0.93	0.25
040 – Petroleum Refining (Combustion)	1.79	4.27	1.54
050 – Manufacturing and Industrial	1.29	7.62	2.20
052 – Food and Agricultural Processing	0.05	0.39	0.06
060 – Service and Commercial	1.11	11.26	2.21
099 – Other (Fuel Combustion)	0.41	2.41	0.28
610 – Residential Fuel Combustion	6.59	15.17	0.11
Total	**11.8**	**44.6**	**7.36**

1. Boilers, Steam Generators, and Process Heaters

a. Overview

Boilers, steam generators, and process heaters fueled by gas or liquid fuel are used to produce hot water, produce steam, and transfer heat from combustion gases to liquid or process streams. These units emit direct PM2.5, NOx, and NH3 and can be found at facilities representing a wide range of industries including, but not limited to, electrical utilities, cogeneration, oil and gas production, petroleum refining, manufacturing and industrial, food and agricultural processing, and service and commercial facilities as shown in Table V-3. These units have significant variability in technology, size, use and age of equipment, as well as variability in potential controls for various pollutants, the affected industries, and the regulatory requirements.

TABLE V-3
BOILERS, STEAM GENERATORS AND PROCESS HEATERS EMISSIONS BASED ON 2030 BASELINE INVENTORY IN THE SOUTH COAST AIR BASIN

Industry	PM2.5 (tpd)	NOx (tpd)	NH3 (tpd)
010 – Electric Utilities	0.06	0.48	0.10
020 – Cogeneration	0.00	0.00	0.00
030 – Oil and Gas Production (Combustion)	0.02	0.07	0.02
040 – Petroleum Refining (Combustion)	1.31	3.68	0.64
050 – Manufacturing and Industrial	0.18	1.15	0.23
052 – Food and Agricultural Processing	0.05	0.30	0.06
060 – Service and Commercial	0.47	3.58	0.20
099 – Other (Fuel Combustion)	0.00	0.00	0.00

Industry	PM2.5 (tpd)	NOx (tpd)	NH3 (tpd)
610 – Residential Fuel Combustion	0.00	0.00	0.00
Total	**2.54**	**9.26**	**1.25**

b. Evaluation

i. Available Control Technologies

Low NOx burners (LNB) and ultra-low NOx burners (ULNB), as well as flue gas recirculation (FGR), are commonly used combustion control technologies that manage NOx emissions in boilers, steam generators, and process heaters. The most popular post-combustion add-on control method is selective catalytic reduction (SCR). With ULNB, emission limits of 7 to 9 ppm[2] are often feasible to achieve. Current units burning gaseous fuels can achieve a 9 ppm NOx limit with ULNB and meeting 7 ppm is potentially possible with burner replacement.[3] Operators often utilize SCR to attain an emissions limit of 5 ppm or below.

There are emerging technologies that have demonstrated achieving 5 ppm without the use of SCR and these include next generation ULNB for boilers smaller than 20 million British thermal units per hour (MMBtu/hr).[4]

ii. South Coast AQMD Control Measures

Table V-4 summarizes two South Coast AQMD control measures for boilers, steam generators, and process heaters.

TABLE V-4
SOUTH COAST AQMD CONTROL MEASURES (BOILERS, STEAM GENERATORS, AND PROCESS HEATERS)

South Coast AQMD Rule	Applicability	Control Measure
Rule 1135 - Emissions of Oxides of Nitrogen from Electricity Generating Facilities	Electric generating units at electricity generating facilities.	Boilers must achieve 5 ppm NOx at 3% O_2
Rule 1146 – Emissions of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters (Amended 12/4/20)	Boilers, steam generators, and process heaters of equal to or greater than 5 MMBtu/hr rated input capacity used in all industrial, institutional, and commercial operations	The various limits in the rule apply to different types of units based on use and size but can be achieved using the following control technologies: LNB, ULNB, SCR

[2] All ppm emission limits are referenced at 3 percent volume stack gas oxygen (O_2) on a dry basis averaged over a period of 15 consecutive minutes
[3] Final Staff Report for PARs 1146, 1146.1 and 1146.2, and PR 1100, South Coast AQMD, December 2018
[4] John Zink Hamworthy SOLEX™ Burner: https://www.johnzinkhamworthy.com/wp-content/uploads/solex-burner.pdf. Accessed on September 27, 2023

South Coast AQMD Rule	Applicability	Control Measure
Rule 1146.1 – Emissions of Oxides of Nitrogen from Small Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters (Amended 12/7/18)	Boilers, steam generators, and process heaters that are greater than 2 MMBtu/hr and less than 5 MMBtu/hr rated heat input capacity used in any industrial, institutional, or commercial operation	The various limits in the rule apply to different types of units based on use and size but can be achieved using the following control technologies: LNB, ULNB
Rule 1146.2 – Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers and Process Heaters (Amended 12/7/18)	Natural gas-fired water heaters, boilers, and process heaters that are less than 2 MMBtu/hr	The various limits in the rule apply to different types of units based on use and size
Rule 1109.1 – Emissions of Oxides of Nitrogen from Petroleum Refineries and Related Operations (Adopted 11/5/21)	Combustion equipment including, but not limited to, boilers and process heaters at petroleum refineries and facilities with related operations to petroleum refineries	The various limits in the rule apply to different types of units based on use and size but can be achieved using the following control technologies: LNB, ULNB, SCR

iii. Review of Control Measures in Other Jurisdictions

To find potential measures to consider as contingency measures, staff considered the control measures in place in other California jurisdictions such as San Joaquin Valley Air Pollution Control District (SJVAPCD) and Ventura County APCD (VCAPCD) that regulate boilers, steam generators, and process heaters. These rules are not structured identically across agencies or rules, which can make direct comparison difficult. For example, subcategories are organized differently among the rules. Table V-5 summarizes the applicable control measures identified in other jurisdictions. In the table, two South Coast AQMD rules for boilers, steam generators, and process heaters – Rules 1146 and 1109.1 – are compared with SJVAPCD Rules 4306 and 4320 and VCAPCD Rule 74.15. Note that the comparison could not be performed for all unit categories. For example, units fired on landfill gas have NOx limits at 25 ppm in Rule 1146, but not in SJVAPCD's rules or VCAPCD's rule. Although this unit category is excluded from the comparison in Table V-5, it shows that South Coast AQMD has a more stringent requirement than other jurisdictions for landfill gas-fired units. For the purpose of comparison, source category numbering follows the format used in SJVAPCD Rule 4320.

Boilers, steam generators, and process heaters permitted to operate in the Basin are sources of NOx emissions. Most of these units are installed with ULNB and/or SCR and predominantly burn natural gas so direct PM2.5 emissions are minimal. Nevertheless, a potential control measure in Appendix III evaluated PM2.5 control technologies for boilers, steam generators, and process heaters and concluded that these technologies are infeasible.

South Coast AQMD Rule 1146 is more stringent than VCAPCD Rule 74.15, but is less stringent than SJVAPCD Rules 4306 and 4320 for some of the unit categories listed below:

- Category A1 (fire tube boilers rated > 5 MMBtu/hr and ≤ 20 MMBtu/hr)
    - Rule 4320 limit: 5 ppm
    - Rule 1146 limit: 7 ppm
- Category A3 (units fired on digester gas rated > 5 MMBtu/hr and ≤ 20 MMBtu/hr)
    - Rules 4306 and 4320 limits: 9 ppm
    - Rule 1146 limit: 15 ppm
- Category A4 (thermal fluid heaters rated > 5 MMBtu/hr and ≤ 20 MMBtu/hr)
    - Rules 4306 and 4320 limits: 9 ppm
    - Rule 1146 limit: 12 ppm
- Category A5 (all other units rated > 5 MMBtu/hr and ≤ 20 MMBtu/hr)
    - Rule 4320 limit: 5 ppm
    - Rule 1146 limit: 9 ppm
- Categories B (B1, B2, and B3 – boilers rated > 20.0 MMBtu/hr and ≤ 75 MMBtu/hr)
    - Rule 4320 limit: 2.5 ppm
    - Rule 1146 limit: 7 ppm for B1 (20 to 75 MMBtu/hr) and 5 ppm for B2 (20 to 75 MMBtu/hr) and B3 (> 75 MMBtu/hr)
- Category C1 (oilfield steam generator rated > 5.0 MMBtu/hr and ≤ 20.0 MMBtu/hr)
    - Rule 4320 limit: 6 ppm
    - Rule 1146 limit: 9 ppm
- Category C2 (units rated > 20 MMBtu/hr and ≤ 75 MMBtu/hr)
    - Rule 4320 limit: 5 ppm
    - Rule 1146 limit: 9 ppm
- Category D3 (refinery boilers rated >110 MMBtu/hr)
    - Rule 4320 limit: 2.5 ppm
    - Rule 1109.1 limit: 5 ppm
- Category D4 (refinery process heaters rated > 5.0 MMBtu/hr and ≤ 40.0 MMBtu/hr)
    - Rule 4320 limit: 5 ppm
    - Rule 1109.1 limit: 9 ppm
- Category D6 (refinery process heaters rated >110 MMBtu/hr)
    - Rule 4320 limit: 2.5 ppm
    - Rule 1109.1 limit: 5 ppm

SJVAPCD Rule 4320 includes technology forcing NOx limits. For example, for categories A1 (5 ppm), B1 (2.5 ppm), C1 (6 ppm), and C2 (5 ppm), very few units have achieved these NOx limits in the SJVAPCD. As of 2020, only 2 percent of 550 units (i.e., 11 units) in these categories were permitted to comply with these NOx limits.[5] Another example is for categories B2 (2.5 pm), B3 (2.5 ppm), D3 (2.5 ppm), D4 (5 ppm), and D6 (2.5 ppm). These NOx limits have not been demonstrated to be achievable in practice for large scale

[5] SJVAPCD, Final Staff Report, "Proposed Amendment to Rule 4306 (Boilers, Steam Generators, and Process Heaters - Phase 3) Proposed amendments to Rule 4320 (Advanced Emission Reduction Options for Boilers, Steam Generators, and Process Heaters Greater Than 5.0 MMBtu/hr)," December 17, 2020, Appendix B: Emissions Reduction Analysis ("Boilers Staff Report: Appendix B")

applications. Because of the technological challenge to achieve such lower limits, Rule 4320 allows operators to pay a compliance fee in lieu of meeting the technology forcing limits until such limits are proven to be feasible in practice. This contrasts with the limits in South Coast AQMD's rules which are mandatory and do not offer fee based alternative compliance options.

South Coast AQMD Rule 1146 establishes NOx limits for existing boiler, steam generator and process heater units which have been demonstrated to be achieved in practice. The current NOx limits for gaseous fuel fired units, excluding digester and landfill gases and fire-tube boilers, with a rated heat input capacity between 5 and 75 MMBtu/hr is 9 ppm in Rule 1146. Based on vendor discussion, NOx emissions at a level of 7 ppm or lower are feasible only with ULNB replacement and new installation. The source test results also showed that it is technically feasible for existing Rule 1146 units (between 5 and 75 MMBtus/hr) to achieve an emission limit of 7 ppm or less with burner replacements. Achieving a 5 ppm NOx limit usually requires the use of SCR. SCR systems are generally utilized for units greater than 10 MMBtu/hr. Although it is potentially feasible, there are several limitations for SCR retrofits to meet 4 ppm or less, such the age, flow, and size of the catalyst bed of the existing SCR system. Another factor is ammonia slip. Meeting NOx emissions of 2.5 ppm is feasible but at the cost of higher ammonia slip (i.e., 10 ppm) which could contribute to the increased emissions of PM2.5 and enhance secondary PM2.5 formation. The most significant constraint is the inadequate safety margin between the permitted limit and the actual emissions to account for fluctuations in external factors such as ambient temperature or fuel heat input. Due to those limitations, it would not be technologically feasible for SCR retrofits to achieve the lower NOx emission limit (e.g., 2.5 ppm).[6]

The NOx emission limit for thermal fluid heaters in Rule 1146 is 12 ppm. Thermal fluid heaters use water as the heating fluid and typically operate at much higher temperatures than process heaters, which results in higher NOx emissions. At the time of rule development, ULNB replacement for existing units achieved 12 ppm NOx while an emission limit of 9 ppm was available for new units in certain applications. Based on the assumptions of 10–90 percent operating capacity of the thermal fluid heaters at different heat capacity sizes, lowering the emission limit from 12 ppm to 9 ppm for existing units would cost $58,000 to $523,000 per ton of NOx reduced.[7] Due to high cost-effectiveness, the 9 ppm NOx emission limit is considered not feasible.

The NOx emission limit for digester gas fired units in Rule 1146 is currently 15 ppm. In addition, South Coast AQMD Rule 1179.1 applies to boilers located at publicly owned treatment works (POTW) facilities and contains an identical 15 ppm NOx limit for digester gas fired units > 2 MMBtu/hr. Based on discussion with vendors, digester gas fired units can be guaranteed to meet 12 ppm while 9 ppm is dependent on fuel composition and heating value which can vary depending on facility. NOx concentration limits below 7 ppm are not feasible due to the presence of hydrogen sulfide (H_2S). Lowering NOx emissions in digester gas fired units might also cause an increase in carbon monoxide (CO) emissions.

[6] South Coast AQMD, Final Staff Report for PARs 1146, 1146.1 and 1146.2, December 2018. http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2018/2018-dec7-028.pdf?sfvrsn=6

[7] South Coast AQMD, 2022 Air Quality Management Plan, Attachment VI-A-1B to Appendix VI, December 2, 2022

Rule 1109.1 NOx limits are 5 ppm with an interim limit of 7.5 ppm for refinery boilers and process heaters with rated heat input > 110 MMBtu/hr. For boilers > 110 MMBtu/hr, the class and category are cost-effective for all units to meet the 5 ppm NOx limit; however, a couple of units were operating near the 5 ppm limit with very high cost-effectiveness (more than $200,000 per ton reduced). Five units were also operating at less than 7.5 ppm with potential emission reductions of 0.02 tpd at a cost of nearly $20 million. Refinery boiler and heater's NOx limits in Rule 1109.1 are less stringent than SJVAPCD's technology forcing limits in Rule 4320; however, as stated earlier in this section, it would be technologically infeasible to achieve the 2.5 ppm NOx limit in practice.

The implementation timeline is an additional consideration regarding the feasibility of the lower NOx limits discussed in this section. Achieving these limits would potentially require single stage SCR, two stage SCR systems, or next generation ULNB combined with SCR. These emission control technologies require complex retrofits or full unit replacement and require significantly longer than 2 years to implement. For this reason, South Coast AQMD rules typically provide more than 3 years for operators to install these technologies to comply with lower emission limits.[8] It is also worth noting that some heaters are incompatible with some of these control technologies (e.g., two stage SCR systems) due to space limitations.

NH3 emissions from fuel combustion are associated with SCR usage. NH3 is used as a reductant to convert NOx in the flue gas into nitrogen (N_2) and water (H_2O) in the SCR system, although unreacted NH3 is also emitted as ammonia slip due to a non-uniform distribution and mixing in the SCR reaction chamber. Ammonia has the potential to form secondary PM2.5 in the air, especially if there are high concentrations of sulfur in the flue gas. SCR catalyst manufacturers have developed an ammonia slip catalyst, which can be installed downstream of the SCR catalyst to convert NH3 to nitrogen and water. However, SCR system designers and catalyst manufacturers generally prefer to optimize the NH3 injection and distribution instead of recommending an ammonia slip catalyst since the additional catalyst adds to the cost and requires additional space which may not be available for existing SCR configurations. In addition, improvement in the SCR technology has helped to alleviate the need for an ammonia slip catalyst by achieving uniform NH3 to NOx distribution and mixing in the SCR design phase. South Coast AQMD considers ammonia slip limits on a case-by-case basis in the equipment permit. Under Regulation XIII – New Source Review, the BACT NH3 slip limit for SCR is 5 ppm.

[8] U.S. EPA similarly concluded that tighter limits for this source category are infeasible as a contingency measure due to SCR units requiring more than 2 years to install in its recently proposed Contingency Measures for Fine Particulate Matter Standards for San Joaquin Valley (88 FR 88008)

TABLE V-5
COMPARISON OF EXISTING CONTROL REQUIREMENTS (BOILERS, STEAM GENERATORS, AND PROCESS HEATERS)

	South Coast AQMD Rule 1146 – Emissions of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters (Amended 12/4/20)	**SJVAPCD Rule 4306** – Boilers, Steam Generators, and Process Heaters (Amended 12/17/20)	**SJVAPCD Rule 4320** – Advanced Emission Reduction Options for Boilers, Steam Generators, and Process Heaters Greater than 5.0 MMBtu/hr (Amended 12/17/20)	**VCAPCD Rule 74.15** – Boilers, Steam Generators and Process Heaters (Amended 11/10/20)
Applicability	Boilers, steam generators, and process heaters of equal to or greater than 5 MMBtu/hr rated input capacity used in all industrial, institutional, and commercial operations	Gaseous or liquid fuel fired boilers, steam generator, or process heater with a total rated heat input greater than 5 MMBtu/hr	Gaseous or liquid fuel fired boilers, steam generator, or process heater with a total rated heat input greater than 5 MMBtu/hr	Portable and stationary boilers, steam generators, and process heaters fired on any gaseous fuel or liquid fuel with a rated heat input capacity equal to or greater than 5 MMBtu/hr, except for utility electric power generating units and any auxiliary boiler thereof and water heaters
A. Units with a total rated heat input > 5 MMBtu/hr to ≤ 20 MMBtu/hr, except for Categories C through G units				
A1. Fire Tube Boilers	7 ppm	7 ppm	5 ppm	9 ppm
A2. Units at Schools	9 ppm	9 ppm	9 ppm	9 ppm or 12 ppm
A3. Units fired on Digester Gas	15 ppm	9 ppm	9 ppm	15 ppm
A4. Thermal Fluid Heaters	12 ppm	9 ppm	9 ppm	9 ppm or 12 ppm
A5. All other units	9 ppm	9 ppm	5 ppm	9 ppm or 12 ppm
B. Units with a total rated heat input > 20 MMBtu/hr, except for Categories C through G units				
B1. Fire Tube Boilers with a total rated heat input > 20.0 MMBtu/hr and ≤ 75 MMBtu/hr	7 ppm	7 ppm	2.5 ppm	9 ppm

	South Coast AQMD Rule 1146 – Emissions of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters (Amended 12/4/20)	**SJVAPCD Rule 4306** – Boilers, Steam Generators, and Process Heaters (Amended 12/17/20)	**SJVAPCD Rule 4320** – Advanced Emission Reduction Options for Boilers, Steam Generators, and Process Heaters Greater than 5.0 MMBtu/hr (Amended 12/17/20)	**VCAPCD Rule 74.15** – Boilers, Steam Generators and Process Heaters (Amended 11/10/20)
B2. All other units with a total rated heat input > 20.0 MMBtu/hr and ≤ 75 MMBtu/hour	9 ppm for units with previous NOx limit ≤ 12 and > 5 ppm prior to 12/7/18 or 5 ppm	7 ppm	2.5 ppm	9 ppm or 12 ppm
B3. Units with a rated heat input > 75 MMBtu/hr	5 ppm	5 ppm	2.5 ppm	9 ppm or 12 ppm
C. Oilfield Steam Generators				
C1. Units with a total rated heat input > 5.0 MMBtu/hr and ≤ 20.0 MMBtu/hr	9 ppm for all others	9 ppm	6 ppm	9 ppm
C2. Units with a total rated heat input > 20.0 MMBtu/hr and ≤ 75.0 MMBtu/hr (90% are 62.5 MMBtu/hr)	9 ppm	9 ppm	5 ppm	9 ppm
C3. Units with a total rated heat input > 75.0 MMBtu/hr (98% are 85 MMBtu/hr)	5 ppm	7 ppm	5 ppm	9 ppm
C4. Units firing on less than 50%, by volume, PUC quality gas	No equivalent	15 ppm	5 ppm	No equivalent
D. Refinery Units				
D1. Boilers with a total rated heat input > 5.0 MMBtu/hr and ≤ 40.0 MMBtu/hr	40 ppm and 5 ppm for replacement units*	30 ppm and 5 ppm for replacement units	5 ppm	N/A
D2. Boilers with a total rated heat input > 40.0 MMBtu/hr and ≤110 MMBtu/hr	5 ppm*	9 ppm and 5 ppm for replacement units	5 ppm	N/A
D3. Boilers with a total rated heat input >110 MMBtu/hr	5 ppm* with an interim limit of 7.5 ppm	5 ppm	2.5 ppm	N/A

	South Coast AQMD Rule 1146 – Emissions of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters (Amended 12/4/20)	**SJVAPCD Rule 4306** – Boilers, Steam Generators, and Process Heaters (Amended 12/17/20)	**SJVAPCD Rule 4320** – Advanced Emission Reduction Options for Boilers, Steam Generators, and Process Heaters Greater than 5.0 MMBtu/hr (Amended 12/17/20)	**VCAPCD Rule 74.15** – Boilers, Steam Generators and Process Heaters (Amended 11/10/20)
D4. Process Heaters with a total rated heat input > 5.0 MMBtu/hr and ≤ 40.0 MMBtu/hr	40 ppm and 9 ppm for replacement units*	30 ppm and 9 ppm for replacement units	5 ppm	N/A
D5. Process Heaters with a total rated heat input > 40.0 MMBtu/hr and ≤110 MMBtu/hr	5 ppm* with an interim limit of 18 ppm	15 ppm and 9 ppm for replacement units	5 ppm	N/A
D6. Process Heaters with a total rated heat input >110 MMBtu/hr	5 ppm* with an interim limit of 22 ppm	5 ppm	2.5 ppm	N/A
E. Lower Use Units				
E1. Units limited by a Permit to Operate to an annual heat input of 9 billion Btu/year to 30 billion Btu/year "Low Use" (no more than 10 percent operating capacity)	• Operate units so stack is maintained with gas oxygen concentrations less than or equal to three percent on a dry basis for 15 min averaging period • Tune units at least twice a year or follow different tune up procedure	30 ppm	9 ppm * Units limited by a Permit to Operate to an annual heat input >1.8 billion Btu/year but < 30 billion Btu/year	• Operate units so stack is maintained with gas oxygen concentrations less than or equal to three percent on a dry basis for 15 min averaging period • Tune units at least twice a year or follow different tune up procedure
Liquid Fueled Units	40 ppm	40 ppm	40 ppm	40 ppm
PM Control Requirements	None specified	None specified	• Gaseous fuels must be public utility quality • Sulfur content limits or operate an SO_2 control system	None specified

	South Coast AQMD Rule 1146 – Emissions of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters (Amended 12/4/20)	**SJVAPCD Rule 4306** – Boilers, Steam Generators, and Process Heaters (Amended 12/17/20)	**SJVAPCD Rule 4320** – Advanced Emission Reduction Options for Boilers, Steam Generators, and Process Heaters Greater than 5.0 MMBtu/hr (Amended 12/17/20)	**VCAPCD Rule 74.15** – Boilers, Steam Generators and Process Heaters (Amended 11/10/20)
			• Liquid fuels only to be used during gas curtailment periods	

* These emission limits are from South Coast AQMD Rule 1109.1 Emissions of Oxides of Nitrogen from Petroleum Refineries and Related Operations, which was adopted on November 5, 2021.

c. Conclusion

Staff does not propose any contingency measures for this category of units. Staff did not identify any PM2.5 control measures that are not required by South Coast AQMD for this source category. In addition, no applicable NH3 control measures were identified for consideration. For NOx, staff considered several potential measures such as lowering NOx limits using ULNB and SCR, but these were not suitable contingency measures considering that it would be technologically infeasible to design, install and operate advanced emission control technology within 2 years of the triggering event. This feasibility consideration is discussed in more detail in the evaluation section. A contingency measure that will not result in emission reductions until more than 2 years in the future would not satisfy the criteria of contingency measures as defined in the Draft Guidance.

2. Reciprocating Internal Combustion Engines (RICE)

a. Overview

A stationary RICE includes any internal combustion engine which uses reciprocating motion to convert heat energy into mechanical work and which is not mobile. Stationary RICEs are used in a wide array of industries, including electricity generation (either as stand-alone generators or in cogeneration applications); oil and gas production; agriculture; and commercial/institutional settings (including as back-up electricity generators). NOx and PM2.5 emissions are generated by engines combusting either gaseous or liquid fuels.

As summarized in Table V-6, from the South Coast AQMD 2030 baseline emissions inventory, engines contribute 8.79 tpd of NOx, 0.87 tpd of PM2.5, and 0.32 tpd of NH3 emissions.

TABLE V-6
STATIONARY ENGINE EMISSIONS BASED ON 2030 BASELINE INVENTORY IN THE SOUTH COAST AIR BASIN

Industry	PM2.5 (tpd)	NOx (tpd)	NH3 (tpd)
010 – Electric Utilities	0.04	0.25	0.00
020 – Cogeneration	0.00	0.00	0.00
030 – Oil and Gas Production (Combustion)	0.02	0.81	0.03
040 – Petroleum Refining (Combustion)	0.02	0.00	0.00
050 – Manufacturing and Industrial	0.65	3.32	0.25
052 – Food and Agricultural Processing	0.01	0.08	0.00
060 – Service and Commercial	0.12	2.05	0.04
099 – Other (Fuel Combustion)	0.04	2.27	0.00
Total	**0.87**	**8.79**	**0.32**

b. Evaluation

i. Available Control Technologies

Available control techniques for stationary engines vary by types of engine configurations. Each engine type produces emissions of NOx, PM2.5 and NH3 at different rates and can have differing approaches for controlling emissions. The engines are distributed among four categories: four-stroke rich-burn, four-stroke lean-burn, two-stroke lean-burn, and portable engines subject to the statewide Air Toxics Control Measure (ATCM).[9]

- Compression-ignition (CI) engines: CI engines are primarily diesel engines but could also be dual-fuel (diesel and natural gas) engines. Particulate matter emissions can be controlled by diesel particulate filters (DPF) and limiting fuel sulfur content. NOx can be controlled with either combustion controls (e.g., exhaust gas recirculation) and/or exhaust treatment such as diesel oxidation catalysts as part of a DPF and SCR;

- Spark-ignition (SI) four-stroke rich-burn (4SRB) engines: 4SRB engines use natural gas as primary fuel. NOx emissions are inherently lower from rich-burn engines compared to lean-burn and add-on controls include three-way catalysts (also known as non-selective catalytic reduction (NSCR)). PM emissions from burning natural gas are inherently low enough that any control approach generally focuses only on limiting fuel sulfur content;

- SI four-stroke lean-burn (4SLB) engines: Natural gas is the primary fuel for 4SLB engines. NOx emissions can be controlled by combustion techniques or exhaust controls, such as SCR. PM emissions from burning natural gas are inherently low enough that any control approach generally focuses only on limiting fuel sulfur content; and

- SI two-stroke lean-burn (2SLB) engines: 2SLB engines primarily use natural gas. Typically, combustion controls are applied to reduce NOx, including layered combustion.[10] As with other SI engines fired on natural gas, PM emissions are inherently low enough that any control approach generally focuses only on limiting fuel sulfur content.

Existing federal regulations require manufacturers to certify stationary CI engines to the U.S. EPA's tiered engine requirements (Tiers 1-4, with Tier 4 being the most stringent).[11] Since 2014, new CI engines have been required to meet Tier 4 criteria except for engines qualifying as emergency engines which must be certified to Tier 2 or Tier 3 standards. The U.S. EPA, on the other hand, does not mandate

[9] https://ww2.arb.ca.gov/resources/documents/perp-regulation-and-portable-engine-atcm

[10] In a layered or stratified charge arrangement: a pre-stratified control kit is applied that results in lower combustion temperatures and lower NO_x formation. Example technologies that could be considered layered stratification include turbochargers and inter-cooling, pre-chamber ignition or high energy ignition, improved fuel injection control, and air/fuel ratio control

[11] See 40 CFR Part 60, Subparts IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines, and 40 CFR Part 1039 – Control of Emissions from New and In-Use Nonroad Compression-Ignition Engines

owners/operators to replace older engines that are uncertified or certified to lower tier levels. U.S. EPA-certified Tier 4 engines are typically not required to install additional controls to meet Best Available Control Technology/Lowest Achievable Emission Rate (BACT/LAER) determination for NOx and PM. A search of the Reasonably Available Control Technology (RACT)/BACT/LAER Clearinghouse (RBLC) did not identify "beyond Tier 4" restrictions for CI engines.

Existing federal regulations require stationary SI engines to meet emissions standards, but do not require U.S. EPA certification for all new SI engines.[12] Like CI engines, these regulations do not require owner/operators to replace older engines or upgrade engines to meet the most recent standards. However, to meet BACT/LAER determinations for NOx, the addition of add-on NOx controls is often required (e.g., SCR or a NSCR, depending on engine type). Because SI engines typically burn cleaner gaseous fuels, add-on PM controls are not required to meet BACT/LAER.

ii. South Coast AQMD Control Measures

Table V-7 summarizes the applicable South Coast AQMD rules and control measures that are applicable to stationary engines. A potential control measure, which examined control technologies for emergency backup generators, is presented in Appendix III. In summary, new or modified units with ≥ 1,000 horsepower compression ignition engines are required to meet updated Lowest Achievable Emissions Rate (LAER) and BACT guidelines which require that the units achieve U.S. EPA's Tier 4 Final emission standards.[13] Existing Tier 2 units can achieve Tier 4 Final emission limits through the use of Diesel Particle Filters (DPF) and SCR.

The evaluation section for boilers, steam generators, and process heaters discusses the source of NH3 emissions from fuel combustion in detail. There is no applicable South Coast AQMD rule to control NH3 emissions from RICE. Furthermore, there are no unique considerations for RICE that would warrant further evaluation in this section.

TABLE V-7
SOUTH COAST AQMD RULES AND CONTROL MEASURES (RECIPROCATING ENGINES)

South Coast AQMD Rule	Applicability	Control Measure
Rule 1110.2 – Emissions from Gaseous- and Liquid-Fueled Engines (Amended 11/3/23)	All stationary and portable engines over 50 rated brake horsepower (bhp)	
	Stationary ICE ≥ 50 bhp, including landfill and digester gas (i.e., biogas) fired engines	11 ppm NOx
	Stationary, low-use engines	36 ppm NOx for ≥ 500 bhp 45 ppm NOx for < 500 bhp

[12] See 40 CFR Part 60, Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines

[13] http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2022/2022-sept2-030.pdf?sfvrsn=6You

South Coast AQMD Rule	Applicability	Control Measure
	Stationary, biogas-fired, low-use engines	36 x ECF* ppm NOx for ≥ 500 bhp, 45 x ECF ppm NOx for < 500 bhp
	Stationary, non-emergency electrical generators	0.070 lbs/MW-hr

* ECF is the efficiency correction factor and is no less than 1.0.

iii. Review of Control Measures in Other Jurisdictions

Table V-8 compares and summarizes the applicable control measures in South Coast AQMD with the requirements in other jurisdictions including SJVAPCD, the Sacramento Metropolitan Air Quality Management District (SMAQMD), and the Maricopa County Air Quality Department (MCAQD).

South Coast AQMD's Rule 1110.2 requires most engines to meet an 11 ppm NOx limit while non-emergency electrical generators require a 0.070 lbs/MW-hr NOx limit. Some engines used in agricultural operations can be exempt from this requirement if a Tier 4 diesel engine is installed and other requirements are met. Overall, South Coast AQMD's Rule 1110.2 is designed to require BARCT-level controls and has the most stringent NOx emission limits for stationary engines compared to other air districts. There are no applicable rules to control NH3 emissions from this category in other jurisdictions.

TABLE V-8
COMPARISON OF EXISTING CONTROL REQUIREMENTS (RECIPROCATING INTERNAL COMBUSTION ENGINES)

	South Coast AQMD Rule 1110.2 – Emissions from Gaseous and Liquid-Fueled Engines (Amended 11/1/19)	**SJVAPCD Rule 4702** – Internal Combustion Engines (Amended 8/19/21)	**SMAQMD Rule 412** – Stationary Internal Combustion Engines Located at Major Sources of NOx (Adopted 6/1/95)	**Maricopa County, AZ Rule 324 –** Stationary Reciprocating Internal Combustion Engines (RICE) (Amended 6/23/21)	**CA ATCM** for Diesel Stationary Compression Ignition Engines (Amended 5/19/11)
Applicability (Equipment, size, fuel type)	All stationary and portable engines rated >50 bhp	All internal combustion engines >50 bhp* * For non-agriculture operations (AO) engines >25 to ≤50 bhp, if non-certified, these may not be offered for sale.	Stationary IC engines rated >50 bhp located at major sources of NOx* * Major sources have potential to emit >25 tpy	Stationary IC engines >125 bhp used for cogeneration; located not at a major NOx source Stationary IC engines >50 bhp used for cogeneration not at a major NOx source if all engines aggregate to >125 bhp Stationary IC engines >50 bhp at major NOx sources Nonroad engines >125 bhp with potential to emit: 0.5 tpy PM2.5; 1.0 tpy NOx, 0.5 tpy VOC; or 1.0 tpy CO	All stationary diesel engines >50 bhp
Control Measure					
NOx emissions limit(s)	Stationary engines with approved emission control plan: 11 ppm	Non-AO SI engines by 12/31/2023: 1. Rich-burn: a. 11 ppm	SI rich-burn: 25 ppm or 90% control	CI engines >250 bhp: 530 ppm	Generally the same as EPA certified standards

	South Coast AQMD Rule 1110.2 – Emissions from Gaseous and Liquid-Fueled Engines (Amended 11/1/19)	**SJVAPCD Rule 4702** – Internal Combustion Engines (Amended 8/19/21)	**SMAQMD Rule 412** – Stationary Internal Combustion Engines Located at Major Sources of NOx (Adopted 6/1/95)	**Maricopa County, AZ Rule 324** – Stationary Reciprocating Internal Combustion Engines (RICE) (Amended 6/23/21)	**CA ATCM** for Diesel Stationary Compression Ignition Engines (Amended 5/19/11)
	Other stationary engines without an emission control plan, biogas-fired: 11 ppm Limits for low-use engines*: • <500 bhp = 45 ppm • ≥500 bhp = 36 ppm * Low use engines <500 HOP/yr or 1 billion Btu/yr. Slightly higher limits are also applicable to landfill or biogas fired engines to account for efficiency Non-emergency electrical generators: 2.5 ppm or 0.070 lb/MWh Note: agricultural and non-agricultural engines held to the same standards but with different compliance schedules applied.	2. Lean-burn: a. Gas compression engines: 40 ppm b. >50% waste gas: 40 ppm c. Others: 11 ppm AO SI Engines: • Rich-burn (by 12/31/23): 11 ppm or 0.15 g/bhp-hr • Lean-burn (by 12/31/29): 0.6 g/bhp-hr or 43 ppm Certified AO and non-AO compression-ignited (CI) engines (no later than 6/1/18): • EPA certified Tier 1 or 2: EPA Tier 4 • EPA certified Tier 3 or 4: CI standard in effect at time of installation Non-certified AO and non-AO CI engines (by 2011):	SI lean-burn: 65 ppm or 90% control CI: 80 ppm or 90% control	CI engines >399 bhp: 550 ppm (at major sources, all CI: 530 ppm) SI lean-burn: 110 ppm SI rich-burn: 20 ppm	

	South Coast AQMD Rule 1110.2 – Emissions from Gaseous and Liquid-Fueled Engines (Amended 11/1/19)	**SJVAPCD Rule 4702** – Internal Combustion Engines (Amended 8/19/21)	**SMAQMD Rule 412** – Stationary Internal Combustion Engines Located at Major Sources of NOx (Adopted 6/1/95)	**Maricopa County, AZ Rule 324 –** Stationary Reciprocating Internal Combustion Engines (RICE) (Amended 6/23/21)	**CA ATCM** for Diesel Stationary Compression Ignition Engines (Amended 5/19/11)
		• 50 – 500 bhp: EPA Tier 3 or Tier 4 • 500 – 750 bhp and <1000 annual HOP: EPA Tier 3 • >750 bhp and <1000 annual HOP: EPA Tier 4			
PM control requirements	None specified CI engines: via applicable EPA Tier requirements	SI engines: control via sulfur limits CI engines: via applicable EPA Tier requirements	None specified CI engines: via applicable EPA Tier requirements	CI: 0.40 g/bhp-hr All SI: not applicable CI engines: via applicable EPA Tier requirements (generally lower than 0.40 g/bhp-hr)	CI: 0.02 – 0.03 g/kW-hr, compliance deadlines vary based on engine type and whether engines were considered new or in-use (equal to or more stringent than federal standards)
Exemptions (to NO_x or particulate matter emissions limits)	• Engines powering orchard wind machines • Emergency standby engines, engines use for fire-fighting and flood control, and any other emergency engines limited to 200 hrs/yr • Laboratory engines	• Engines used to propel implements of husbandry • Engines used exclusively to power wind machines • Some de-rated AO and non-AO engines with de-rating before 6/1/2005 (below 50 bhp)	• Emergency standby engines • Engines used exclusively for agricultural purposes • Engine test stands • Engine control evaluations • Nonroad engines • Motor vehicle engines • Flight line engines • Low use engines:	• Emergency standby engines used for power, emergency services, sewage overflow • Compressed gas stationary RICE used for solar testing and research • Engine performance verification, including	Some emergency engines not required to install particulate matter controls

	South Coast AQMD Rule 1110.2 – Emissions from Gaseous and Liquid-Fueled Engines (Amended 11/1/19)	**SJVAPCD Rule 4702** – Internal Combustion Engines (Amended 8/19/21)	**SMAQMD Rule 412** – Stationary Internal Combustion Engines Located at Major Sources of NOx (Adopted 6/1/95)	**Maricopa County, AZ Rule 324** – Stationary Reciprocating Internal Combustion Engines (RICE) (Amended 6/23/21)	**CA ATCM** for Diesel Stationary Compression Ignition Engines (Amended 5/19/11)
	• Engines used for performance testing • Auxiliary engines used to power other engines/ turbines during start-ups • Portable engines registered under state registration (Title 13, Article 5 of CCR) • Agriculture stationary engines that: cannot get electrical service or operator does not qualify for state funding under CA Health and Safety Code Section 44229; and replace engines with Tier 4 replacement engines; and does not operate the Tier 4 engines in a manner to exceed the not-to-exceed standards of 40 CFR Part 1039 Section 1039.101(e)	• Engines powering mobile agricultural equipment • State-registered or Rule 2280 registered portable equipment engines • Emergency standby or low use engines • Public safety equipment	○ SI: varies by engine size, range is 40-200 hrs/yr ○ CI: varies by engine size, range is 200-1,435 hrs/yr	at the production facility • Engine development and testing • Flight line engines • Nonroad engines • Low use engines: ○ Engines ≤1000 bhp operating <200 hrs/yr ○ Engines >1000 bhp operating <100 hrs/yr	

	South Coast AQMD Rule 1110.2 – Emissions from Gaseous and Liquid-Fueled Engines (Amended 11/1/19)	**SJVAPCD Rule 4702** – Internal Combustion Engines (Amended 8/19/21)	**SMAQMD Rule 412** – Stationary Internal Combustion Engines Located at Major Sources of NOx (Adopted 6/1/95)	**Maricopa County, AZ Rule 324 –** Stationary Reciprocating Internal Combustion Engines (RICE) (Amended 6/23/21)	**CA ATCM** for Diesel Stationary Compression Ignition Engines (Amended 5/19/11)
	• Some additional exemptions also apply				
NOx emissions compliance alternative	None listed	Payment of NOx emissions fee in lieu of meeting the emissions limits: sunsets 12/31/23 after which engines must meet limits for non-AO SI engines	None listed	None listed	None listed

c. Conclusion

Staff does not propose any contingency measures for stationary engines. No applicable NH3 or PM2.5 control measures were identified for consideration. While lower limits of NOx could be achieved by installing SCR, installing SCR and achieving reductions within 2 years of triggering would be technologically infeasible. Contingency measures should be measures that would result in the projected emission reductions within a year after the triggering event, or within 2 years with proper justification. A contingency measure that will not result in emission reductions until further in the future would not satisfy the criteria of contingency measures as defined in the Draft Guidance.

3. Combustion Turbines

a. Overview

Industries operating in the South Coast Air Basin that use combustion turbines include the following: electric utilities; cogeneration; oil and gas production; petroleum refining; and commercial operations. Most often, combustion turbines are used to generate power for supplying the electrical grid or for on-site use. Natural gas and diesel/distillate oil are the most common fuels combusted, however, according to the emissions inventory, other fuels used in the Basin include landfill gas, refinery gas, and process gas.

NOx, NH3, and PM2.5 emissions result from fuel combustion in various types of industry. Daily emissions are summarized below in Table V-9 by industry.

TABLE V-9
COMBUSTION TURBINE EMISSIONS BASED ON 2030 BASELINE INVENTORY IN THE SOUTH COAST AIR BASIN

Industry	PM2.5 (tpd)	NOx (tpd)	NH3 (tpd)
010 – Electric Utilities	0.33	1.76	0.44
020 – Cogeneration	0.00	0.01	0.01
030 – Oil and Gas Production (Combustion)	0.07	0.04	0.21
040 – Petroleum Refining (Combustion)	0.44	0.42	0.83
050 – Manufacturing and Industrial	0.06	0.08	0.06
060 – Service and Commercial	0.08	0.44	0.13
Total	**0.98**	**2.75**	**1.68**

The most common fuels used to generate power in the combustion turbine category are natural gas, landfill gas, process gas, and refinery gas. Electric utilities account for over 60 percent of the category total NOx emissions, and natural gas is the dominant fuel combusted in electric utility turbines taking up about 80 percent of NOx emissions. Service and commercial and petroleum refining are the second and third largest categories of NOx emissions for combustion turbines, respectively. For the service and commercial sector, NOx emissions are greatest from landfill gas-fired turbines, while combustion of process and refinery gases combined is the dominant (over 80 percent) source of NOx emissions from turbines for petroleum refining because refinery fuel gas (RFG) burns at higher temperatures and thus can increase NOx emissions compared to turbines burning natural gas. For example, dry low NOx (DLN) combustors can have approximately 10 percent greater NOx emissions when operating on refinery gas compared to natural gas.

Control of NOx from combustion turbines can be accomplished using combustion controls, such as water or steam injection DLN and ULNB, or post-combustion controls, including SCR.[14] DLN combustors can achieve between 9 ppm and 25 ppm in gas turbines operating with natural gas and between 10 ppm and 27.5 ppm in gas turbines operating on refinery gas. SCR can achieve about 95 percent NOx reduction in both types of gas turbines. It is common for both control technologies to be applied (e.g., DLN + SCR + oxidation catalyst). Combination of DLN and SCR can achieve 2 ppm NOx limit with proper engineering and design.

b. Evaluation

In the South Coast Air Basin, emissions from combustion turbines are regulated by Rules 1134, 1135, and 1109.1. Rule 1134 establishes limits for NOx emissions based on unit size (0.3 MW and greater) and fuel type (gas or oil). The rule has different compliance limits through the end of 2023 by unit size and has varied emission limits on and after January 1, 2024 by fuel type. Emission limits are expressed on a dry volume basis, corrected to 15 percent O_2. The current and future applicable emission limits under Rule 1134 are further detailed in Table V-10.

Rule 1135 establishes a 2 ppm NOx limit for combined cycle gas turbines fired with natural gas from electric generating units at electricity generating facilities (EGFs). Rule 1109.1 establishes NOx concentration limits that represent BARCT for combustion equipment located at petroleum refineries and facilities with operations related to petroleum refineries.

Ammonia slip from SCR is expected to be the primary source of NH3 emissions. This is discussed in detail in the evaluation section of boilers, steam generators, and process heaters. Staff did not identify any more stringent requirements for NH3 in other districts' rules. In addition, control measure BCM-09 – Ammonia Emission Reductions from NOx Controls commits to minimize the ammonia slip for the operation of SCRs.

[14] https://www.epa.gov/system/files/documents/2022-03/combustion-turbine-nox-technology-memo.pdf

TABLE V-10
SOUTH COAST AQMD CONTROL MEASURES FOR COMBUSTION TURBINES

South Coast AQMD Rule	Applicability	Control Measure
Rule 1134 – Emissions of Oxides of Nitrogen from Stationary Gas Turbines (Amended 2/4/22)	Applies to all stationary gas turbines, 0.3 MW and greater	NOx emission limits are identified below by unit size (MW rating) and by fuel type. <u>Until 12/31/2023:</u> Compliance limit = reference limit x (unit efficiency / 25%) Reference limits by MW rating: • 0.3 – <2.9 MW: 25 ppm • 2.9 – <10.0 MW: 9 ppm; 15 ppm without SCR • ≥10.0 MW: 9 ppm; 12 ppm without SCR • ≥60 MW combined cycle: 9 ppm; 15 ppm without SCR • 2.9 – <10.0 MW utilizing 60% or more digester gas: 25 ppm <u>Beginning 1/1/2024:</u> • Liquid fuel turbines on outer continental shelf (OCS): 30 ppm • Natural gas - combined cycle/cogeneration turbine: 2 ppm • Natural gas - simple cycle: 2.5 ppm • Produced gas: 9 ppm • Produced gas - OCS turbines: 15 ppm • Other (including recuperative gas turbines): 12.5 ppm • Natural gas - compressor gas turbines: 3.5 ppm
Rule 1135 – Emissions of Oxides of Nitrogen from Electricity Generating Facilities (Amended 1/7/22)	Applies to electric generating units at electricity generating facilities	Combined cycle gas turbines and associated duct burners: 2 ppm Simple cycle gas turbines: 2.5 ppm
Rule 1109.1 – Emissions of Oxides of Nitrogen from Petrochemical Refineries and Related Operations (Adopted 11/5/21)	Applies to owners or operators of facilities with units at petroleum refineries and facilities with related operations to petroleum refineries	<u>Gas turbines fueled with natural gas:</u> • 2 ppm NOx BARCT limit on a 24-hour rolling average • 2.5 ppm conditional limit for those operating close to BARCT limit • 5 ppm during natural gas curtailment periods

South Coast AQMD Rule	Applicability	Control Measure
		Gas turbines fueled with other gaseous fuel: 3 ppm on a 24-hour rolling average Gas turbines fueled with natural gas or other gaseous fuel: 20 ppm interim limit on a 365-day rolling average for facilities that exit RECLAIM but before the BARCT or conditional limit is met

Staff examined stationary gas turbine rules in other California air districts as well as the RACT/BACT/LAER Clearinghouse (RBLC) as summarized in Table V-11.

c. Conclusion

Staff compared South Coast AQMD's NOx emission limits for combustion turbines to those in other air districts. South Coast AQMD's NOx emission limits are generally the most stringent and are equivalent to BACT standards. While the RBLC contains slightly lower NOx emission limits for certain categories, lowering regulatory limits as a contingency measure would not be appropriate as affected sources would need to design and install advanced emission control technology such as SCR. This feasibility consideration is discussed in further detail in the evaluation section for boilers, steam generators, and process heaters. No contingency measures are proposed for combustion turbines, as implementing potential measures within 2 years is not feasible.

TABLE V-11
COMPARISON OF EXISTING CONTROL REQUIREMENTS FOR GAS TURBINES

Source Category	South Coast AQMD Rules 1134, 1135, and 1109.1	SJVAPCD Rule 4703	BAAQMD Rule 9-9	RACT/BACT/LAER Clearinghouse (RBLC)
<3 MW: gas fuel	Rules 1134/1135: 2.5 ppm (simple cycle NG) Rule 1134: 9 ppm (PG) 12.5 ppm (other) Rule 1109.1: 2 ppm (NG) 3 ppm (other gaseous fuel)	9 ppm	<0.5 MW units: exempt 42 (natural gas) 50 (RFG, WG, LPG)	2 ppm (<25 MW non-EGU NG)
<3 MW: liquid fuel	^	25 ppm	<0.5 MW units: exempt 65 ppm	No data
3-10 MW pipeline turbine: gas fuel*	Rule 1134: 3.5 ppm (gas compressors)	8 ppm	25-42 ppm (NG) 50 ppm (RFG, WG, LPG)	2 ppm (<25 MW non-EGU NG)
3-10 MW pipeline turbine: liquid fuel	^	25 ppm	65 ppm	--
3-10 MW other turbines (<877 hr/yr): gas fuel	Rule 1134/1135: 2.5 ppm (simple cycle NG) Rule 1134: 9 ppm (PG) 12.5 ppm (other) Rule 1109.1: 2 ppm (NG) 3 ppm (other gaseous fuel)	9 ppm	25-42 ppm (NG) 50 ppm (RFG, WG, LPG)	2 ppm (<25 MW non-EGU NG)
3-10 MW other turbines (<877 hr/yr): liquid fuel	^	25 ppm	65 ppm	--
3-10 MW other turbines (>877 hr/yr): gas fuel	Rule 1134/1135: 2.5 ppm (simple cycle NG) Rule 1134: 9 ppm (PG) 12.5 ppm (other) Rule 1109.1:	5 ppm	25-42 ppm (NG) 50 ppm (RFG, WG, LPG)	2 ppm (<25 MW non-EGU NG)

Source Category	South Coast AQMD Rules 1134, 1135, and 1109.1	SJVAPCD Rule 4703	BAAQMD Rule 9-9	RACT/BACT/LAER Clearinghouse (RBLC)
	2 ppm (NG) 3 ppm (other gaseous fuel)			
3-10 MW other turbines (>877 hr/yr): liquid fuel	^	25 ppm	65 ppm	--
>10 MW simple cycle (<200 hr/yr): gas fuel	Rule 1134/1135: 2.5 ppm (simple cycle NG) Rule 1109.1: 2 ppm (NG) 3 ppm (other gaseous fuel)	25 ppm	15 ppm (15 to 25 MW) 9 ppm (>25 to 50 MW) 5 ppm (>50 MW NG) 9 ppm (>50 MW RFG, WG)	2 ppm (>25 MW)
>10 MW simple cycle (<200 hr/yr): liquid fuel	^	42 ppm	42 ppm (15 to 25 MW) 25 ppm (>25 MW)	4 ppm (>25 MW EGU, ULSD)
>10 MW simple cycle (>200 hr/yr): gas fuel	Rule 1134/1135: 2.5 ppm (NG) Rule 1109.1: 2 ppm (NG) 3 ppm (other gaseous fuel)	5 ppm	15 ppm (15 to 25 MW) 9 ppm (>25 to 50 MW) 5 ppm (>50 MW NG) 9 ppm (>50 MW RFG, WG)	2 ppm (>25 MW)
>10 MW simple cycle (>200 hr/yr): liquid fuel	^	25 ppm	42 ppm (15 to 25 MW) 25 ppm (>25 MW)	4 ppm (>25 MW EGU ULSD)
>10 MW combined cycle, standard compliance: gas fuel	Rule 1134/1135: 2.5 ppm (NG) Rule 1109.1: 2 ppm (NG) 3 ppm (other gaseous fuel)	5 ppm	15 ppm (15 to 25 MW) 9 ppm (>25 to 50 MW) 5 ppm (>50 MW NG) 9 ppm (>50 MW RFG, WG)	2 ppm (>25 MW)
>10 MW combined cycle, standard compliance: liquid fuel	^	25 ppm	42 ppm (15 to 25 MW) 25 ppm (>25 MW)	4 ppm (>25 MW EGU ULSD)
>10 MW combined cycle, enhanced compliance: gas fuel	Rule 1134/1135: 2.5 ppm (NG) Rule 1109.1: 2 ppm (NG) 3 ppm (other gaseous fuel)	3 ppm	15 ppm (15 to 25 MW) 9 ppm (>25 to 50 MW) 5 ppm (>50 MW NG) 9 ppm (>50 MW RFG, WG)	2 ppm (>25 MW)

Source Category	South Coast AQMD Rules 1134, 1135, and 1109.1	SJVAPCD Rule 4703	BAAQMD Rule 9-9	RACT/BACT/LAER Clearinghouse (RBLC)
>10 MW combined cycle, enhanced compliance: liquid fuel	^	25 ppm	42 ppm (15 to 25 MW) 25 ppm (>25 MW)	4 ppm (>25 MW EGU ULSD)

Abbreviations: EGU – electricity generating unit; NG – natural gas; PG – process gas; RFG – refinery fuel gas; WG – waste gas; LPG – liquefied petroleum gas; ULSD – ultra-low sulfur diesel.

* 12 ppm is the limit under non-steady state operating conditions.

^ Rule 1134 disallows the use of liquid fuel in gas turbines except for units located in the outer continental shelf (OCS) or units providing emergency power to a health facility during a natural gas curtailment; Rule 1135 has similar provisions for EGUs during natural gas curtailment. NO_X limits during these periods are specified in the permit.

4. Residential and Commercial Fuel Combustion

a. Overview

Source categories 060-020 (Service and Commercial-Space Heating), 060-030 (Service and Commercial-Water Heating), 610-606 (Residential Fuel Combustion-Space Heating), and 610-608 (Residential Fuel Combustion-Water Heating) are comprised of combustion appliances or furnaces in commercial and residential buildings that typically burn natural gas leading to combustion emissions of criteria pollutants and GHGs. Space and water heating comprise nearly 90 percent of all building-related natural gas demand in California.[15] In the Basin, these commercial and residential heaters account for nearly 55 percent of the region's total stationary point and area NOx emissions in 2030. Table V-12 summarizes the annual emissions of NOx and PM2.5 from these sources in the 2030 baseline emissions inventory. Note that residential and commercial space and water heating has zero NH3 emissions and that residential wood combustion is evaluated in the miscellaneous processes section of this document.

TABLE V-12
SPACE AND WATER HEATERS EMISSIONS BASED ON 2030 BASELINE INVENTORY IN THE SOUTH COAST AIR BASIN

Source Category	NOx (tpd)	PM2.5 (tpd)
060-020: Service and Commercial – Space Heating	2.11	0.13
060-030: Service and Commercial – Water Heating	0.46	0.14
610-606: Residential Fuel Combustion – Space Heating	7.73	0.89
610-608: Residential Fuel Combustion – Water Heating	1.81	0.56
Total	**12.1**	**1.72**

Manufacturers of water heaters have implemented combustion modifications to meet the NOx limits required in rules by the South Coast AQMD and other jurisdictions. This is done using burner designs such as LNBs and ULNBs, incorporating design principles that include staged air burners, staged fuel burners, pre-mix burners, internal recirculation, and radiant burners.

It is important to note that the South Coast AQMD's existing rules for these emission categories, as well as existing rules in other jurisdictions, apply to new units manufactured or installed after the rule's compliance date. As a result, getting emission reductions from these sources is difficult because these restrictions do not apply to the existing population of units and only apply when an existing unit needs to be replaced or a unit is installed in a new home or establishment. According to the International Association of Certified Home Inspectors (NACHI), a conventional water heater has an expected service life of 6 to 12 years, a pool water

[15] Michael Kenney, Nicholas Janusch, Ingrid Neumann, and Mike Jaske. 2021. California Building Decarbonization Assessment. California Energy Commission. Publication Number: CEC-400-2021-006-CMF. Web link: *https://www.energy.ca.gov/data-reports/reports/building-decarbonization-assessment*

heater has a typical life of 8 years, furnaces have a typical life of 15 to 25 years, and heat pumps and heat exchangers typically last 10 to 15 years.[16] These life expectancies are guidelines only, and a number of factors can influence the actual life of these units including the quality of the unit, weather, usage, installation, and maintenance.

b. Evaluation

The South Coast AQMD currently has three rules that regulate NOx emissions from residential and commercial water heating (Rules 1121 and 1146.2, respectively) and residential space heating (Rule 1111). Rule 1121 regulates NOx emissions from residential type, natural gas-fired water heaters with heat input rates less than 75,000 Btu/hr; Rule 1146.2 regulates NOx emissions from small boilers, process heaters, and water heaters including the commercial sector with heat input rates less than or equal to 2,000,000 Btu/hr; and Rule 1111 regulates NOx emissions from residential type, natural gas-fired central furnaces for heating with heat input rate less than 175,000 Btu/hr or for combination of heating and cooling units with a cooling rate less than 65,000 Btu/hr. The emissions limits that currently apply to newly manufactured or installed residential space and water heaters and commercial water heaters are itemized in Table V-13.

TABLE V-13
SOUTH COAST AQMD CONTROL MEASURES FOR SPACE AND WATER HEATERS

South Coast AQMD Rule	Applicability	Control Measure
Rule 1121 – Control of Nitrogen Oxides from Residential Type, Natural Gas-Fired Water Heaters (Amended 9/3/04)	Residential type, natural gas-fired water heaters rated <75,000 Btu/hr; exemptions: • Water heaters rated ≥75,000 Btu/hr • Water heaters used in recreational vehicles • Water heaters in mobile homes (except where specified)	• 10 ng NOx/joule or 15 ppm • Gas-fired mobile home water heaters: 40 ng/joule or 55 ppm
Rule 1146.2 – Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers and Process Heaters (Amended 12/7/18)	Natural gas-fired water heaters, boilers, and process heaters with a rated heat input ≤2,000,000 Btu/hr	14 ng/joule or 20 ppm
Rule 1111 – Reduction of NOx Emissions from Natural Gas-Fired, Fan-Type Central Furnaces (Amended 9/1/23)	Natural gas-fired central furnaces rated < 175,000 Btu/hr or combined heating and cooling units rated cooling of <65,000 Btu/hr	14 ng/joule for both condensing and non-condensing furnaces, weatherized furnace, and mobile home furnaces;

[16] International Association of Certified Home Inspectors, InterNACHI's Standard Estimated Life Expectancy Chart for Homes, *https://www.nachi.org/life-expectancy.htm*, accessed November 1, 2023

South Coast AQMD Rule	Applicability	Control Measure
		Mitigation fee alternate compliance option end date extended to 9/30/25 for mobile home furnaces

As summarized in Tables V-13, South Coast AQMD's regulated limits are 10 ng NOx/joule for water heaters and 14 ng NOx/joule for space heaters. Staff also examined water and space heater emission rule requirements that have been implemented or recommended for implementation in other air districts in Table V-14.

TABLE V-14
OTHER AIR DISTRICTS' CONTROL MEASURES FOR SPACE AND WATER HEATERS

Rule	Applicability	Control Measure
SJVAPCD Rule 4308 – Boilers, Steam Generators, and Process Heaters - 0.075 MMBtu/hr to less than 2.0 MMBtu/hr (Amended 11/14/13)	Applies to boilers, steam generators, process heaters and water heaters rated from 0.075 to 2 MMBtu/hr; exemptions: • Units installed in manufactured homes • Units installed in recreational vehicles • Hot water pressure heaters	Pool Heaters using PUC gas: • ≥0.075 to ≤0.4 MMBtu/hr: 0.068 lb/MMBtu or 55 ppm • >0.4 to <2.0 MMBtu/hr: 0.024 lb/MMBtu or 20 ppm All other units using PUC gas: 0.024 lb/MMBtu or 20 ppm Units fired on non-PUC gas or liquid fuel: • ≥0.075 to ≤0.4 MMBtu/hr: 0.093 lb/MMBtu or 77 ppm • >0.4 MMBtu/hr: 0.036 lb/MMBtu or 30 ppm
SJVAPCD Rule 4905 – Natural Gas-Fired, Fan-Type Central Furnaces (Amended 12/16/21)	Applies to natural gas-fired, fan-type central furnaces <175,000 Btu/hr and combination heating and cooling units <65,000 Btu/hr; Exemptions: • Units to be installed with propane conversion kits for propane firing only	Condensing, Non-condensing, Weatherized, and Manufactured Home Units: 14 ng/joule of heat output Emission fee compliance option for manufacturers; fee end date has passed for all unit types except Manufactured Home units with fee end date of 9/30/2023
SJVAPCD Rule 4902 – Residential Water Heaters (Certified Water Heaters) (Amended 3/19/09)	Applies to PUC quality natural gas-fired residential water heaters ≤ 75,000 Btu/hr; exemptions: • Water heaters >75,000 Btu/hr • Water heaters using fuels other than PUC quality natural gas	Natural gas-fired mobile home water heater: 40 ng NOx/joule of heat output Natural gas-fired pool heater: 40 ng NOx/joule

Rule	Applicability	Control Measure
	• Water heaters used exclusively in recreational vehicles	Natural gas-fired water heater (excluding mobile home water heaters, instantaneous water heaters, and pool heaters): 10 ng NOx/joule Natural gas-fired instantaneous residential water heaters: 14 ng NOx/joule
SMAQMD Rule 414 – Water Heaters, Boilers and Process Heaters Rated Less Than 1,000,000 Btu per Hour (Amended 10/25/18)	Water Heaters, boilers, or process heaters rated <1 million Btu/hr fired with gaseous or nongaseous fuels; exemptions: • Water heaters in recreational vehicles • Pool/spa heaters <75,000 Btu/hr • Water heaters, boiler, and process heaters fired with liquefied petroleum gas • Hot water pressure washers fired with gaseous or liquid fuels	<75,000 Btu/hr: • Mobile Home: 40 ng NOx/joule or 55 ppm • All others: 10 ng NOx/joule or 15 ppm 75,000 to < 400,000 Btu/hr: • Pool/spa: 40 ng NOx/joule or 55 ppm • All others: 14 ng NOx/joule or 20 ppm 400,000 to < 1 million Btu/hr: • All types – 14 ng NOx/joule or 20 ppm
BAAQMD Regulation 9, Rule 6 – Nitrogen Oxides Emissions from Natural Gas-Fired Water Heaters (Amended 3/15/23)	Natural Gas-Fired Water Heaters and Boilers; exemptions: • Natural gas-fired water heaters and boilers rated > 2 million Btu/hr • Natural gas water heaters used in recreational vehicles • Water heaters using a fuel other than natural gas Natural gas-fired pool/spa heaters rated <400,000 Btu/hr	Natural gas-fired storage tank water heaters ≤75,000 Btu/hr: • 10 ng NOx/joule (excludes water heaters used for mobile homes) • *0 ng NOx/joule (manufactured after 1/1/27; excludes water heaters used for mobile homes)* Natural gas-fired boilers and water heaters >75,000 to 2 million Btu/hr: • 14 ng NOx/joule • *0 ng NOx/joule (manufactured after 1/1/31)* Natural gas-fired boilers and water heaters 400,000 to 2 million Btu/hr: 14 ng NOx/joule Natural gas-fired mobile home water heaters: 40 ng NOx/joule Natural gas-fired pool/spa heaters >400,000 to 2 million Btu/hr: 14 ng NOx/joule
San Diego Air Pollution Control District (SDAPCD) Rule	Natural Gas-Fired Water Heaters ≤ 75,000 Btu/hr; exemptions: • Water heaters rated >75,000 Btu/hr	Natural gas-fired water heater (excluding mobile home water heaters): 10 ng NOx/joule or 15 ppm

Rule	Applicability	Control Measure
69.5.1 – Natural Gas-Fired Water Heaters (Adopted 6/24/15)	• Water heaters used in recreational vehicles • Water heaters used exclusively to heat swimming pools and hot tubs • Water heaters using fuels other than natural gas • Instantaneous water heaters	Natural gas-fired mobile home water heater: 40 ng NOx/joule or 55 ppm
VCAPCD Rule 74.11 – Natural Gas-Fired Water Heaters (Revised 1/12/10)	Natural Gas-Fired Water Heaters <75,000 Btu/hr; exemptions: • Water heaters rated >75,000 Btu/hr • Natural gas water heaters used in recreational vehicles	Natural gas-fired water heater (excluding mobile home water heaters): 10 ng NOx/joule Natural gas-fired mobile home water heater: 40 ng NOx/joule
VCAPCD Rule 74.11.1 – Large Water Heaters and Small Boilers (Revised 9/11/12)	Large Water Heaters and Small Boilers; exemptions	Units rated 75,000 to 400,000 Btu/hr: 14 ng NOx/joule Units rated 400,000 to 1 million Btu/hr: 20 ppm NOx (after 1/1/13)
VCAPCD Rule 74.22 – Natural Gas-Fired, Fan-Type Central Furnaces (Adopted 11/9/93)	Natural Gas-Fired, Fan-Type Central Furnaces; exemptions: • Units installed in mobile homes	40 ng NOx/joule
BAAQMD Regulation 9, Rule 4 – Nitrogen Oxides from Natural Gas-Fired Furnaces (Amended 3/15/23)	Natural gas-fired furnaces rated 175,000 Btu/hr or less	Natural gas-fired fan type central furnace: • 40 ng NOx/joule (1984+) • *14 ng NOx/joule (2024+)* *0 ng NO_x/joule (manufactured after 1/1/29)*
CARB Zero Emission Standard for Space and Water Heaters	Space heaters and water heaters, implementation begins in 2030	Zero emission standard
Other Identified Potential Measures	Residential space and water heating	• Develop incentives for early replacement of residential space and water heaters with high-efficiency electric heat pumps or zero emission heaters • Require a zero NO_x appliance standard in existing buildings.

None of the current limits in other jurisdictions are more stringent than those currently in place in the South Coast AQMD. BAAQMD's rules include zero emission limits for furnaces and water heaters that begin to phase in for new units starting in 2027. Staff analyzed the BAAQMD rules as part of the BACM/MSM evaluation in Appendix III and concluded that adoption of a zero emission standard for space and water heaters was needed to satisfy MSM requirements.

c. Conclusion

Staff has not identified any feasible controls to propose as contingency measures for this source category. The PM2.5 Plan control strategy already includes measures to require newly sold or installed residential fuel combustion units to be zero emission where feasible and low NOx where not. In addition, CARB has committed to adopt the Zero Emission Standard for Space and Water Heaters control measure to satisfy MSM requirements. The only potential contingency measure that would be surplus to those efforts would be to require replacement of existing units before the end of their useful life. Staff does not consider this to be economically feasible, especially due to the undue burden it would place on disadvantaged communities. Nevertheless, South Coast AQMD is committed to expanding access to incentives through rebate programs for zero emission space and water heaters, especially for disadvantaged communities. A rebate program is being developed through the public process associated with Proposed Amended Rules 1111 and 1121.[17]

5. Other Fuel Combustion

a. Overview

There are other gaseous and liquid fuel fired combustion equipment that contribute to fuel combustion emissions. These include, but are not limited to, dryers, kilns, afterburners, evaporators, fryers, and burn-off furnaces. Two South Coast AQMD rules – Rule 1147 and Rule 1147.1 – regulate NOx emissions from these combustion units. Rule 1147 – NOx Reductions from Miscellaneous Sources (Amended 5/6/22) establishes BARCT NOx emission limits from miscellaneous combustion equipment and Rule 1147.1 – NOx Reductions from Aggregate Dryers (Adopted 8/6/21) establishes NOx limits representative of BARCT for gaseous fuel fired aggregate dryers. Emissions associated with these combustion units are summarized in Table V-15.

TABLE V-15
OTHER FUEL COMBUSTION EQUIPMENT EMISSIONS BASED ON 2030 BASELINE INVENTORY IN THE SOUTH COAST AIR BASIN

Major Source Category	Process	NOx (tpd)	PM2.5 (tpd)	NH3 (tpd)
020-COGENERATION	995-OTHER	0.00	0.00	0.16
040-PETROLEUM REFINING (COMBUSTION)	070-IN-PROCESS FUEL	0.00	0.00	0.00
040-PETROLEUM REFINING (COMBUSTION)	070-IN-PROCESS FUEL	0.15	0.03	0.06
050-MANUFACTURING AND INDUSTRIAL	012-OVEN HEATERS (FORCE DRYING SURFACE COATINGS)	0.03	0.00	0.00
050-MANUFACTURING AND INDUSTRIAL	012-OVEN HEATERS (FORCE DRYING SURFACE COATINGS)	0.00	0.00	0.00

[17] https://www.aqmd.gov/home/rules-compliance/rules/scaqmd-rule-book/proposed-rules/rule-1111-and-rule-1121

Major Source Category	Process	NOx (tpd)	PM2.5 (tpd)	NH3 (tpd)
050-MANUFACTURING AND INDUSTRIAL	070-IN-PROCESS FUEL	0.25	0.03	0.04
050-MANUFACTURING AND INDUSTRIAL	070-IN-PROCESS FUEL	0.00	0.00	0.00
050-MANUFACTURING AND INDUSTRIAL	070-IN-PROCESS FUEL	0.00	0.02	0.01
050-MANUFACTURING AND INDUSTRIAL	070-IN-PROCESS FUEL	0.00	0.05	0.08
050-MANUFACTURING AND INDUSTRIAL	070-IN-PROCESS FUEL	0.00	0.00	0.00
050-MANUFACTURING AND INDUSTRIAL	995-OTHER	0.00	0.00	0.00
050-MANUFACTURING AND INDUSTRIAL	995-OTHER	2.22	0.30	1.52
050-MANUFACTURING AND INDUSTRIAL	995-OTHER	0.04	0.00	0.00
050-MANUFACTURING AND INDUSTRIAL	995-OTHER	0.00	0.00	0.00
050-MANUFACTURING AND INDUSTRIAL	995-OTHER	0.52	0.00	0.00
052-FOOD AND AGRICULTURAL PROCESSING	070-IN-PROCESS FUEL	0.00	0.00	0.00
052-FOOD AND AGRICULTURAL PROCESSING	995-OTHER	0.00	0.00	0.00
060-SERVICE AND COMMERCIAL	012-OVEN HEATERS (FORCE DRYING SURFACE COATINGS)	0.00	0.00	0.00
060-SERVICE AND COMMERCIAL	070-IN-PROCESS FUEL	0.04	0.00	0.00
060-SERVICE AND COMMERCIAL	070-IN-PROCESS FUEL	0.01	0.00	0.00
060-SERVICE AND COMMERCIAL	070-IN-PROCESS FUEL	0.00	0.00	0.00
060-SERVICE AND COMMERCIAL	995-OTHER	0.00	0.00	0.00
060-SERVICE AND COMMERCIAL	995-OTHER	0.10	0.03	0.02
060-SERVICE AND COMMERCIAL	995-OTHER	0.62	0.15	1.59
060-SERVICE AND COMMERCIAL	995-OTHER	1.07	0.14	0.22
060-SERVICE AND COMMERCIAL	995-OTHER	3.36	0.11	0.00
060-SERVICE AND COMMERCIAL	995-OTHER	0.00	0.00	0.00
099-OTHER (FUEL COMBUSTION)	080-RESOURCE RECOVERY	0.01	0.01	0.00
099-OTHER (FUEL COMBUSTION)	995-OTHER	0.13	0.36	0.28
Total		**8.56**	**1.24**	**4.00**

b. Evaluation

i. Available Control Technologies

LNB or ULNB is a commercially available combustion control technology and SCR is a post-combustion add-on control technology that is commercially available and commonly employed to control NOx emissions from a wide range of NOx sources. Current NOx limits in Rule 1147 are established between 20 and 60 ppm corrected to 3 percent O_2 for most unit categories, although turbines have a NOx limit set at 9 ppm corrected to 15% O2. Lower NOx emissions with LNB/ULNB are feasible for burner replacements and new installation. Achieving 20 ppm NOx using LNB/ULNB systems without SCR is feasible in certain applications. Source test data also showed existing Rule 1147 equipment and burner technology can feasibly achieve between 20 and 30 ppm NOx in existing applications. SCR systems typically require minimum exhaust temperatures of about 500 °F, and many applications subject to Rule 1147 would need the installation of additional heat input devices, such as duct burners, to achieve SCR minimum exhaust temperatures. Duct burner installation would lower the system's overall reduction potential and raise NOx emissions at the SCR's inlet. Additionally, according to vendor quotations, adding duct burners would raise the control system's total cost. Current Rule 1147 NOx limits can be feasibly achieved with burner only control technologies.[18]

The NOx limit for aggregate dryers in Rule 1147.1 is set at 30 ppm. Based on discussions with burner manufacturers, 25 ppm NOx is difficult to achieve in existing facilities due to limited excess air required for low NOx burners, while 30 ppm is achievable for most retrofit applications. Source test data also suggested existing equipment and burner technology can feasibly achieve 30 ppm NOx. Therefore, staff finalized NOx limits at 30 ppm in Rule 1147.1.[19] SCR is often infeasible for aggregate dryers due to low exhaust temperatures (refer to details above).

ii. South Coast AQMD Control Measures

Table V-16 summarizes NOx emission limits in Rule 1147.

TABLE V-16
NOX EMISSION LIMITS FOR COMBUSTION EQUIPMENT CATEGORIES IN RULE 1147

Equipment Categories	Process Temperature	Emission Limits (corrected to 3% O_2, dry)
Gaseous Fuel Fired Equipment[1]		
Afterburner, Degassing Unit, Thermal Oxidizer, Catalytic Oxidizer or Vapor Incinerator	All	20 ppm or 0.024 lb/MMBtu
Remediation Unit	All	60 ppm or 0.073 lb/MMBtu

[18] Final Staff Report for Proposed Amended Rule 1147 – NOx Reductions from Miscellaneous Sources, South Coast AQMD, May 2022. https://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2022/2022-May6-029.pdf?sfvrsn=6

[19] Final Staff Report for Proposed Rule 1147.1 – NOx Reductions from Aggregate Dryers, South Coast AQMD, August 2021. https://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2021/2021-Aug6-028.pdf?sfvrsn=6

Equipment Categories	Process Temperature	Emission Limits (corrected to 3% O_2, dry)
Burn-off Furnace, Burnout Oven, Incinerator or Crematory with or without Integrated Afterburner	All	30 ppm or 0.036 lb/MMBtu
Evaporator, Fryer, Heated Process Tank, or Parts Washer	All	60 ppm or 0.073 lb/MMBtu
Oven, Dehydrator, Dryer, Heater, Kiln, Calciner, Cooker, Roaster, Furnace, or Heated Storage Tank	<1,200°F	20 ppm or 0.024 lb/MMBtu
	≥1,200°F	30 ppm or 0.036 lb/MMBtu
Make-Up Air Heater or other Air Heater located outside of building with temperature-controlled zone inside building	All	30 ppm or 0.036 lb/MMBtu
Tenter Frame or Fabric or Carpet Dryer	All	20 ppm or 0.024 lb/MMBtu
Autoclave	All	30 ppm or 0.036 lb/MMBtu
Tunnel Kiln or Beehive Kiln	<1,200°F	30 ppm or 0.036 lb/MMBtu
	≥1,200°F	60 ppm or 0.073 lb/MMBtu
Chiller (Absorption or Adsorption)	All	20 ppm or 0.024 lb/MMBtu
Turbine <0.3 MW[2]	All	9 ppm or 0.033 lb/MMBtu
Rotary Dryer	All	30 ppm or 0.036 lb/MMBtu
Other Unit or Process Temperature	<1,200°F	30 ppm or 0.036 lb/MMBtu
	≥1,200°F	60 ppm or 0.073 lb/MMBtu
Liquid Fuel Fired Equipment		
All liquid fuel-fired Units[2]	<1,200°F	40 ppm or 0.053 lb/MMBtu
	≥1,200°F	60 ppm or 0.073 lb/MMBtu

[1] Emission limit applies to burners in Units fueled by 100% natural gas that are used to incinerate air toxics, VOCs, or other vapors; or to heat a Unit. The emission limit applies solely when burning 100% gaseous fuel and not when the burner is incinerating air toxics, VOCs, or other vapors. The Unit shall be tested or certified to meet the emission limit while fueled with natural gas.

[2] Emission limits in ppm for Turbines are corrected to 15% O_2, dry basis.

Rule 1147.1 requires that aggregate dryers achieve a NOx limit of 30 ppm at 3 percent O_2 dry. The compliance schedule depends on the age of the burner and current permit conditions. Equipment at aggregate facilities, potentially including aggregate dryers, are also subject to South Coast AQMD Rule 1155 – Particulate Matter

(PM) Control Devices (Amended 5/2/14). Rule 1155 establishes best management practices for PM air pollution control devices, such as baghouses, from a wide range of manufacturing operations, including aggregate dryers. Rule 1155 requires no visible emissions from any PM air pollution control devices required to have a South Coast AQMD permit. For the largest tier (Tier 3 as defined to have the filter surface area greater than 7,500 square feet) baghouse, the outlet PM concentration is required to meet 0.01 grains per dry standard cubic foot (gr/dscf) or less, and the installation of a bag leak detection system (BLDS) is required. The BLDS continuously monitors baghouse performance by detecting changes in particle mass loading in the exhaust. Facility operators are alerted when bag leakage and similar failures occur such that they can repair the problem areas in a timely manner to minimize excess PM being vented to the atmosphere.

iii. Review of Control Measures in Other Jurisdictions

Other analogous rules adopted by other air districts include SJVAPCD Rules 4309 and 4313 and VCAPCD Rule 74.34 and are summarized in Table V-17 for comparison.

TABLE V-17
OTHER AIR DISTRICTS' CONTROL MEASURES FOR OTHER FUEL COMBUSTION

Rule	Applicability	Control Measure		
SJVAPCD Rule 4309 – Dryers, Dehydrators, and Ovens (Adopted 12/15/05)	Any dryer, dehydrator, or oven that is fired on gaseous fuel, liquid fuel, or is fired on gaseous and liquid fuel sequentially, and the total rated heat input for the unit is ≥5.0 MMBtu/hr	NOx Limit (ppm, corrected at 19% O_2)		
			Gaseous Fuel Fired	Liquid Fuel Fired
		Asphalt/Concrete Plants	4.3	12.0
		Milk, Cheese, and Dairy Processing <20 MMBtu/hr	3.5	3.5
		Milk, Cheese, and Dairy Processing ≥20 MMBtu/hr	5.3	5.3
		Other processes not described above	4.3	4.3
SJVAPCD Rule 4313 – Lime Kilns (Adopted 3/27/03)	Lime kilns	Gaseous Fuel: 0.10 lb/MMBtu of NOx Distillate Fuel: 0.12 lb/MMBtu of NOx Residual Fuel Oil: 0.20 lb/MMBtu of NOx		
VCAPCD Rule 74.34 – NOx Reductions from Miscellaneous Sources (Adapted 12/13/16)	Dryers, furnaces, heaters, incinerators, kilns, ovens, and duct burners where the total rated heat input for the unit is ≥5.0 MMBtu/hr	NOx Emission Limits (ppm, corrected at 3% O_2)		
		Asphalt Manufacturing (Dryers)	40 or 0.048 lb/MMBtu	
		Sand & Gravel Processing (Dryers)	40 or 0.048 lb/MMBtu	
		Paper Products Manufacturing (Hot Air Furnace, Duct Burner, Paper Dryer)	40 or 0.048 lb/MMBtu	
		Metal Heat Treating/ Metal Melting Furnace	60 or 0.072 lb/MMBtu	
		Kiln	80 or 0.096 lb/MMBtu	

Rule	Applicability	Control Measure		
			Process Temperature <1,200°F	Process Temperature ≥1,200°F
		Oven, Dryer (besides asphalt, sand or paper dryer), Heater, Incinerator, Other Furnaces, or Other Duct Burner	30 or 0.036 lb/MMBtu	60 or 0.072 lb/MMBtu

SJVAPCD Rule 4309 contains NOx limits between 3.5 to 5.3 ppm corrected to 19 percent O_2 which are between 32 and 50 ppm NOx corrected to 3 percent O_2. Rule 4309 has no separate emission limits based on process temperature, so comparable NOx emission limits may be more or less stringent compared to existing South Coast AQMD Rule 1147 depending on the process and temperature. SJVAPCD Rule 4313 has an emission limit of 0.10 lb/MMBtu of NOx from gaseous fuel fired lime kilns which is higher than South Coast AQMD Rule 1147's NOx limits for kilns that range from 0.024 to 0.036 lb/MMBtu depending on the process temperature.

VCAPCD Rule 74.34 establishes a NOx emission limit of between 30 to 80 ppm corrected to 3 percent O_2 for any natural gas fired combustion unit where the unit total heat input is greater than or equal to 5 MMBtu/hr. Similar to South Coast AQMD Rule 1147, VCAPCD Rule 74.34 separates emission limits for ovens, dryers, heaters, incinerators, furnaces and duct burners depending on process temperature. Units operating below 1,200°F are limited to 30 ppm NOx while those operating above or equal to 1,200°F are limited to 60 ppm NOx. VCAPCD also contains separate limits for kilns of 80 ppm as well as separate limits for paper product manufacturing and aggregate processes limited to 40 ppm NOx. VCAPCD Rule 74.34 NOx limits are generally less stringent than existing Rule 1147 requirements and Rule 1147.1 requirement for the aggregate dryer category. For example, the NOx limit for aggregate dryers is 40 ppm in VCAPCD Rule 74.34 while the limit is 30 ppm in Rule 1147.1. The NOx limits for oven, dryer, heater, and furnaces range from 30 to 60 ppm in VCAPCD Rule 74.34, whereas those limits range from 20 to 30 ppm in Rule 1147.

c. Conclusion

Staff does not propose any contingency measures for this category of units. Staff did not identify any PM2.5 control measures that are not required by South Coast AQMD for this source category, nor were applicable NH3 control measures identified for consideration. Staff considered several potential measures such as lowering NOx limits using ULNB and SCR, but these were not suitable contingency measures considering that it would be technologically infeasible to design, install and operate advanced emission control technology within 2 years of the triggering event. In addition, SCR is not an appropriate control method for units with low exhaust temperatures.

Waste Disposal

a. Overview

Waste Disposal categories in the South Coast Air Basin emissions inventory include 110 – Sewage Treatment, 120 – Landfills, 130 – Incinerators, 140 – Soil Remediation, and 199 – Other (Waste Disposal). Collectively, these source categories contribute 0.26 tpd PM2.5 emissions, 1.58 tpd NOx emissions, and 6.39 tpd NH3 emissions to the 2030 South Coast Air Basin emissions inventory. These emissions are contributed by landfill flares, composting, and incinerators. Flare emissions under the waste disposal source categories are predominately generated by landfill flares. Smaller quantities of emissions are generated by sewage treatment and incineration flares combusting digester gas, process gas, waste gas, and natural gas. Composting emissions are generated by the decomposition of organic materials. Incinerator emissions are primarily generated by waste disposal activities in the industrial sector and involve combustion of distilled oil, liquified petroleum gas, natural gas, pathological waste and waste gas.

b. Evaluation

1. Landfills

The evaluation of control measures for flares, including landfill flares, is provided in the Petroleum Production and Marketing Section of this document. This evaluation focuses on control measures for landfill equipment other than flares. South Coast AQMD Rule 1150.1 – Control of Gaseous Emissions from Municipal Solid Waste Landfills regulates emissions from non-methane organic compounds (NMOC), VOCs and toxic air contaminant (TAC) emissions from Municipal Solid Waste (MSW) landfills to prevent public exposure to such emissions. This rule also reduces methane emissions, a greenhouse gas, but does not include particulate matter, NOx or ammonia control measures.

Existing regulations for landfill emissions sources in other jurisdictions include BAAQMD Regulation 8-34, Mojave Desert Air Quality Management District (MDAQMD) Rule 1126, and SJVPACD Rule 4642. These rules have requirements for the collection and destruction of VOCs from solid waste disposal sites, but do not include particulate matter, NOx, or ammonia control measures. As VOCs are not a significant PM2.5 precursor in the South Coast Air Basin, these rules were not evaluated. Staff did not identify any NOx, particulate matter, or ammonia controls for consideration as contingency measures.

2. Sewage Treatment

The only emissions from this source category are associated with the treatment of liquid waste. For an evaluation of combustion emissions at sewage treatment plants, refer to the fuel combustion section in this appendix. Evaluation of control measures for sewage treatment did not identify any NOx, particulate matter, or ammonia controls for consideration as contingency measures.

3. Composting

Composting is a process in which solid organic waste materials are decomposed in the presence of oxygen under controlled conditions through the action of bacteria and other microorganisms. Composting operations occur at facilities that process greenwaste, biosolids, manure, and/or foodwaste. Greenwaste composting means composting of greenwaste by itself or as a mixture with foodwaste, or with up to 20 percent manure, per pile volume basis. Agricultural composting is conducted in agricultural settings where the feedstock consists of wastes generated on-site by the production and processing of farm or agricultural products. While there are no PM2.5 or NOx emissions associated with composting in the Basin, 1.6 tpd of ammonia are emitted and the remainder of this evaluation focuses on those emissions.

South Coast AQMD's Rule 1133 series contains requirements to reduce ammonia emissions due to the decomposition of organic materials. Rule 223 – Emission Reduction Permits for Large Confined Animal Facilities includes composting as a class two mitigation measure and specifies minimum composting requirements. These rules are summarized in Table V-18.

TABLE V-18
SOUTH COAST AQMD CONTROL MEASURES FOR COMPOSTING

South Coast AQMD Rule	Applicability	Requirements
Rule 1133.1 – Chipping and Grinding Activities (Amended 7/8/11)	Chipping and grinding activities to produce materials other than active or finished compost	• Chip or grind and utilize on-site or remove curbside, non-curbside, or mixed greenwaste from the site within 48 hours of receipt • Foodwaste cannot be processed at the facility unless approved by the Local Enforcement Agency
Rule 1133.2 – Emission Reductions from Co-Composting Operations (Adopted 1/10/03)	Co-composting operations, defined as those where biosolids and/or manure are mixed with bulking agents to produce compost	• Utilize an enclosure that meets the following requirements: has an inward face velocity of at least 100 ft/min; area of all openings cannot exceed 2% of the enclosure's surface area; and no measurable increase in NH3 above background levels outside the enclosure • Conduct all curing under negative pressure

South Coast AQMD Rule	Applicability	Requirements
		• Exhaust from the enclosure must be vented to an emission control device of at least 80% efficiency for NH3 removal • Alternatively, new co-composting operations can submit a compliance plan demonstrating an overall reduction in NH3 emissions of at least 80%. The facilities would not have to comply with the above requirements
Rule 1133.3 – Emission Reductions from Greenwaste Composting Operations (Adopted 7/8/11)	Greenwaste composting operations that produce active or finished compost from greenwaste by itself or greenwaste in combination with manure or foodwaste	• Cover active phase piles with at least 6 inches of finished compost within 24 hours of pile formation • For the first 15 days, apply water such that the top half of the pile is wet at a depth of at least 3 inches • Compost containing more than 10% foodwaste must employ an emission control device with at least 80% control efficiency for NH3 emissions
Rule 223 – Emission Reduction Permits for Large Confined Animal Facilities (Adopted 6/2/06)	Applies to dairies with ≥ 1,000 cows and poultry farms with ≥ 650,000 chickens.	If composting is selected as a mitigation measure: • Employ an aerated static pile vented to a control device with at least 80% control efficiency • Compost in accordance with the requirements in Rule 1133.2

Staff evaluated regulations for composting in other jurisdictions. SJVAPCD Rule 4566 – Organic Material Composting and SJVAPCD Rule 4565 – Biosolids, Animal Manure, and Poultry Litter Operations were identified as potentially applicable. However, these rules only seek to reduce VOC emissions associated with composting and do not contain specific requirements for the control of ammonia emissions.

Antelope Valley Air Quality Management District (AVAQMD) Rule 1133 regulates emissions of VOCs and NH3 from composting and related operations and prevents inadvertent decomposition from occurring during chipping and grinding operations. AVAQMD Rule 1133 requirements include chipping, grinding, or removal of curbside greenwaste from the site within 3 days, non-curbside greenwaste within 14 days, and mixed greenwaste from the site within 7 days of receipt. South Coast AQMD Rule 1133.1 has more stringent requirements than AVAQMD for chipping and grinding, where operators must chip or grind and utilize on-site or remove curbside, non-curbside, or mixed greenwaste from the site within 2 days of receipt.

Imperial County Air Pollution Control District (ICAPCD) Rule 430 also regulates VOC and NH3 emissions from composting, co-composting and related operations involving animal manure and poultry litter. ICAPCD Rule 430 requires operators to select from a menu of mitigation options involving treatment of compost piles and manure management. South Coast AQMD Rule 1133.2 establishes performance standards for operations to achieve at least 70 percent and 80 percent control efficiency for VOC and NH3 emissions for existing and new operations, respectively. South Coast AQMD Rule 1133.3 requires emission control devices and establishes Best Management Practices (BMPs) for greenwaste composting operations based on the amount of foodwaste a facility processes. Therefore, staff concludes that South Coast AQMD's rules for composting are more stringent than the composting measures in ICAPCD Rule 430.

Emission reductions from composting operations were separately evaluated in Appendix III under potential control measure (PCM) 10. According to California Department of Resources Recycling and Recovery (CalRecycle's) Final Environmental Impact Report, 46 new or expanded compost facilities and 24 new or expanded anaerobic digester facilities would be required in the South Coast Air Basin by 2030 to process newly diverted waste due to implementation of SB 1383.[20] Implementation of SB 1383 may result in increased emissions from processing of organic waste via composting and anaerobic digestion. The PM2.5 Plan seeks to further control emissions from these facilities through BCM-11 – Emission Reductions from Organic Waste Composting.

Finally, BCM-10 – Emission Reductions from Direct Land Application of Chipped and Ground Uncomposted Greenwaste seeks to require composting of chipped and ground greenwaste prior to land application. BCM-10 is one of the control measures that staff identified as being needed to satisfy MSM requirements. Composting of the greenwaste in accordance with the BMPs in Rule 1133.3 will achieve NH3 emission reductions compared to natural decomposition.

With the inclusion of BCM-10 and BCM-11 in the control strategy, staff concludes that no further opportunities exist for a contingency measure. Furthermore, evaluation of rules in other air districts for composting did not identify any NH3 controls that have not been implemented in the South Coast Air Basin.

4. Incinerators

Incinerators are used to burn waste material at high temperatures until reduced to ash. Staff reviewed incinerator control measures in other jurisdictions. SJVAPCD Rule 4203 – Particulate Matter Emissions from

[20] CalRecycle SB 1383 Final Environmental Impact Report. https://www2.calrecycle.ca.gov/Docs/Web/119973

Incineration of Combustible Refuse limits particulate matter emissions from the incineration of combustible refuse, establishes concentration limits and establishes an allowable emissions rate, and prohibits the discharge of visible emissions. SJVAPCD Rule 4302 – Incinerator Burning prohibits the use of any incinerator except for a multiple chamber incinerator or one equally effective in controlling air pollution.

Neither South Coast AQMD nor BAAQMD implement rules with similar particulate matter emissions requirements as in the applicable SJVAPCD regulations. However, the PM2.5 Plan control strategy includes BCM-07 – Emission Reductions from Incinerators which is expected to require control technology that results in NOx and PM2.5 emission reductions. South Coast AQMD Proposed Rule 1165 – Control of Emissions from Incinerators, which is associated with implementation of control measure BCM-07, is currently under development.[21]

c. Conclusion

As detailed above, staff did not identify any potential contingency measures for the waste disposal categories in the South Coast Air Basin that are surplus to the PM2.5 Plan control strategy and would achieve quantifiable reductions within 2 years.

Cleaning and Surface Coating

Cleaning and Surface Coating source categories include 210 – Laundering, 220 – Degreasing, 230 – Coatings and Related Process Solvents, 240 – Printing, 250 – Adhesives and Sealants, and 299 – Other (Cleaning and Surface Coating). These source categories contribute 0.04 tpd of NOx, 1.59 tpd of PM2.5, and 0.16 tpd of NH3 emissions to the 2030 baseline emissions inventory.

VOCs are the primary pollutant emitted from these source categories and their main emission sources are the application and use of solvents, coatings, inks, adhesives, and sealants. Particulate matter emissions are generated by sources in these categories via spraying, material handling, and mixing processes. NH3 and amines are commonly used in the formulation of water-based inks, coatings, and adhesives, and can contribute fugitive emissions from various applications. The small quantity of NOx emissions is associated with dryers, which typically burn natural gas. An analysis of fuel combustion sources was presented earlier in this appendix.

Most air districts including South Coast AQMD require that source operators utilize an emissions control device with a control efficiency of at least 90 percent for VOCs. Additionally, most air agencies require implementation of similar BMPs and good housekeeping to minimize emissions (e.g., requirements to install enclosures for coating operations and prohibiting the use of spray coating unless a high transfer efficiency method is used). South Coast AQMD staff did not identify any particulate matter control measures that are not already implemented in the Basin, nor did staff identify applicable measures for NOx and NH3 emissions.

[21] https://www.aqmd.gov/home/rules-compliance/rules/scaqmd-rule-book/proposed-rules/rule-1165

Thus, staff has not identified any Cleaning and Surface Coating control measures for further consideration as contingency measures in the South Coast Air Basin.

Petroleum Production and Marketing

a. Overview

Petroleum Production and Marketing categories include 310 – Oil and Gas Production, 320 – Petroleum Refining, and 330 – Petroleum Marketing, and 399 – Other (Petroleum Production and Marketing). These source categories contribute 0.91 tpd PM2.5 emissions, 0.63 tpd NOx emissions, and 0.07 tpd NH3 emissions to the 2030 South Coast Air Basin emissions inventory. The primary emission sources in these categories are flares, cooling towers, refinery coking, and Fluid Catalytic Cracking Units (FCCUs).

b. Evaluation

1. Flares

A flare is a tall stack equipped with a burner, used to destroy any excess gases produced by industrial and miscellaneous processes. Flare systems are in continuous operation. Most of the time these systems are in standby mode, ready to combust gases as soon as they enter the flare. U.S. EPA requirements for flares are addressed under 40 CFR Part 60.18 (which specifies operational requirements for flares), 40 CFR Part 63.11 (which specifies work standard practices for flares), and 40 CFR Part 60 Subpart Ja – Standards of Performance for Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After May 14, 2007. South Coast AQMD regulates non-refinery flares (i.e., landfill, sewage treatment, and incinerator flares for waste disposal) under Rule 1118.1 and refinery flares under Rule 1118.

Existing regulations for flares in other jurisdictions include SJVAPCD Rule 4311 that requires flares exceeding annual capacity throughput thresholds to install ultra-low NOx (ULN) flaring technologies and encourages alternative uses of waste gas to reduce flaring. Santa Barbara County Air Pollution Control District (SBCVAPCD) Rule 359 – Flares and Thermal Oxidizers, BAAQMD Rule 12-11 – Flare Monitoring at Petroleum Refineries, BAAQMD Rule 12-12 – Flares at Petroleum Refineries, and SDAPCD Rule 69.7 – Landfill Gas Flares also regulate emissions from flaring and are summarized in Table V-17. Because other districts typically regulate flaring activities under one rule, South Coast AQMD Rules 1118 and 1118.1 for refinery and non-refinery flares are listed under the same column in Table V-19.

TABLE V-19
COMPARISON OF EXISTING CONTROL MEASURES FOR FLARES

	South Coast AQMD Rule 1118 – Control of Emissions from Refinery Flares (Amended 01/06/2023) & Rule 1118.1 – Control of Emissions from Non-Refinery Flares (Amended 01/04/19)	SJVAPCD Rule 4311 – Flares (Amended 12/17/20)	SBCAPCD Rule 359 – Flares and Thermal Oxidizers (Amended 06/28/94)	BAAQMD Rule 12-11 – Flare Monitoring at Petroleum Refineries (Amended 11/03/21) & Rule 12-12 – Flares at Petroleum Refineries (Amended 11/03/21)	SDAPCD Rule 69.7 – Landfill Gas Flares (Adopted 03/09/23):
Applicability	1118 Flaring operations at petroleum refineries, sulfur recovery plants, and hydrogen production plants. 1118.1 Non-refinery facilities, including, but not limited to, oil and gas production facilities, wastewater treatment facilities, landfills, and organic liquid handling facilities.	Operations involving the use of flares.	Flares and thermal oxidizers at oil and gas production sources, petroleum refinery and related sources, natural gas services and transportation sources and wholesale trade in petroleum/petroleum products.	Flares at refineries.	All landfill gas flares at a municipal solid waste landfills where flare emissions are at or above the federal major stationary source threshold for NOx.
Requirements	1118 • Monitor and record data on refinery and related flaring operations and to control and minimize flaring and related emissions • Notify South Coast AQMD of flare events (both planned and unplanned) • Minimize all flaring, except during emergencies, shutdowns, startups, and turnarounds • Monitor emissions and submit quarterly emissions report • Meet performance target for sulfur dioxide emissions of less than 0.5 tons per million barrels of crude processing capacity, averaged over one year. • Any facility that exceeds performance targets must submit flare minimization plan and pay mitigation fees for excess	• Reduce flaring activities with emission limits, operation limits, requirements to monitor, record, and report flaring activities • NOx, VOC, and CO emission limits by operation category for flares at oil and gas, chemical, landfill, digester, or organic liquid loading operations. • NOx and VOC emission limits for ground level enclosed flares; • If emission limits cannot be met the operator must limit flaring to the required annual throughput	• Contains requirements for flares and thermal oxidizers including sulfur content limits, flare minimization plans, and emergency event provisions • NOx and VOC emission limits for ground level flares and thermal oxidizers exceeding 120 standard cubic feet per day	• Reduce emissions from flares at refineries by minimizing the frequency and magnitude of flaring • Monitoring flares in several ways that include vent gas flow and composition, pilots and purging, and video monitoring • Contains management practices for flaring such as flare minimization plans, operating and design standards, recordkeeping and reporting requirements.	• The landfill gas flare shall be properly maintained and operational at all times • In the event the landfill gas flare is inoperable, the gas mover equipment shall be shut down and closed within one hour • Monitoring and record keeping requirements • NOx and CO emission limits for enclosed landfill flares

	South Coast AQMD Rule 1118 – Control of Emissions from Refinery Flares (Amended 01/06/2023) & Rule 1118.1 – Control of Emissions from Non-Refinery Flares (Amended 01/04/19)	SJVAPCD Rule 4311 – Flares (Amended 12/17/20)	SBCAPCD Rule 359 – Flares and Thermal Oxidizers (Amended 06/28/94)	BAAQMD Rule 12-11 – Flare Monitoring at Petroleum Refineries (Amended 11/03/21) & Rule 12-12 – Flares at Petroleum Refineries (Amended 11/03/21)	SDAPCD Rule 69.7 – Landfill Gas Flares (Adopted 03/09/23):
	emissions. 1118.1 • Reduce NOx and VOC emissions from flaring produced gas, digester gas, landfill gas, and other combustible gases or vapors and to encourage alternatives to flaring. • Comply with applicable NOx, VOC, and CO emission limits • Comply with annual percent capacity	• If annual throughput thresholds are exceeded for 2 consecutive years, flare operator must replace or modify flare to meet applicable NOx and VOC limits • Refineries meet performance target for sulfur dioxide emissions of less than 0.5 tons per million barrels of crude processing capacity, averaged over one year.			
Exemptions	1118 • Flaring as a result of a catastrophic event including a major fire or an explosion at the facility • Constitutes a safety hazard to the sampling personnel at the sampling location approved in the Flare Monitoring and Recording • Any sulfur dioxide emissions from flare events caused by external power curtailment beyond the operator's control (excluding interruptible service agreements), natural disasters or acts of war or terrorism 1118.1 • Flares at asphalt plants, biodiesel plants, hydrogen production plants	• Flares used for well testing, tank degassing, and pipeline degassing operations • Flares that combust regeneration gas • Emergency flares not subject to emission limits • Flares operated at municipal solid waste landfills that combust less than 2,000 million standard cubic feet (MMscf) of landfill gas per calendar year and that have ceased accepting waste • Flares that combust only propane or butane or a	• Burning of sulfur, hydrogen sulfide, acid sludge or other sulfur compounds in the manufacturing of sulfur or sulfur compounds • Burning of any gas with a net heating value of less than 300 Btu/scf provided the fuel used to incinerate such gas does not contain sulfur compounds in excess of the rules set limits • Permitted flares at 1.7 MMBTU/hr or less are exempt from emission limits • Emergency Flares	• Flares that are used to control emissions from organic liquid storage, loading racks, marine vessel loading terminals, wastewater treatment systems, and pump seals.	• Standards, Test Methods, Source Test Requirements of this rule shall not apply to an existing open landfill gas flare, which commenced operation on or before March 9, 2023.

	South Coast AQMD Rule 1118 – Control of Emissions from Refinery Flares (Amended 01/06/2023) & Rule 1118.1 – Control of Emissions from Non-Refinery Flares (Amended 01/04/19)	SJVAPCD Rule 4311 – Flares (Amended 12/17/20)	SBCAPCD Rule 359 – Flares and Thermal Oxidizers (Amended 06/28/94)	BAAQMD Rule 12-11 – Flare Monitoring at Petroleum Refineries (Amended 11/03/21) & Rule 12-12 – Flares at Petroleum Refineries (Amended 11/03/21)	SDAPCD Rule 69.7 – Landfill Gas Flares (Adopted 03/09/23):
	fueled in part with refinery gas, petroleum refineries, sulfuric acid plants, and sulfur recovery plants • Flares subject to South Coast AQMD Rule 1147 • Flares routing only propane or butane or a combination of propane and butane directly into the flare burner • Flares at a landfill that collects less than 2,000 MMscf of landfill gas per calendar year and has either ceased accepting waste.	combination of propane and butane			
Annual Capacity Thresholds	1118.1 Non-refineries, expressed as the percentage of capacity used to flare gas: • Any gas combusted in an open flare: 5% • Digester gas: 70% • Landfill gas: 20% • Produced gas: 5%	• Oil and gas and chemical operations: 25,000 MMBtu per year • Landfill operations: 90,000 MMBtu per year • Digester operations: 100,000 MMBtu per year • Organic liquid loading operations: 25,000 MMBtu per year			
NOx Emission Limits	1118.1 Non-refineries: • Digester gas at major source: 0.025 lb/MMBtu • Digester gas at minor source: 0.06 lb/MMBtu • Landfill gas: 0.025 lb/MMBtu • Produced gas: 0.018 lb/MMBtu • Other flare gas: 0.06 lb/MMBtu	• Digester operations at major source: 0.025 lb/MMBtu • Digester operations not at major source: 0.060 lb/MMBtu • Landfill operations:0.025 lb/MMBtu • Flares at oil and gas operations or chemical	Enclosed flare exceeding 120,000 scf/day: • Without steam-assist (<10 MMBtu): 0.0952 lb/MMBtu • Without steam-assist (10-100 MMBtu): 0.1330 lb/MMBtu • Without steam-assist (>100 MMBtu): 0.5240 lb/MMBtu • With steam-assist: 0.068		Enclosed landfill gas flare: 0.06 lb/MMBtu

	South Coast AQMD Rule 1118 – Control of Emissions from Refinery Flares (Amended 01/06/2023) & Rule 1118.1 – Control of Emissions from Non-Refinery Flares (Amended 01/04/19)	SJVAPCD Rule 4311 – Flares (Amended 12/17/20)	SBCAPCD Rule 359 – Flares and Thermal Oxidizers (Amended 06/28/94)	BAAQMD Rule 12-11 – Flare Monitoring at Petroleum Refineries (Amended 11/03/21) & Rule 12-12 – Flares at Petroleum Refineries (Amended 11/03/21)	SDAPCD Rule 69.7 – Landfill Gas Flares (Adopted 03/09/23):
	• Organic liquid storage: 0.25 lb/MMBtu • Organic liquid loading: 0.034 lb/1,000 gallons loaded	operations: 0.018 lb/MMBtu • Organic liquid loading operations: 0.034 lb/1,000 gallons loaded Enclosed Flare: • Without steam-assist (<10 MMBtu): 0.0952 lb/MMBtu • Without steam-assist (10-100 MMBtu): 0.1330 lb/MMBtu • Without steam-assist (>100 MMBtu): 0.5240 lb/MMBtu • With steam-assist: 0.068 lb/MMBtu	lb/MMBtu		

Refinery Flares

Every petroleum refinery operating within the South Coast AQMD's jurisdiction has one or more flares to control emissions from process units and storage vessels. Eight petroleum refining facilities, three hydrogen plants, and one sulfur recovery plant within Los Angeles County operate a total of 31 flares subject to Rule 1118. Rule 1118 requires facilities to submit notifications and reports, monitor emissions, meet emission performance targets, and maintain a public inquiry hotline. Any facility that exceeds these performance targets is required to submit a flare minimization plan and to pay mitigation fees for the excess emissions. Refineries and related facilities are required to notify South Coast AQMD of flare events expected to exceed one or more thresholds of 100 pounds of VOCs, 500 pounds of sulfur dioxides (SO_2), or 500,000 standard cubic feet of gas combusted. Rule 1118 was last amended in January 2023 to address U.S. EPA's partial SIP disapproval of the rule to remove a clause that granted the Executive Officer sole authority to approve ASTM standards, and now includes CARB and U.S. EPA approval for ASTM standards.

Evaluation of Rule 1118 revealed potentially less stringent NOx controls compared to SJVAPCD Rule 4311. Specifically, Rule 4311 sets an annual throughput threshold of 25,000 MMBtu/year or a NOx emission limit of 0.018 lb/MMBtu for oil and gas flares, including refinery flares, while Rule 1118 does not set an explicit NOx limit. However, staff is currently pursuing an amendment of Rule 1118,[22] which is expected to address this issue. Proposed Amended Rule (PAR) 1118, tentatively scheduled for adoption in Spring 2024, will increase the stringency of Rule 1118 by lowering SO_2 performance targets, establishing new NOx performance targets for hydrogen clean service flares, and establishing a throughput threshold for liquified petroleum gas (LPG) clean service flares at refineries. For hydrogen clean service flares, the NOx performance target in PAR 1118 is 0.3 lbs. per million standard cubic feet of hydrogen production capacity. PAR 1118 addresses LPG flares by instituting a throughput threshold of 15,000 MMBtu/year, which is lower than the threshold in SJVAPCD Rule 4311. Operators are expected to comply with the more stringent threshold by installing an LPG recovery system (i.e., refrigeration/chiller system) or implementing flare operation changes through installing a new LPG flare or retrofitting an existing LPG flare, resulting in lower NOx emissions. Therefore, staff concludes that PAR 1118 is more stringent than SJVAPCD Rule 4311.

Non-refinery Flares

South Coast AQMD Rule 1118.1 – Control of Emissions from Non-Refinery Flares was adopted on January 4, 2019, to reduce NOx and VOC emissions from flaring produced gas, digester gas, landfill gas, and other combustible gases or vapors and to encourage alternatives to flaring. Non-refinery facilities include oil and gas production facilities, wastewater treatment facilities, landfills, organic liquid handling facilities, and others. At the time of rule adoption, there were 153 facilities subject to Rule 1118.1.

Table V-16 compares Rule 1118.1 with control measures for flares implemented in other jurisdictions. NOx limits under Rule 1118.1 are as stringent as those in other jurisdictions. Rule 1118.1 and SJVAPCD Rule 4311 both require either flare throughput reduction or flare replacement to meet applicable emission limits when the applicable annual capacity threshold is exceeded. However, each jurisdiction takes a different approach

[22] https://www.aqmd.gov/home/rules-compliance/rules/scaqmd-rule-book/proposed-rules/rule-1118

to setting annual capacity thresholds. Rule 1118.1 sets annual thresholds based on a percentage of capacity that a flare is used, while SJVAPCD Rule 4311 sets annual thresholds based on heat capacity in MMBtu per year. If a flare under Rule 1118.1 exceeds its annual capacity threshold, then the operator of the flare is required to take action to reduce the throughput or comply with more stringent emission limits. While direct comparison of rule requirements is challenging due to the different structures of the rules, staff concludes that Rule 1118.1 is generally as stringent as those from other agencies.

2. Wet Cooling Towers

Wet cooling towers are heat exchange devices used to remove large amounts of heat absorbed in the circulating cooling water systems at power plants, petroleum refineries, petrochemical plants, natural gas processing plants, and a wide variety of industrial operations. Small amounts of particulate matter can be emitted from cooling towers via the production of drift, when dissolved solids in the circulating fluid are entrained in the cooling air and discharged from the cooling tower. As described in the U.S. EPA's compilation of air pollutant emission factors (AP-42), drift eliminators are usually incorporated into cooling tower design to remove droplets from the air stream before exiting the tower.[23] Cooling towers contribute 0.49 tpd of PM2.5 emissions and zero NOx and NH3 emissions to the 2030 baseline emissions inventory.

Staff did not identify any federal, state, or local regulations that control PM emissions from cooling towers. The only federal requirement that applies to cooling towers is under 40 CFR 63.654 and requires monitoring and repair of leaks of VOC from heat exchange systems.

Cooling towers are evaluated in Appendix III of the PM2.5 Plan under PCM 3. Staff determined that prior to developing a policy to implement controls, an emissions inventory and an equipment universe must be established. Control measure BCM-13 – Emission Reductions from Industrial Cooling Towers proposes development of an emissions inventory, equipment universe, and improved emission factors for cooling towers and seeks reductions of PM2.5 emissions from industrial process cooling towers with drift eliminator technologies. BCM-13 aims to assess the feasibility of phasing in the use of drift eliminators with 0.001 percent drift rate for existing cooling towers where cost-effective, and a potential BACT drift rate of 0.0005 percent for new construction. Given the inclusion of BCM-13 in the control strategy, staff did not identify any potential contingency measures for cooling towers.

3. Coking

Delayed coking is a process in petroleum refining that involves the thermal decomposition of heavy hydrocarbons to produce valuable products like petroleum coke, gas oil, and other lighter hydrocarbons. This process is employed to convert the heavy residual fractions obtained from crude oil distillation into more valuable and marketable products. Delayed Coking Units (DCUs) emit 0.05 tpd PM2.5 emissions in the 2030 baseline inventory. DCUs are regulated by South Coast AQMD Rule 1114 – Petroleum Refinery Coking Operations. Rule 1114 requires depressurization of a coke drum to less than two pounds per square inch

[23] EPA's AP-42, Section 13.4 for Wet Cooling Towers, page 13.4-3 at https://www.epa.gov/sites/default/files/202010/documents/13.4_wet_cooling_towers.pdf

gauge prior to venting to the atmosphere, resulting in emission reductions. Staff did not identify any rules in other districts that control PM2.5 emissions from DCUs.

4. FCCUs

Catalytic cracking accounts for 0.48 tpd NOx, 0.33 tpd PM2.5, and 0.06 tpd NH3 emissions in the 2030 baseline inventory. Catalytic cracking is a refinery process conducted in FCCUs where petroleum derivative feedstock is charged and fractured into smaller molecules in the presence of a catalyst. FCCUs are regulated by South Coast AQMD Rules 1105.1 and 1109.1. Relevant requirements are summarized in Table V-20.

TABLE V-20
SOUTH COAST AQMD CONTROL MEASURES FOR FCCUs

South Coast AQMD Rule	Applicability	Requirements
Rule 1105.1 – Reduction of PM10 and Ammonia Emissions from Fluid Catalytic Cracking Units (Adopted 11/7/03)	Applies to fluid catalytic cracking units at petroleum refineries	• Filterable PM10 must be limited to: ○ 3.6 pounds per hour; or ○ 0.005 gr/dscf of flue gas corrected to 3% O_2 dry; or ○ 2.8 pounds per thousand barrels of fresh feed. • NH3 must be limited to 10 ppm corrected to 3% O_2 dry
Rule 1109.1 – Emissions of Oxides of Nitrogen from Petroleum Refineries and Related Operations (Adopted 11/5/21)	Applies to petroleum refineries and facilities with related operations to petroleum refineries	FCCUs must meet NOx limits of 2 ppm and 5 ppm @ 3% O_2 on a 365-day and 7-day rolling average, respectively, with an interim NOx limit of 40 ppm @ 3% O_2 on a 365-day rolling average

Staff reviewed control measures for FCCUs in other jurisdictions and identified BAAQMD Regulation 6, Rule 5 as potentially applicable. This regulation contains an NH3 emission limit that is identical to that in Rule 1105.1 and a PM10 emissions limit of 0.010 gr/dscf at 5 percent O_2 on an annual average basis. Staff concluded that the requirements in Rule 1105.1 are more stringent than those in BAAQMD Regulation 6, Rule 5. Staff also evaluated requirements for FCCUs contained in 40 CFR Part 60 Subpart Ja, which did not

reveal any more stringent requirements than those in South Coast AQMD rules. Thus, staff concluded that South Coast AQMD currently implements the most stringent measures for FCCUs.

c. Conclusion

Staff did not identify any potential contingency measures for the petroleum production and marketing categories in the South Coast Air Basin that could achieve quantifiable reductions and be implemented within 2 years. While the NOx limit for refinery flares in Rule 1118 is currently not as stringent as those in other jurisdictions, a rule amendment to address this deficiency is underway which precludes consideration of this measure for contingency purposes. The current rule amendment is the second phase of a planned two-phase amendment for Rule 1118. The first phase, adopted in 2017, primarily focused on establishing mechanisms to gather more information through scoping documents prepared by the owners and operators of regulated facilities. The current rule amendment relies upon the information gathered from the scoping documents submitted after the 2017 amendment and South Coast AQMD staff's investigations on flare emission reductions.

Industrial Processes

1. Chemical

Processes that contribute emissions to source category 410 – Chemical include the manufacture of plastic products, rubber products, chemicals, and fiberglass. Such sources contribute 0.39 tpd direct PM2.5 emissions, 0.07 tpd NOx emissions, and 0.01 tpd NH3 emissions to the Basin's 2030 baseline emissions inventory, with the majority of emissions contributed by plastics and plastic products manufacturing. There is no source-specific rule for this source category in the Basin. However, such manufacturing processes are subject to general PM emission control requirements including Rule 404 – Particulate Matter – Concentration and Rule 405 – Solid Particulate Matter - Weight. Staff did not identify any potential control measures limiting particulate matter, NH3, or NOx for plastics and plastic manufacturing or the remaining processes covered by this category that can achieve quantifiable reductions. To the extent that any particulate matter, NH3, and NOx emissions are generated by fuel combustion sources in this category, refer to the evaluation of fuel combustion sources in this appendix.

2. Food and Agriculture

Source category 420 – Food and Agriculture includes emissions from various types of processing operations including agricultural products processing, bakeries, and breweries. The projected 2030 baseline emissions for this category include 0.06 tpd PM2.5 emissions, 0.03 tpd NOx emissions, and zero NH3 emissions. While there are no applicable PM2.5, NOx, or NH3 control measures specific to this source category, operations in the Basin are subject to the general PM emission control requirements in Rule 404 – Particulate Matter - Concentration and Rule 405 – Solid Particulate Matter - Weight. Most NOx emissions are associated with fuel combustion in food and agricultural products processing. Control measures for fuel combustion are

evaluated in the fuel combustion section in this appendix. Staff did not identify additional control measures to propose for this source category.

3. Mineral Processes

a. Overview

Source category 430 – Mineral Processes contributes 0.99 tpd PM2.5 emissions, 0.38 tpd NOx emissions, and 0.07 tpd NH3 emissions to the 2030 Basin's baseline emissions inventory. PM2.5 emissions from this category are generated by storage piles of mineral and metal products, asphaltic concrete, and sand/aggregate, asphaltic concrete production, surface blasting, and other. The majority of NOx emissions for this source category come from "Other - Mineral and Metal Products (Unspecified)," followed by cement manufacturing and gypsum manufacturing. These processes are also responsible for the majority of ammonia emissions. Because these processes are associated with the manufacturing of mineral products such as asphalt roofing, cement and concrete, and non-metallic minerals, the source of ammonia as well as NOx emissions is likely to be fuel combustion in heaters, dryers, and engines. Staff evaluated control measures for fuel combustion sources in the fuel combustion section of this appendix.

Particulate matter emissions from the mineral processes source category come from non-combustion related activities including earth moving activities, surface blasting, bulk material handling and mixing, wind erosion of exposed surfaces and storage piles, and vehicle activity on unpaved and paved roadways. Point sources of particulate matter emissions can also emerge throughout the manufacturing process when dust collectors are utilized for material recovery and emissions control. Baghouses are used in asphalt batch plants where moist aggregate is delivered into the drum dryer to be dried out, and in concrete batch plants where concrete materials are introduced into the mixer and agitated.

b. Evaluation

Staff reviewed control measures for this source category implemented by South Coast AQMD and other state and local air agencies. Each jurisdiction has different rule structures, which can make direct comparison difficult. Table V-21 summarizes the control measures staff considered for this source category.

TABLE V-21
CONTROL MEASURES IMPLEMENTED BY SOUTH COAST AQMD AND OTHER DISTRICTS FOR MINERAL PROCESSES

Rule	Applicability	Control Measure
South Coast AQMD Rule 404 – Particulate Matter - Concentration (Amended 2/7/86)	Applies to any source which emits particulate matter	• Establishes particulate matter maximum concentrations based on gas volume discharged • 0.196 gr/dscf limit

Rule	Applicability	Control Measure
South Coast AQMD Rule 405 – Particulate Matter - Weight (Amended 2/7/86)	Applies to any source which emits solid particulate matter including lead and lead compounds	• Establishes solid particulate matter discharge rates based on process weight per hour, ranging from 0.99 lbs/hr to 30.0 lbs/hr
South Coast AQMD Rule 1140 – Abrasive Blasting (Amended 8/2/95)	Establishes requirements for materials used in an abrasive blasting operation and sets limits on the opacity of air contaminants produced by blasting	Comply with the following performance standards: • Confined blasting shall be used; • Wet abrasive blasting shall be used; • Hydroblasting shall be used; or • Dry unconfined blasting abrasives shall contain: ○ Before blasting, no more than 1% by weight material passing a No. 70 U.S. Standard sieve ○ After blasting, no more than 1.8% by weight material ≤5 µm Opacity limit requirements for abrasive blasting operations: • For a compliant operation, opacity limit is set at Ringelmann #2 for 3 minutes in any one hour • For a non-compliant operation, opacity limit is set at Ringelmann #1 for 3 minutes in any one hour
South Coast AQMD Rule 1155 – Particulate Matter Control Devices (Amended 5/2/14)	Applies to permitted PM air pollution control (APC) devices venting processes that have non-combustion PM emissions	• Requires weekly Method 22 visible emissions check for all APC devices • Requires 0.01 gr/dscf standard and BLDS for Tier 3 baghouse
South Coast AQMD Rule 1156 – Further Reductions of Particulate Emissions from Cement Manufacturing Facilities (Amended 11/6/15)	Applies to all operations, materials handling, and transport at a cement manufacturing facility, including, but not limited to, kiln and clinker cooler, material storage, crushing, drying, screening, milling, conveying, bulk loading and unloading systems, internal roadways, material transport, and track-out. After facility closure, also applies to the owner/operator of the property on which a cement manufacturing facility has operated on or after November 4, 2005	• Visible emissions not exceeding 10% opacity. For open piles, roadways, and other unpaved areas, visible emissions no greater than 20% opacity based on 12 readings or 50% opacity based on 5 readings • No visible dust plum from 100 feet in any direction from any operations • Require permitted air pollution control (APC) devices for various operations • APC device outlet PM concentration at BACT limit 0.005 gr/dscf
South Coast AQMD Rule 1157 – PM10 Emission Reductions from Aggregate	Applies to all permanent and temporary aggregate and related operations; exemptions listed under subparagraph (h) of Rule 1157	• Opacity limits • Requires control measures (such as watering, use of dust suppressant) for paved and unpaved roads, and

Rule	Applicability	Control Measure
and Related Operations (Amended 9/8/06)		unpaved vehicle and equipment traffic areas • Requires control of carry-out and trackout • Requirements for handling, storage and transport of bulk materials including storage piles, material loading, unloading, and transferring • Requirements for storage piles • Control requirements for conveyors, crushing equipment and screening equipment
South Coast AQMD Rule 2100 – Registration of Portable Equipment (Adopted 7/11/97)	Establishes standards for registration of certain portable emissions units. The complete list of units subject to Rule 2100 is provided in subparagraph (b) of the rule. Covered sources include confined and unconfined abrasive blasting, Portland concrete batch plants, sand and gravel screening, rock crushing, and unheated pavement crushing and recycling operations	• 20% opacity limits (40% for unconfined abrasive blasting) • Control equipment including fabric or cartridge type filter dust collectors, wet suppression systems • 99% particulate matter control efficiency requirement for dust collection equipment • Other source-specific requirements
SJVAPCD Rule 2280 – Portable Equipment Registration (Amended 12/20/18)	Establishes standards for registration of certain portable emissions units for operation at participating districts. The complete list of units subject to Rule 2280 is provided at section 2.0 of the rule. Covered sources include confined and unconfined abrasive blasting operations, concrete batch plants, sand and gravel screening, rock crushing, and pavement crushing and recycling operations	• 20% opacity limits (40% for unconfined abrasive blasting) • Control equipment including fabric or cartridge type filter dust collectors, wet suppression systems • 99% efficiency requirement for dust collection equipment • Other source-specific requirements
SJVAPCD Rule 4201 – Particulate Matter Concentration (Amended 12/17/92)	Applies to any source operation which emits or may emit dust, fumes, or total suspended particulate matter	0.1 gr/dscf dust emissions limit for all sources
SJVAPCD Rule 4202 – Particulate Matter - Emission Rate (Amended 12/17/92)	Applies to any source operation which emits or may emit particulate matter	Establishes emission limits based on process throughput, ranging from 0.36 lbs/hr to 46.72 lbs/hr
SJVAPCD Regulation VIII – Fugitive PM10 Prohibitions (Amended in 2004)	Applies to specified outdoor fugitive dust sources; complete list provided at SJVPACD Rule 8011, section 3.0 (Definitions)	• Rule 8011 establishes general requirements for fugitive dust sources

Rule	Applicability	Control Measure
		• Rule 8021 contains requirements for construction, demolition, excavation, extraction, and other earthmoving activities • Rule 8031 contains standards for the outdoor handling, storage and transport of bulk materials • Rule 8041 contains standards for control of carryout and trackout at those sources subject to a SJVAPCD fugitive dust rule • Rule 8061 contains requirements for paved and unpaved roads • Rule 8071 contains requirements for unpaved vehicle and equipment traffic areas
BAAQMD Regulation 6, Rule 1 – General Requirements (Amended 8/1/18)	Applies to all types of emission sources; exemptions include temporary sandblasting, open outdoor fires, wood burning devices, and metal recycling and shredding operations	• 20% opacity limit • 0.15 gr/dscf limit for exhaust gas • Throughput-based emission limits, ranging from 1.78 lbs/hr to 40.0 lbs/hr, or 0.99 lbs/hr to 30.0 lbs/hr if the potential to emit TSP is greater than 1,000 kg/year
BAAQMD Regulation 6, Rule 6 – Prohibition of Trackout (Adopted 8/1/18)	Applies to large bulk material sites, large construction sites, and large disturbed surface sites	• Prohibits trackout to the public paved road for a distance of 25 feet • 20% opacity limit during cleanup of trackout • Monitoring and recordkeeping requirements

The control measures identified for mineral processes include limiting opacity (e.g., 20 percent), particulate matter control efficiency (e.g., 99 percent), and particulate matter concentration standards. South Coast AQMD Rule 2100 and Rule 1157 are comparable to the rules being implemented in other jurisdictions. Rule 1140 sets emission standards of air pollutants from abrasive blasting operations using the Ringelmann Chart. The Ringelmann Chart No. 1 corresponds to an opacity of 20 percent and No. 2 to an opacity of 40 percent. In addition, Rule 1155 applies to particulate matter air pollution control devices including baghouses, HEPA filters, cyclones, and electrostatic precipitators. While the 0.01 gr/dscf particulate emissions standard and installation of BLDS apply to the largest Tier 3 baghouse, the requirement of no visible emissions applies to all types of PM air pollution control devices venting non-combustion processes including this mineral process source category. The no visible emissions requirement in Rule 1155 is more stringent than the 20 percent opacity limit in other rules implemented by South Coast AQMD and other districts. Typically, an opacity reading at 20 percent is approaching the lowest level human eyes can detect and any emissions at 10 percent opacity or lower is not detectable by human eyes and thus, is considered no visible emissions. Overall, staff

did not identify any particulate matter control measures implemented in other jurisdictions that are not incorporated in South Coast AQMD rules to consider as potential contingency measures.

c. Conclusion

Staff evaluation of controls for this category did not identify any potential contingency measures that could be implemented and achieve quantifiable emission reductions within 2 years of being triggered.

4. Metal Processes

a. Overview

Source category 440 – Metal Processes includes secondary metal production, metal plating and coating operations, and other unspecified industrial processes that involve mineral and metal products, aluminum, iron, and steel. Sources in this category contribute 0.25 tpd PM2.5 emissions, 0.29 tpd NOx, and zero NH3 emissions to the 2030 Basin's baseline emissions inventory. Metal melting, metal heat treating, metal heating, and metal forging furnaces are the primary sources of NOx emissions in this category. Metal plating and coating also contributes NOx emissions. NOx can be generated as a byproduct from metal treatment processes where nitric acid is used as an oxidant. For example, plating or catalyst recovery involves the reaction of nitric acid and transition metals and emits NOx.

b. Evaluation

Staff reviewed control measures established for this source category by South Coast AQMD, SJVAPCD, BAAQMD, VCAPCD, Great Basin Unified APCD (GBUAPCD), and Amador County Air District. Table V-22 summarizes the metal process control measures identified. The metal process controls identified rely on a range of control measures that generally fall into several common categories. Particulate matter control requirements of the relevant South Coast AQMD rules are generally similar to those identified in SJVAPCD and BAAQMD, which include opacity limits, control device efficiency, enclosures, housekeeping and best management practices. While SJVAPCD and BAAQMD rules generally regulate the non-ferrous metal melting facilities in one rule, South Coast AQMD rules divide this source category into more facility types for which separate rules are implemented for chromium and non-chromium metal melting. For example, South Coast AQMD Rule 1147.2 applies to metal melting, metal heat treating, and metal heating and forging furnaces that are operated at non-RECLAIM, RECLAIM, and former RECLAIM facilities, requiring a South Coast AQMD permit. Staff also evaluated applicable NOx concentration limits in other air districts' rules, among which the lowest was 60 ppm. Rule 1147.2 has more stringent NOx concentration limits ranging from 15 to 60 ppm for metal melting, heating, forging, and treating furnaces. Note that there are zero emissions of PM2.5 and NOx for chrome plating and coating operations and thus, South Coast AQMD Rule 1169 – Hexavalent Chromium - Chrome Plating and Chromic Acid Anodizing, and similar requirements in other jurisdictions were not considered in this evaluation.

TABLE V-22
EXISTING CONTROL MEASURES IN SOUTH COAST AQMD AND OTHER JURISDICTIONS (METAL PROCESSES)

Rule	Applicability	Control Measure

South Coast AQMD Rule 1147.2 – NOx Reductions from Metal Melting and Heating Furnaces (Adopted 4/1/22)	Applies to non-RECLAIM, RECLAIM, and former RECLAIM facilities that operate metal melting, metal heat treating, and metal heating and forging furnaces that require a South Coast AQMD permit	**NOx limits for existing units**
		For unit size <40 MMBtu/hr:
		• Metal melting furnace: 40 ppm
		• Metal heat treating, metal heating, and metal forging:
		  • ≤1,200 °F: 40 ppm
		  • >1,200 °F: 50 ppm
		• Units with radiant-tube burners: 50 ppm
		For unit size ≥40 MMBtu/hr: 15 ppm
		
		Alternative NOx limits for existing units
		For unit size <40 MMBtu/hr:
		• Metal melting furnace: 50 ppm
		• Metal heat treating, metal heating, and metal forging:
		  • ≤1,200 °F: 50 ppm
		  • >1,200 °F: 60 ppm
		• Units with radiant-tube burners: 60 ppm
		
		NOx limits for new units
		For unit size <40 MMBtu/hr:
		• Metal melting furnace: 40 ppm
		• Metal heat treating, metal heating, and metal forging:
		  • ≤1,200 °F: 30 ppm
		  • >1,200 °F: 40 ppm
		• Units with radiant-tube burners: 40 ppm
		For unit size ≥40 MMBtu/hr: 15 ppm
		(All NOx limits above are corrected to 3% O_2)

South Coast AQMD Rule 1407 – Control of Emissions of Arsenic, Cadmium, and Nickel from Non-Chromium Metal Melting Operations (Amended 10/4/19)	Applies to facilities conducting non-chromium metal melting operations	• Particulate matter control device with 99% or greater control efficiency • Good operating practices and good housekeeping practices

Rule	Applicability	Control Measure
South Coast AQMD Rule 1407.1 – Control of Toxic Air Contaminant Emissions from Chromium Alloy Melting Operations (Adopted 1/8/21)	Applies to facilities conducting chromium alloy melting, including smelters (primary and secondary), foundries, die-casters, mills, and other establishments conducting miscellaneous melting processes	• Chromium emission limits requiring monitoring to demonstrate compliance • 10% opacity limit • Prescribes building requirements for chromium alloy melting operations • Requires cleaning using approved cleaning method and at certain minimum frequencies
South Coast AQMD Rule 1420.2 – Emission Standards for Lead from Metal Melting Facilities (Adopted 10/2/15)	Applies to metal melting facilities that melt 100 tons or more of lead per year	• Ambient lead concentration limits • Ambient air monitoring to demonstrate compliance • Requires total enclosure for select process areas • Particulate matter control devices of no less than 99% control efficiency • HEPA filter or equivalent filtration media that is of a minimum of 99.97% control efficiency for 0.3 µm particles
South Coast AQMD Rule 1426 – Emissions from Metal Finishing Operations (Amended 4/2/21)	Applies to owners and operators of metal finishing facilities	• Enclosure • Good housekeeping measures • Best management practices
South Coast AQMD Rule 1430 – Control of Emissions from Metal Grinding Operations at Metal Forging Facilities (Adopted 3/3/17)	Applies to metal grinding and metal cutting operations at metal forging facilities	• Enclosures for metal grinding and cutting operations • Emission control devices with 0.2 gr/dscf at control device outlet • HEPA filter or filters of equivalent control efficiency 99.97% for 0.3 µm particles at final stage of control device • Housekeeping requirements
South Coast AQMD Rule 1460 – Control of Particulate Emissions from Metal Recycling and Shredding Operations (Adopted 11/4/22)	Applies to metal recycling facilities and metal shredding facilities	• Good housekeeping • Best management practices
SJVAPCD Rule 7060 – Toxic Metals from Non-Ferrous Metal Melting (Adopted 12/15/94)	Applies to existing non-ferrous metal melting furnaces	• 99% particulate matter control efficiency requirement for dust collection equipment • 10% opacity limit

Rule	Applicability	Control Measure
		• Good operating practices demonstrated through a maintenance plan or procedures approved by the SJVAPCD • Good housekeeping practices
BAAQMD Regulation 11, Rule 15 – Airborne Toxic Control Measure for Emissions of Toxic Metals from Non-Ferrous Metal Melting (Adopted 4/6/94)	Applies to a wide range of non-ferrous metal melting operations	• Particulate matter control device with 99% or greater control efficiency • Good operating practices demonstrated through maintenance plan or procedures approved by BAAQMD • 10% opacity limit for fugitive emissions • Good housekeeping practices
VCAPCD Rule 74.34 – NOx Reductions from Miscellaneous Sources (Adopted 12/13/16)	Applies to metal heat treating and metal melting furnaces	• 60 ppm NOx at 3% O_2
GBUAPCD Rule 404-B – Oxides of Nitrogen (Amended 5/8/96)	Applies to combustion equipment	• 125 ppm with natural gas fuel • 225 ppm with liquid or solid fuel
BAAQMD Regulation 9, Rule 3 – Nitrogen Oxides from Heat Transfer Operations (Amended 4/24/18)	Heat transfer operations	• Existing heat transfer operation limits 175 ppm NOx when gaseous fuel is burned • New or modified heat transfer operation limits 125 ppm NOx when natural gas is burned
Amador County Air District Regulation II, SIP Rule 19 – Fuel Burning Equipment (Adopted 9/14/71)	Non-mobile fuel burning equipment	• 140 lbs/hr NOx
SJVAPCD Rule 4301 – Fuel Burning Equipment (Amended 12/17/92)	Applies to fuel burning equipment	• 140 lbs/hr NOx

c. Conclusion

Staff reviewed the available control measures for the metal processes category and found that the available measures are already being implemented in the Basin. Therefore, no contingency measures are proposed for this source category.

5. Wood and Paper

Source category 450 – Wood and Paper includes emissions from sawmills, woodworking, pulp and paper manufacturing, and paperboard/fiberboard manufacturing, and other related processes. These sources contribute 3.23 tpd PM2.5 emissions, 0.01 tpd NH3 emissions, and zero NOx emissions to the 2030 Basin's

baseline emissions inventory. Almost all (98 percent) of the PM2.5 emissions come from wood-related other processes whereas all NH3 emissions come from paperboard/fiberboard manufacturing processes.

South Coast AQMD Rule 1137 – PM10 Emission Reductions from Woodworking Operations (Adopted 2/1/02), includes requirements to control PM10 emissions from woodworking operations with a pneumatic conveyance system. There are no other requirements for wood and paper sources implemented by the South Coast AQMD or other jurisdictions and thus, staff has not identified any controls from this category for consideration as contingency measures.

6. Glass and Related Products

No direct PM2.5, NOx, or NH3 emissions are reported from the source category 460 – Glass and Related Products in the 2030 South Coast Air Basin emissions inventory. Therefore, this source category was not evaluated.

7. Electronics

No direct PM2.5, NOx, or NH3 emissions are reported from the source category 470 – Electronics in the 2030 South Coast Air Basin baseline emissions inventory. Therefore, this source category was not evaluated.

8. Other (Industrial Processes)

Source category 499 – Other (Industrial Processes) consists of miscellaneous industrial sources, largely reported as "Cooling Towers-Hydrocarbon Compounds (Unspecified)," "Other-Material Not Specified," "Other-Hydrocarbon Compounds (Unspecified)," and "Other-Textiles/Fabrics" in the South Coast Air Basin emissions inventory. These sources contribute 0.49 tpd PM2.5, 0.02 tpd NOx, and 8.59 tpd NH3 emissions to the 2030 baseline emissions inventory. For an evaluation of control measures for cooling towers, refer to the petroleum production and marketing section. Nearly all of the NH3 emissions in this category are associated with "Other-Material Not Specified." Combustion sources most likely contribute to the emissions reported for this source category. Staff evaluation of control measures for fuel combustion sources is contained in the fuel combustion section of this appendix.

Solvent Evaporation

Source categories under Solvent Evaporation include 510 – Consumer Products, 520 – Architectural Coatings and Related Solvents, 530 – Pesticides/Fertilizers, and 540 – Asphalt Paving/Roofing. While these source categories emit primarily VOCs, there are also 0.03 tpd PM2.5, 1.17 tpd NH3, and zero NOx emissions for these categories. All PM2.5 emissions come from asphalt roofing operations. South Coast AQMD does not have a source-specific rule regulating asphalt roofing operations. Staff reviewed MDAQMD Rule 471 – Asphalt Roofing Operations, but determined that this rule only applies to VOC emissions. Staff did not identify rules in other jurisdictions with PM2.5 control measures specific to asphalt roofing operations. Agricultural fertilizers are the sole source of NH3 emissions under this source category. South Coast AQMD

has not identified effective mechanisms within its authority to regulate NH3 emissions from agricultural fertilizers. Furthermore, South Coast AQMD is not aware of any other jurisdiction with existing rules or regulations controlling NH3 emissions from fertilizers. Staff did not identify any other applicable measures in other jurisdictions to consider as potential contingency measures for solvent evaporation.

Miscellaneous Processes

1. Residential Fuel Combustion

a. Overview

Source category 610 – Residential Fuel Combustion consists of several subcategories, including wood combustion and fuel combustion (space heating, water heating, cooking, and other appliances, such as clothes dryers, barbecues, and water heaters used for pools, spas and hot tubs). Residential wood combustion sources are evaluated in this section; fuel combustion sources (particularly space heaters and water heaters) were previously evaluated in this appendix.

Residential fuel combustion sources contribute 6.59 tpd direct PM2.5, 15.17 tpd NOx, and 0.11 tpd NH3 emissions to the 2030 baseline inventory (approximately 12.2 percent, 7.2 percent, and 0.14 percent of overall PM2.5, NOx, and NH3 emissions, respectively), with wood burning contributing the majority of direct PM2.5 emissions. Residential wood burning includes wood-burning heaters (i.e., woodstoves, pellet stoves, and wood-burning fireplace inserts), which are used primarily for heat generation, and wood-burning fireplaces, which are used primarily for aesthetic purposes.

One of the most effective ways to reduce wintertime smoke is a curtailment program that restricts use of wood-burning heaters and fireplaces on days that are conducive to buildup of particulate matter concentrations (i.e., days where ambient PM2.5 and/or PM10 concentrations are forecast to be above a particular level, known as a "curtailment threshold").

South Coast AQMD Rule 445 – Wood Burning Devices establishes requirements for the sale, transfer, operation, and installation of wood burning devices and on the advertising of wood for sale intended for burning. Among those requirements is a wood burning curtailment program that implements an approved PM2.5 contingency measure.[24]

b. Evaluation

The BACM/MSM analysis in Appendix III contains an extensive evaluation of control measures for residential wood burning devices. The analysis found that the curtailment threshold in Rule 445 would need to be lowered to 25 µg/m3 and the low-income exemption would need to be removed to match the stringency of other districts' rules. This measure has been incorporated into the control strategy as BCM-18. Thus, it is ineligible for consideration as a contingency measure. However, staff determined that it would be feasible

[24] Air Plan Approval; California; Los Angeles—South Coast Air Basin, 87 Fed. Reg. 12866 (March 8, 2022)

to achieve OYW of PM2.5 emission reductions through a contingency measure that would further lower the curtailment threshold to 23 µg/m3.

c. Conclusion

Staff identified a feasible contingency measure for Rule 445 for the purposes of satisfying PM2.5 contingency measure requirements for the 2012 annual PM2.5 standard. The contingency measure would further lower the curtailment threshold beyond the level proposed in control measure BCM-18. There were no additional measures identified for this source category that could be implemented within 2 years and result in quantifiable emission reductions.

2. Fugitive Dust Categories

Fugitive dust source categories include 620 – Farming Operations, 630 – Construction and Demolition, 640 – Paved Road Dust, 645 – Unpaved Road Dust, and 650 – Fugitive Windblown Dust. Fugitive dust emissions are typically generated through the pulverization of surface materials by mechanical force or by entrainment of dust particles in turbulent air streams.[25] Fugitive dust particulate matter emissions are typically reduced and managed using control techniques or measures that prevent materials from being deposited onto surfaces (preventative) or that remove deposited materials from surfaces (mitigative). Examples of these measures include watering, elimination of dirt carryout on paved roads at construction sites and cleaning of spillage on travel surfaces within a specific timeframe after said spillage occurs. South Coast AQMD Rule 401, Rule 403, and other rules (e.g., Rules 1127, 1156, 1157, 1158, 1186, 1460, and 1466) regulate these forms of fugitive particulate matter emissions.

The following sections contain an analysis of fugitive dust source categories and associated control measures.

General Requirements for Fugitive Dust Sources

South Coast AQMD has a comprehensive suite of rules regulating fugitive dust. The Rule 403 series establishes general requirements and definitions. Notably, fugitive dust from any active operation, storage pile, or disturbed surface area must not remain visible in the atmosphere beyond the property line of the emission source or, if the emission is the result of movement of a motorized vehicle, the dust plume cannot exceed 20 percent opacity. Additionally, Rule 401 prohibits the discharge of any pollutant that exceeds the shading of No. 1 on the Ringelmann Chart, as published by the United States Bureau of Mines. Multiple source-specific rules contain requirements that seek to minimize fugitive dust emissions.

[25] EPA, "Compilation of Air Pollutant Emissions Factors, Volume 1: Stationary Point and Area Sources," Chapter 13, Section 2, available at *https://www.epa.gov/sites/default/files/2020-10/documents/13.2_fugitive_dust_sources.pdf* (last updated January 1995)

i. Farming Operations

a. Overview

Source category 620 – Farming Operations consists of fugitive dust particulate matter emissions caused by farming related activities, including tilling dust, harvesting operations, and various animal specific feedlot operations. Similarly, U.S. EPA's national emissions inventory indicates that dust emissions from this source category are generated from agricultural tilling and dust kicked up by animal hooves and feet. Farming operation dust emissions account for a very limited portion (about 0.2 percent) of the Basin's PM2.5 emissions inventory, contributing 0.13 tpd in 2030. About 0.12 tpd are from tilling, dairies, and poultry farms. The remaining 0.01 tpd of PM2.5 emissions in this source category are from harvesting operations. Staff did not further evaluate measures for harvesting as the achievable emission reductions for any potential measure would be far less than 0.01 tpd and would have an inconsequential impact on air quality. Finally, this source category emits 6.13 tpd of NH3 emissions in 2030, or about 8 percent of all NH3 emissions in the Basin.

b. Evaluation

Staff reviewed control measures for the farming operations category. While there are several states and districts that have established fugitive dust rules, many of them exempt agricultural sources from regulation. Table V-19 below summarizes the applicable control measures identified in other jurisdictions with existing fugitive dust requirements for farming operations.

Staff compared South Coast AQMD rule requirements with the requirements of the rules identified in other jurisdictions. South Coast AQMD does not have a single rule that is analogous to the Conservation Management Practices (CMP) rules in other jurisdictions. This is largely because the emissions inventory for agricultural operations in the Basin is much smaller than in areas that have CMP rules. Although a direct comparison to other districts' rules is challenging, if not impossible, qualitative inferences can be made. Rule 403 is a general fugitive dust rule that is most similar to other districts' rules and it is therefore used as the primary comparison in Table V-23. Rule 403 is accompanied by a Fugitive Dust Handbook, including Attachment A – Agricultural Handbook, that was also consulted for the analysis.[26] In addition to Rule 403, South Coast AQMD Rules 223, 1127, and 1186 have requirements to control fugitive dust emissions from dairies and other Confined Animal Facilities (CAFs).

[26] https://www.aqmd.gov/docs/default-source/compliance/rule-403-dust-control-forms/rule-403-fugitive-dust-implementation-handbook-0120km-arc.pdf?sfvrsn=6

TABLE V-23
COMPARISON OF EXISTING RULE REQUIREMENTS FOR FARMING OPERATIONS

	South Coast AQMD Rule 403 – Fugitive Dust (including Fugitive Dust Handbook) (Amended 6/3/05)	SJVAPCD Rule 4550 – Conservation Management Practices (including District CMP handbook and CMP list) (Adopted 8/19/04)	ICAPCD Rule 806 – Conservation Management Practices (Amended 10/16/12)	MDAQMD Rule 411 – Conservation Management Practices for Agricultural Operations (Adopted 5/3/21)
Applicability	Applies to agricultural vegetative crop sites with combined disturbed surface area greater than 10 acres unless the operator implements practices in the Agricultural Handbook and completes a self-monitoring form. Exemptions: • Dairy farms • CAFs with disturbed surface areas of one acre or less	• Applies to agricultural operation sites greater than 100 acres and with elevations less than 3,000 feet • Exempts dairies with less than 500 cows and poultry farms with less than 125,000 chickens. Other animal headcount exemptions. • Exempts forestry, grazing pastures, and nurseries.	Applies to agricultural operation sites greater than 40 acres	• Applies to agricultural operation sites greater than 100 acres when < 5 separate residences within ¼ mile or sites greater than 40 acres when > 5 separate residences within ¼ mile.

	South Coast AQMD Rule 403 – Fugitive Dust (including Fugitive Dust Handbook) (Amended 6/3/05)	SJVAPCD Rule 4550 – Conservation Management Practices (including District CMP handbook and CMP list) (Adopted 8/19/04)	ICAPCD Rule 806 – Conservation Management Practices (Amended 10/16/12)	MDAQMD Rule 411 – Conservation Management Practices for Agricultural Operations (Adopted 5/3/21)
Control Measures - Cropland (Other)	Cease soil preparation and/or maintenance activities during wind speeds > 25 mph; soil moisture monitoring; irrigate after land leveling; conservation tillage; mulching; cover crop; crop residue management; surface roughening; cross wind stripcropping; field windbreaks; ridge roughness; wind barriers; establish vegetation; dust suppressants; surface area modification	Alternate Tilling; Application Efficiencies; Baling/Large Bales; Bulk Materials Control; Chemigation/Fertigation; Conservation Irrigation; Fallow Land; Grinding/Chipping/Shredding; Integrated Pest Management; Irrigation Power Units; Mulching; Night Farming; No Burning; Non-Tillage/Chemical Tillage; Organic Practices; Permanent Crops; Reduced Pruning; Soil Amendments; Soil Incorporation; Sulfur; Reduction or Elimination of Dusting; Surface Roughening; Transgenic Crops; Wind Barrier	Alternate Tilling; Application Efficiencies; Baling/Large Bales; Bulk Materials Control; Chemigation/Fertigation; Conservation Irrigation; Fallow Land; Grinding/Chipping/Shredding; Integrated Pest Management; Irrigation Power Units; Mulching; Night Farming; No Burning; Non- Tillage/Chemical Tillage; Organic Practices; Permanent Crops; Reduced Pruning; Soil Amendments; Soil Incorporation; Sulfur; Reduction or Elimination of Dusting; Surface Roughening; Transgenic Crops; Wind Barrier	Alternate Tilling; Application Efficiencies; Baling/Large Bales; Bulk Materials Control; Chemigation/Fertigation; Conservation Irrigation; Fallow Land; Grinding/Chipping/Shredding; Integrated Pest Management; Irrigation Power Units; Mulching; Night Farming; No Burning; Non- Tillage/Chemical Tillage; Organic Practices; Permanent Crops; Reduced Pruning; Soil Amendments; Soil Incorporation; Sulfur; Reduction or Elimination of Dusting; Surface Roughening; Transgenic Crops; Wind Barrier

	South Coast AQMD Rule 403 – Fugitive Dust (including Fugitive Dust Handbook) (Amended 6/3/05)	SJVAPCD Rule 4550 – Conservation Management Practices (including District CMP handbook and CMP list) (Adopted 8/19/04)	ICAPCD Rule 806 – Conservation Management Practices (Amended 10/16/12)	MDAQMD Rule 411 – Conservation Management Practices for Agricultural Operations (Adopted 5/3/21)
Control Measures - Poultry Operations	<u>Manure Handling & Storage</u> Cover manure; spread manure under low wind conditions; Cleanout frequency <u>Feeding</u> Boot or Sock on feed auger <u>Open Areas</u> Soil moisture; irrigation; conservation tillage; mulching <u>Unpaved Roads/Traffic Areas</u> Pavement, gravel, or asphalt required for all access roads and feed lanes (Rule 1186); Restricted access; Dust suppressant <u>Equipment Parking Areas</u> Dust suppressant; Cover/pave with gravel, asphalt, concrete	<u>Manure Handling & Storage</u> Time of Manure Spreading; Cleanout frequency; Outdoor storage <u>Feeding</u> Boot or Sock <u>Open Areas</u> Vegetation; Reduced tillage; Windblocks; Dust suppressant <u>Unpaved Roads/Traffic Areas</u> Gravel; Restricted Access; Pave; Dust suppressant; Speed Limit; Track-Out Control; Vegetation	N/A	N/A

	South Coast AQMD Rule 403 – Fugitive Dust (including Fugitive Dust Handbook) (Amended 6/3/05)	SJVAPCD Rule 4550 – Conservation Management Practices (including District CMP handbook and CMP list) (Adopted 8/19/04)	ICAPCD Rule 806 – Conservation Management Practices (Amended 10/16/12)	MDAQMD Rule 411 – Conservation Management Practices for Agricultural Operations (Adopted 5/3/21)
Control Measures - Dairy Operations	<u>Unpaved Roads/Traffic Areas</u> Pavement, gravel, or asphalt required for all access roads and feed lanes (Rule 1186); Restricted Access; Dust suppressant <u>Equipment Parking Areas</u> Dust suppressant; Cover/pave with gravel, asphalt, concrete South Coast AQMD Rules 223 and 1127 Requirements <u>Corral/Manure Handling</u> Scrape/harrow before 9 am or when moisture content > 20%; water corral before manure removal; clear corrals without scraping down to soil; Pave feedlanes; minimize excess water <u>Overall Management/Feeding</u> Cover silage piles; feed according to National Research Council guidelines; feed high moisture corn; disposal requirements; flush milk parlor; enclose and vent parlor to control device	<u>Corral/Manure Handling</u> Sprinkling of Open Corral; Frequency of scraping/cleanout; Freestall housing; Fibrous layer in dusty areas; Pull-type manure harvesting equipment; Scraping/harrowing <u>Overall Management/Feeding</u> Bulk Materials Control; Feeding near dusk; Wet feed during mixing; Wet material in wagon first before feeding; Downwind shelterbelts/boundary trees <u>Unpaved Roads/Traffic Areas</u> Gravel; Restricted Access; Pave; Dust suppressant; Speed Limit; Track-Out Control; Speed bumps; Appropriate equipment and vehicles	N/A	N/A

	South Coast AQMD Rule 403 – Fugitive Dust (including Fugitive Dust Handbook) (Amended 6/3/05)	SJVAPCD Rule 4550 – Conservation Management Practices (including District CMP handbook and CMP list) (Adopted 8/19/04)	ICAPCD Rule 806 – Conservation Management Practices (Amended 10/16/12)	MDAQMD Rule 411 – Conservation Management Practices for Agricultural Operations (Adopted 5/3/21)
Control Measures - Feedlot Operations	<u>Unpaved Roads/Traffic Areas</u> Speed control; access restriction; pavement, gravel, or asphalt required for all access roads and feed lanes (Rule 1186); surface modification; track-out prevention; prohibit turning tractors and implements on paved public roads Below requirements are from South Coast AQMD Rules 223 and 1127: <u>Pens/Manure Handling</u> Vacuum/scrape freestalls; remove manure daily; rake/harrow/scrape bedding; dry manure handling system; flush freestalls; shade structures <u>Overall Management/Feeding</u> Cover silage piles; feed according to National Research Council guidelines; feed high moisture corn; disposal requirements; flush milk parlor; enclose and vent parlor to control device; cease hay grinding between 2 and 5 pm if visible emission extend more than 50 feet (Rule 1186)	<u>Pens/Manure Handling</u> Sprinkling of Open Corral; Frequency of scraping/cleanout; Shade for animal; Fibrous layer in dusty areas; Pull-type manure harvesting equipment <u>Overall Management/Feeding</u> Bulk Materials Control; Feeding near dusk; Wet feed during mixing; Wet material in wagon first before feeding; Downwind shelterbelts/boundary trees <u>Unpaved Roads/Traffic Areas</u> Gravel; Restricted Access; Pave; Dust suppressant; Speed Limit; Track-Out Control; Speed bumps; Appropriate equipment and vehicles	N/A	N/A

The NH3 emissions from this source category are associated with livestock waste. South Coast AQMD conducted an extensive evaluation of control measures for livestock waste as part of Potential Control Measure 4 - Emission Reductions from Livestock Waste at Confined Animal Facilities in Appendix III. Due to that evaluation, the PM2.5 Plan includes control measure BCM-08 - Emission Reductions from Livestock Waste at Confined Animal Facilities. As this control measure is part of the attainment strategy, it is ineligible for consideration as a contingency measure.

c. Conclusion

Staff compared South Coast AQMD rule requirements to measures in other jurisdictions and did not identify any PM2.5 measures for farming operations in other jurisdictions that could be implemented and achieve quantifiable emission reductions within 2 years of being triggered. In addition, the only feasible measures to further reduce NH3 emissions from livestock waste have been included as part of the control strategy. Therefore, no suitable measure can be considered as a potential contingency measure at this time.

ii. Construction and Demolition

a. Overview

Source category 630 – Construction and Demolition consists of fugitive dust particulate matter emissions caused by construction activities that result from building residential, commercial, industrial, institutional, or governmental structures. Construction and demolition activities include any on-site mechanical activities conducted in preparation of the building, alteration, rehabilitation, demolition, or improvement of property such as grading, excavation, loading, crushing, cutting, planning, shaping or ground-breaking. Construction and demolition sources contribute 2.49 tpd PM2.5 emissions representing 4.61 percent of the total PM2.5 emissions in the 2030 South Coast Air Basin emissions inventory.

b. Evaluation

South Coast AQMD regulates PM2.5 emissions from construction and demolition under Rule 403 – Fugitive Dust. Rule 403 requires the implementation of best available dust control measures during any active man-made operations capable of generating fugitive dust, and requires measures to prevent, reduce or mitigate fugitive dust emissions. This rule also requires activities defined as “large operations” to notify the South Coast AQMD by submitting specific forms and implement additional control measures. A large operation is defined as any active operation on property containing 50 or more acres of disturbed surface area; or any earth moving operation with a daily earth-moving or throughput volume of 3,850 cubic meters (5,000 cubic yards), three times during the most recent 365 day period.

Emissions from construction and demolition result predominantly from site preparation work, light-duty vehicle travel, and other operations. In addition to general rule requirements, Rule 403 requires active operations to utilize the best available control measures to minimize fugitive dust emissions from each

dust source type within the active operation. Existing regulations for construction and demolition emissions sources in other jurisdictions include SJVAPCD Rule 8021 – Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities, SMAQMD Rule 403 – Fugitive Dust, SDAPCD Rule 55- Fugitive Dust Control, and Clark County Air Quality Regulations (AQR) Section 94 – Permitting and Dust Control for Construction and Temporary Commercial Activities. Table V-24 compares regulations for the construction and demolition source category in other jurisdictions to South Coast AQMD Rule 403.

TABLE V-24
COMPARISON OF EXISTING CONTROL MEASURES FOR CONSTRUCTION AND DEMOLITION

	South Coast AQMD Rule 403 – Fugitive Dust (Amended 06/03/05)	SJVAPCD Rule 8021 – Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities (Amended 08/19/04)	SMAQMD Rule 403 – Fugitive Dust (Adopted 08/03/77)	SDAPCD Rule 55 – Fugitive Dust Control (Adopted 06/24/09)	Clark County Air Quality Regulations Section 94 – Permitting and Dust Control for Construction and Temporary Commercial Activities (Amended 08/03/21)
Applicability	• Any activity or man-made condition capable of generating fugitive dust.	• Any construction, demolition, excavation, extraction, and other earthmoving activities, including, but not limited to, land clearing, grubbing, scraping, travel on site, and travel on access roads to and from the site • Construction of new landfill disposal sites or modification to existing landfill disposal sites prior to commencement of landfilling activities.	• Operations which periodically may cause fugitive dust emissions into the atmosphere.	• Any commercial construction or demolition activity capable of generating fugitive dust emissions, including active operations, open storage piles, and inactive disturbed areas.	• All construction and temporary commercial activities that disturb soils and emit PM.

Requirements	• No person shall cause fugitive dust emissions from any active operation, open storage pile, or disturbed surface area such that:
	  • dust remains visible in the atmosphere beyond the property line of emission source; or
	  • dust emission exceeds 20 percent opacity if the dust emission is the result of a motorized vehicle.
	<u>No person shall</u>:
	• conduct active operations without utilizing the applicable best available control measures; see Table V-21
		• Limit fugitive dust emissions from construction, demolition, excavation, extraction, and other earthmoving activities
		• No person shall perform any construction, demolition, excavation, extraction, or other earthmoving activities unless rule requirements are sufficiently implemented to limit VDE to 20% opacity and comply with conditions for a stabilized surface area
		• Implement the requirements below when using wrecking balls or other wrecking equipment to raze or demolish buildings:
		  • Apply sufficient water to building
			• A person shall take every reasonable precaution not to cause fugitive dust emissions from being airborne beyond the property line where the emissions originate, from any construction, handling or storage activity, or any wrecking, excavation, grading, clearing of land or solid waste disposal operation
			• Reasonable precautions shall include, but are
				• Airborne Dust Beyond the Property Line: No person shall engage in construction or demolition activity in a manner that discharges visible dust emissions into the atmosphere beyond the property line for a period more than 3 minutes in any 60 minute period
				• Track-Out/Carry-Out: Visible roadway dust from active operations, spillage from transport trucks, erosion, or track-out/carry-out shall:
				  ○ be minimized by trackout/carry-out and
					• Establishes requirements to obtain and comply with a dust control operating permit and a dust mitigation plan, and the procedures to maintain dust control of these activities.
					• Any person engaging in construction activities on a site having a Permit shall be subject to all conditions set forth in the permit
					• Construction site superintendent and all others designated as on-site representatives of the

	South Coast AQMD Rule 403 – Fugitive Dust (Amended 06/03/05)	SJVAPCD Rule 8021 – Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities (Amended 08/19/04)	SMAQMD Rule 403 – Fugitive Dust (Adopted 08/03/77)	SDAPCD Rule 55 – Fugitive Dust Control (Adopted 06/24/09)	Clark County Air Quality Regulations Section 94 – Permitting and Dust Control for Construction and Temporary Commercial Activities (Amended 08/03/21)

	• cause PM10 levels to be enhanced by 50 micrograms per cubic meter
	• allow track-out to extend 25 feet or more in cumulative length from the point of origin from an active operation
	  • All track-out from an active operation shall be removed at the conclusion of each workday or evening shift
	• Conduct an active operation with a disturbed surface area of five or more acres, or with a daily import or export of 100 cubic yards or more of bulk material without utilizing at least one of the following measures at each vehicle egress from the site to a paved public road:
	  • Install a pad consisting of washed gravel (minimum-size: one inch) maintained in a clean condition to a depth of at least six inches and extending at least 30 feet wide and at least 50 feet long.
	  • Pave the surface extending at least 100 feet and at least 20 feet wide.
	  • Utilize a wheel shaker/wheel spreading device consisting of raised dividers (rails, pipe, or
		exterior surfaces, unpaved surface areas where equipment will operate, and razed building materials to limit VDE to 20% opacity throughout the duration of razing and demolition activities.
		• Apply sufficient dust suppressants to unpaved surface areas within 100 feet where materials from razing or demolition activities will fall in order to limit VDE to 20% opacity.
		• Apply sufficient dust suppressants to unpaved surface areas where wrecking or hauling equipment will be operated in order to limit VDE to 20% opacity
		• Handling, storage, and transport of bulk materials on-site or off-site resulting from the demolition or razing of buildings shall comply with the requirements specified in Rule 8031 (Bulk Materials)
		• Apply water within 1 hour of demolition to unpaved surfaces within 100 feet of the demolished structure.
		• Prevention and removal of carryout or trackout on paved public access roads from demolition operations shall be
			not limited to:
			• Use, where possible, of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, the construction of roadways or the clearing of land
			• Application of asphalt, oil, water, or suitable chemicals on dirt roads, materials stockpiles, and other surfaces which can give rise to airborne dusts
			• Other means approved by the Air Pollution Control Officer.
				erosion control measures- (1) track-out grates or gravel beds at each egress point, wheel-washing at each egress during muddy conditions, soil binders, chemical soil stabilizers, geotextiles, mulching, or seeding; and (2) for outbound transport trucks- using secured tarps or cargo covering, watering, or treating of transported material
				○ be removed at the conclusion of each work day when active operations cease, or every 24 hours for continuous operations
				○ The use of blowers for removal of track-out/carry-out is prohibited under any circumstances.
					Permittee; all construction supervisors and foremen of on-site contractors and subcontractors; water truck and water pull drivers for each construction project are required to complete the dust control class
					• Any person who engages in a construction activity or temporary commercial activity, with or without a permit, shall employ Best Management Practices and comply with soil stabilization standards and emissions standards

	South Coast AQMD Rule 403 – Fugitive Dust (Amended 06/03/05)	SJVAPCD Rule 8021 – Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities (Amended 08/19/04)	SMAQMD Rule 403 – Fugitive Dust (Adopted 08/03/77)	SDAPCD Rule 55 – Fugitive Dust Control (Adopted 06/24/09)	Clark County Air Quality Regulations Section 94 – Permitting and Dust Control for Construction and Temporary Commercial Activities (Amended 08/03/21)
	grates) at least 24 feet long and 10 feet wide OR install and utilize a wheel washing system to remove bulk material from tires and vehicle undercarriages before vehicles exit the site • Any other control measures approved by the EO and the U.S. EPA • Additional requirements for large operations • Dust control plan • implement additional dust control measures; see Table V-22	performed in accordance with Rule 8041- Carryout and Trackout • 15 mph speed limitation and posting of speed limit signs on uncontrolled unpaved access/haul roads on construction sites • Wind generated fugitive dust requirements • Cease outdoor construction, excavation, extraction, and other earthmoving activities that disturb the soil whenever VDE exceeds 20% opacity • Operator shall submit a Dust Control Plan to the APCD prior to the start of any construction activity that will include 10 acres or more of disturbed surface area for residential developments, or 5 acres or more of disturbed surface area for non-residential development, or will include moving, depositing, or relocating more than 2,500 cubic yards per day of bulk materials on at least three days • District notification of earthmoving activities on smaller construction sites <u>Control Measures</u> PRE-ACTIVITY:			

	South Coast AQMD Rule 403 – Fugitive Dust (Amended 06/03/05)	SJVAPCD Rule 8021 – Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities (Amended 08/19/04)	SMAQMD Rule 403 – Fugitive Dust (Adopted 08/03/77)	SDAPCD Rule 55 – Fugitive Dust Control (Adopted 06/24/09)	Clark County Air Quality Regulations Section 94 – Permitting and Dust Control for Construction and Temporary Commercial Activities (Amended 08/03/21)
		• Pre-water site sufficient to limit VDE to 20% opacity, and • Phase work to reduce the amount of disturbed surface area at any one time. DURING ACTIVE OPERATIONS: • Apply water or chemical/organic stabilizers/suppressants sufficient to limit VDE to 20% opacity; or • Construct and maintain wind barriers sufficient to limit VDE to 20% opacity. If utilizing wind barriers, control measure B1 above shall also be implemented. • Apply water or chemical/organic stabilizers/suppressants to unpaved haul/access roads and unpaved vehicle/equipment traffic areas sufficient to limit VDE to 20% opacity and meet the conditions of a stabilized unpaved road surface. TEMPORARY STABILIZATION DURING PERIODS OF INACTIVITY: • Restrict vehicular access to the area; and • Apply water or chemical/organic stabilizers/suppressants, sufficient to comply with the conditions of a stabilized surface			

	South Coast AQMD Rule 403 – Fugitive Dust (Amended 06/03/05)	SJVAPCD Rule 8021 – Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities (Amended 08/19/04)	SMAQMD Rule 403 – Fugitive Dust (Adopted 08/03/77)	SDAPCD Rule 55 – Fugitive Dust Control (Adopted 06/24/09)	Clark County Air Quality Regulations Section 94 – Permitting and Dust Control for Construction and Temporary Commercial Activities (Amended 08/03/21)
Exemptions	• Emergency situations • Active operations conducted during essential service utilities to provide electricity, natural gas, telephone, water and sewer during periods of service outages and emergency disruptions • Any contractor subsequent to the time the contract ends, provided that such contractor implemented the required control measures during the contractual period • Any grading contractor, for a phase of active operations, subsequent to the contractual completion of that phase of earthmoving activities, provided that the required control measures have been implemented during the entire phase of earth-moving activities, through and including five days after the final grading inspection • Weed abatement operations • Blasting operations are permitted by the California Division of Industrial Safety • Sandblasting operations.	• Emergency activities • Active operations conducted by essential service utilities to provide electricity, natural gas, telephone, water and sewer during periods of service outages and emergency disruptions. • Activities conducted at an elevation of 3,000 feet or higher above sea level. • On-field agricultural sources. • Blasting activities that have been permitted by the California Division of Industrial Safety • Maintenance or remodeling of existing buildings and additions to existing buildings where total building area is not increased by more than fifty percent, or 10,000 square feet, whichever is less • All additions to existing single family residential buildings. • Disking of weeds and dried vegetation related to fire prevention required by a Federal, State or local agency on a site less than one-half (½) acre. • The spreading of landfill daily cover necessary to cover garbage/rubbish in order to preserve public health and safety and to comply with the	• Emissions emanating from agricultural operations, currently unworked land designated as reclaimed for agriculture, or unpaved roads open to public travel (this exclusion shall not apply to industrial or commercial facilities).	• Noncommercial construction or demolition activities in support of any structure designed for and used exclusively as a dwelling for not more than four families • Emergency operations • Active operations conducted by essential service utilities to provide electricity, natural gas, telephone, water and/or sewer during periods of unplanned service outages and emergency disruptions; • Any active operation, open storage pile, or inactive disturbed area which the operator can demonstrate that necessary fugitive dust preventive or mitigating actions are in conflict with CA or federal Endangered Species Acts, or a local, state, or federal water quality requirement • Explosive blasting operations • Abrasive blasting operations regulated by Rule 71 (Abrasive Blasting) • Activities subject to an APCD permit to operate	• Operation of emission units or activities permitted under a stationary source permit • Normal farm cultural practices and equestrian facilities in compliance with zoning requirements • Emergency activities that may disturb soil performed or ordered under a directive by any utility or government agency in order to prevent public injury or restore critical utilities to functional status • Temporary commercial activities outside of hydrographic Areas 212 (Las Vegas Valley), 216 (Garnet Valley), and 217 (Hidden Valley North).

	South Coast AQMD Rule 403 – Fugitive Dust (Amended 06/03/05)	SJVAPCD Rule 8021 – Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities (Amended 08/19/04)	SMAQMD Rule 403 – Fugitive Dust (Adopted 08/03/77)	SDAPCD Rule 55 – Fugitive Dust Control (Adopted 06/24/09)	Clark County Air Quality Regulations Section 94 – Permitting and Dust Control for Construction and Temporary Commercial Activities (Amended 08/03/21)
		requirements of the California Integrated Waste Management Board during wind conditions which would generate fugitive dust.		• Permanent unpaved roads.	

Regulations for construction and demolition listed in Table V-24 present a variety of approaches used by other districts to mitigate fugitive dust. Staff evaluation concluded that South Coast AQMD's requirements in Rule 403 are at least as stringent as those in other districts. Some districts such as SVJAPCD have a specific rule for construction and demolition, with mitigation measures for other sources of fugitive dust such as trackout addressed under a separate rule. Other district rules listed in Table V-24 regulate multiple fugitive dust sources under the same rule. Clark County AQR Section 94 – Permitting and Dust Control for Construction and Temporary Commercial Activities is similar in structure to South Coast AQMD Rule 403 and includes best management practices for each dust source type within the active operation. Table V-25 compares South Coast AQMD Rule 403 best available control measures applicable to all construction activity to Clark County AQR Section 94 best management practices. South Coast AQMD implements additional control measures for large operations and includes contingency measures for when applicable performance standards cannot be met through these controls. South Coast AQMD Rule 403 control measures and contingency measures for large operations are presented in Table V-26.

TABLE V-25
BEST AVAILABLE CONTROL MEASURES (APPLICABLE TO ALL CONSTRUCTION ACTIVITY SOURCES)

Source Category	South Coast AQMD Rule 403 Best Available Control Measures	Clark County Air Quality Regulations, Section 94
Backfilling	• Stabilize backfill material when not actively handling; AND • Stabilize backfill material during handling; AND • Stabilize soil at completion of activity.	• Maintain optimum moisture content in backfill material and operate equipment in a manner that limits fugitive dust to comply with regulations before, during, and after handling of material and during storage until the long-term stabilization requirements are achieved.
Clearing and grubbing	• Maintain stability of soil through pre-watering of site prior to clearing and grubbing; AND • Stabilize soil during clearing and grubbing activities; AND • Stabilize soil immediately after clearing and grubbing activities.	• Maintain optimum moisture content in soil before, during, and after clearing and grubbing activities to prevent unstable soil conditions and limit fugitive dust until the long-term stabilization requirements are achieved
Clearing forms	• Use water spray to clear forms; OR • Use sweeping and water spray to clear forms; OR • Use vacuum system to clear forms.	• Limit visible emissions before, during, and after the clearing of forms, foundations, and slabs to no more than an average of 20% opacity for any period totaling 3 minutes in any 60-minute period, or to no more than 50% instantaneous opacity, pursuant to the AQRs. • At least one of the following must be used to clear forms, foundations, and slabs: (1) water spray (2) sweeping and water spray (3) industrial vacuum.
Crushing	• Stabilize surface soils prior to operation of support equipment; AND • Stabilize material after crushing.	• Maintain optimum moisture content in soil where support equipment and vehicles will operate to prevent unstable soil conditions and limit fugitive dust until the long-term stabilization requirements are achieved. • Maintain optimum moisture content in material before, during, and after crushing activities to limit emissions.
Cut and fill	• Pre-water soils prior to cut and fill activities; AND • Stabilize soil during and after cut and fill activities.	• Maintain optimum moisture content in soil where support equipment and vehicles will operate to prevent unstable soil conditions and limit fugitive dust until the long-term stabilization requirements listed in BMP 11 are achieved. • Maintain optimum moisture content in soils before, during, and after cut and fill activities to limit fugitive dust until the long-term stabilization requirements are achieved.
Demolition-mechanical/manual	• Stabilize wind erodible surfaces to reduce dust; AND • Stabilize surface soil where support equipment and vehicles will operate; AND • Stabilize loose soil and demolition debris and comply with South Coast AQMD Rule 1403.	• An asbestos survey must be conducted on any facility or structure subject to NESHAP requirements before demolition can commence. • A separate, complete Clark County NESHAP Demolition Notification Form must be submitted to DAQ for each structure at least 10 working days prior to demolition. The asbestos survey must be attached to this notification. • Maintain optimum moisture content in soil where support equipment and vehicles will operate to prevent unstable soil conditions and limit fugitive dust until the long-term stabilization requirements are achieved. • Maintain optimum moisture content in demolition debris before, during, and after demolition activities to limit emissions.

Source Category	South Coast AQMD Rule 403 Best Available Control Measures	Clark County Air Quality Regulations, Section 94
		• Stabilize surrounding area immediately following demolition by applying water and/or dust palliative to all disturbed soil surfaces.
Disturbed soil	• Stabilize disturbed soil throughout the construction site; AND • Stabilize disturbed soil between structures.	• Maintain optimum moisture content in soils before, during, and after all construction activities to prevent unstable soils and limit fugitive dust until the long-term stabilization requirements listed in BMP 11 are achieved. • If interior block walls are planned, install walls as early as possible in the construction project.
Earth-moving activities	• Pre-apply water to depth of proposed cuts; AND • Re-apply water as necessary to maintain soils in a damp condition and to ensure that visible emissions do not exceed 100 feet in any direction; AND • Stabilize soils once earth-moving activities are complete.	-
Importing/exporting of bulk materials	• Stabilize material while loading to reduce fugitive dust emissions; AND • Maintain at least six inches of freeboard on haul vehicles; AND • Stabilize material while transporting to reduce fugitive dust emissions; AND • Stabilize material while unloading to reduce fugitive dust emissions; AND • Comply with Vehicle Code Section 23114.	• Maintain optimum moisture content in surface soils and bulk material before, during, and after all importing/exporting activities to prevent unstable soils and limit fugitive dust until the long-term stabilization requirements listed in BMP 11 are achieved. • Clean the wheels and undercarriage of haul trucks before they leave the construction site. • Check belly/end dump truck seals regularly, and remove trapped rocks to prevent spillage.
Landscaping	• Stabilize soils, materials, slopes.	• Maintain optimum moisture content in soils and landscaping material before, during, and after landscaping activities to limit fugitive dust until the long-term stabilization requirements listed in BMP 11 are achieved. • Apply water, surfactant, or tackifier to maintain disturbed soils and landscaping material in a stable condition until the long-term stabilization requirements listed in BMP 11 are achieved.
Road shoulder maintenance	• Apply water to unpaved shoulders prior to clearing; AND • Apply chemical dust suppressants and/or washed gravel to maintain a stabilized surface after completing road shoulder maintenance.	-
Screening	• Pre-water material prior to screening; AND • Limit fugitive dust emissions to opacity and plume length standards; AND • Stabilize material immediately after screening.	• Maintain optimum moisture content in soil where support equipment and vehicles will operate to prevent unstable soil conditions and limit fugitive dust until the long-term stabilization requirements listed in BMP 11 are achieved. • Maintain optimum moisture content in material before, during, and after screening activities to limit emissions until the long-term stabilization requirements are achieved. • All stockpiles must be removed or leveled prior to project completion unless otherwise approved by the Control Officer. Stockpiles approved to be left in place must be in compliance with the long-term stabilization requirements

Source Category	South Coast AQMD Rule 403 Best Available Control Measures	Clark County Air Quality Regulations, Section 94
Staging areas	• Stabilize staging areas during use; AND • Stabilize staging area soils at project completion	• Maintain optimum moisture content in soils before, during, and after all staging area activities to prevent unstable soils and limit fugitive dust until the long-term stabilization requirements are achieved.
Stockpiles/Bulk Material Handling	• Stabilize stockpiled materials. • Stockpiles within 100 yards of off-site occupied buildings must not be greater than eight feet in height; or must have a road bladed to the top to allow water truck access or must have an operational water irrigation system that is capable of complete stockpile coverage.	• Maintain optimum moisture content in soil where support equipment and vehicles will operate to prevent unstable soil conditions and limit fugitive dust until the long-term stabilization requirements are achieved. • Maintain optimum moisture content in material before, during, and after stockpiling activities to limit fugitive dust until long-term stabilization is achieved.
Traffic areas for construction activities	• Stabilize all off-road traffic and parking areas; AND • Stabilize all haul routes; AND • Direct construction traffic over established haul routes.	• Limit visible dust emissions from vehicle operations and stabilize all unpaved routes, including unpaved parking areas.
Trackout	• Do not allow track-out to extend 25 feet or more in cumulative length from the point of origin from an active operation • All track-out from an active operation shall be removed at the conclusion of each workday or evening shift	• Install and maintain a trackout control device in an effective condition at all access points where Paved and unpaved access or travel routes intersect • Maintain dust control and clean all trackout that extends 50 feet or more from paved surfaces.
Trenching	• Stabilize surface soils where trencher or excavator and support equipment will operate; AND • Stabilize soils at the completion of trenching activities.	• Maintain optimum moisture content in soil where support equipment and vehicles will operate to prevent unstable soil conditions and limit fugitive dust until the long-term stabilization requirements are achieved • Maintain optimum moisture content in soils before, during, and after trenching activities to limit fugitive dust until the long-term stabilization requirements are achieved.
Truck Loading	• Pre-water material prior to loading; AND • Ensure that freeboard exceeds six inches	• Maintain optimum moisture content in soil where support equipment and vehicles will operate to prevent unstable soil conditions and limit fugitive dust until the long-term stabilization requirements are achieved. • Maintain optimum moisture content in material before, during, and after truck loading activities to limit fugitive dust.
Turf Overseeding	• Apply sufficient water immediately prior to conducting turf vacuuming activities to meet opacity and plume length standards; AND • Cover haul vehicles prior to exiting the site.	-
Unpaved roads/parking lots	• Stabilize soils to meet the applicable performance standards; AND • Limit vehicular travel to established unpaved roads (haul routes) and unpaved parking lots.	• Limit visible dust emissions from vehicle operations and stabilize all unpaved routes, including unpaved parking areas.
Vacant Land	• For vacant lots 0.10 acre or larger and have a cumulative area of 500 square feet or more that are driven over and/or used by motor vehicles and/or off-road vehicles: prevent motor vehicle and/or off-road vehicle trespassing, parking and/or access by installing barriers, curbs, fences, gates, posts, signs, shrubs, trees or other effective control measures.	-

TABLE V-26
SOUTH COAST AQMD RULE 403 ADDITONAL MEASURES FOR LARGE OPERATIONS

Source Category	Control Action	Contingency Measure
Earth-moving (except construction cutting and filling areas, and mining operations)	• Maintain soil moisture content at minimum of 12%, as determined by ASTM method D2216, or other equivalent method approved by Executive Officer, CARB, and the U.S. EPA. 2 soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and 2 such evaluations each subsequent four-hour period of active operations; OR • For any earth-moving which is more than 100 feet from all property lines, conduct watering as necessary to prevent visible dust emissions from exceeding 100 feet in length in any direction.	For ALL earth-moving activities: • Cease all active operations; OR • Apply water to soil not more than 15 minutes prior to moving such soil.
Earth-moving: Construction fill areas	• Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM method D2216, or other equivalent method approved by the Executive Officer, the California Air Resources Board, and the U.S. EPA. For areas which have an optimum moisture content for compaction of less than 12 percent, as determined by ASTM Method 1557 or other equivalent method approved by the Executive Officer, CARB, and the U.S. EPA, complete the compaction process as expeditiously as possible after achieving at least 70 percent of the optimum soil moisture content. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations during each subsequent four hour period of active operations.	• See above.
Earth-moving: Construction cut areas and mining operations	• Conduct watering as necessary to prevent visible emissions from extending more than 100 feet beyond the active cut or mining area unless the area is inaccessible to watering vehicles due to slope conditions or other safety factors.	• See above.
Disturbed surface areas (except completed grading areas)	• Apply dust suppression in sufficient quantity and frequency to maintain a stabilized surface. Any areas which cannot be stabilized, as evidenced by wind driven fugitive dust must have an application of water at least twice per day to at least 80 percent of the unstabilized area.	For ALL disturbed surface areas: • On the last day of active operations prior to a weekend, holiday, or any other period when active operations will not occur for not more than four consecutive days: apply water with a mixture of chemical stabilizer diluted to not less than 1/20 of the concentration required to maintain a stabilized surface for a period of six months; OR • Apply chemical stabilizers prior to wind event; OR • Apply water to all unstabilized disturbed areas 3 times per day. If there is any evidence of wind driven fugitive dust, watering frequency is increased to a minimum of four times per day; OR • Establish a vegetative ground cover within 21 days after active operations have ceased; OR

Source Category	Control Action	Contingency Measure
		• Utilize any combination of control actions such that, in total, these actions apply to all disturbed surface areas.
Disturbed surface areas: Completed grading areas	• Apply chemical stabilizers within five working days of grading completion; OR • Take actions specified for inactive disturbed surface areas.	• See above.
Inactive disturbed surface areas	• Apply water to at least 80 percent of all inactive disturbed surface areas on a daily basis when there is evidence of wind driven fugitive dust, excluding any areas which are inaccessible to watering vehicles due to excessive slope or other safety conditions; OR • Apply dust suppressants in sufficient quantity and frequency to maintain a stabilized surface; OR • Establish a vegetative ground cover within 21 days after active operations have ceased. Ground cover must be of sufficient density to expose less than 30 percent of unstabilized ground within 90 days of planting, and at all times thereafter; OR • Utilize any combination of control actions above such that, in total, these actions apply to all inactive disturbed surface areas.	• See above.
Unpaved roads	• Water all roads used for any vehicular traffic at least once per every two hours of active operations [3 times per normal 8 hour work day]; OR • Water all roads used for any vehicular traffic once daily and restrict vehicle speeds to 15 miles per hour; OR • Apply a chemical stabilizer to all unpaved road surfaces in sufficient quantity and frequency to maintain a stabilized surface.	• Apply chemical stabilizers prior to wind event; OR • Apply water twice per hour during active operation; OR • Stop all vehicular traffic.
Open storage piles	• Apply chemical stabilizers; OR • Apply water to at least 80 percent of the surface area of all open storage piles on a daily basis when there is evidence of wind driven fugitive dust; OR • Install temporary coverings; OR • Install a three-sided enclosure with walls with no more than 50 percent porosity which extend, at a minimum, to the top of the pile. This option may only be used at aggregate-related plants or at cement manufacturing facilities.	• Apply water twice per hour; OR • Install temporary coverings.
Paved road track-out	• N/A	• Cover all haul vehicles; OR • Comply with the vehicle freeboard requirements of Section 23114 of the California Vehicle Code for both public and private roads.
All Categories	• Any other control measures approved by EO and U.S. EPA	• Any other contingency measures approved by EO and U.S. EPA

c. Conclusion

Although a direct comparison to other districts' rules is challenging due to the different structures, qualitative inferences can be made. South Coast AQMD control measures for construction and demolition sources employ a variety of mitigation measures based on source type and are generally as stringent as rule in other districts. These measures focus on limiting VDE, stabilizing soils and storage piles, and minimizing trackout. Furthermore, South Coast AQMD Rule 403 includes additional, more stringent measures for large operations. Staff did not identify any applicable construction and demolition controls for consideration as contingency measures.

iii. Paved Road Dust

a. Overview

Source category 640 – Paved Road Dust includes emissions resulting from vehicles traveling over paved surfaces. Resuspended particulate emissions (e.g., vehicle-related deposition like exhaust, material spillage, pavement wear, litter, etc.) from paved roads originate from loose materials present on the surface. The average speed of vehicles traveling on the road, average daily vehicular traffic, number of lanes and average daily vehicular traffic per lane, percentage of heavy vehicles present, and presence of curbs, storm sewers and parking lanes are significant factors that can contribute to paved road dust emissions. Although control techniques for paved roads that prevent material from being deposited onto the surface (preventive controls) are usually more cost effective than control techniques that remove deposited materials from the travel lanes (mitigative controls), both methods are used in conjunction to minimize particulate emissions within this category. Determining the correct strategies in minimizing particulate matter emissions, however, can often be complicated. For example, street sweeping gutters and curb areas may actually increase the redistribution of loose material onto the traveled portion of the road, which may produce a short-term increase in particulate matter emissions.[27]

Paved road sources contribute 9.11 tpd direct PM2.5 emissions, representing 16.9 percent of 2030 baseline PM2.5 emissions. South Coast AQMD has a number of regulations to reduce trackout and prevent materials from being deposited on roadways. These include:

- Rule 403 series
- Rule 1156 – Further Reductions of Particulate Emissions from Cement Manufacturing Facilities
- Rule 1157 – PM10 Emission Reductions from Aggregate and Related Operations
- Rule 1158 – Storage, Handling, and Transport of Coke, Coal and Sulfur
- Rule 1460 – Control of Particulate Emissions from Metal Recycling and Shredding Operations
- Rule 1466 – Control of Particulate Emissions from Soils with Toxic Air Contaminants

[27] EPA, "Compilation of Air Pollutant Emissions Factors, Volume 1: Stationary Point and Area Sources," Chapter 13, Section 2.1, available at *https://www.epa.gov/sites/default/files/2020-10/documents/13.2.1_paved_roads.pdf* (last updated January 2011).

Additionally, Rule 1186 – PM10 Emissions from Paved and Unpaved Roads, and Livestock Operations contains requirements for the construction of roadways which are intended to reduce PM2.5 emissions. Rule 1186 also requires PM10-efficient street sweepers.

b. Evaluation

Appendix III contains an extensive evaluation of paved road dust control measures. Based on that evaluation, a potential control measure examining the feasibility of increased sweeping frequencies and requiring the use of the most efficient sweepers was identified. As a result, the control strategy includes BCM-14 – Further Emission Reductions from Paved Road Dust Sources, which calls for a pilot project to assess the effectiveness of closed system regenerative air sweepers as there is some evidence that these sweepers reduce entrained dust emissions compared to mechanical brush sweepers. Staff reviewed the BACM/MSM analysis in Appendix III and found that there weren't any areas where the analysis could be expanded for paved road dust contingency measures.

c. Conclusion

Staff conducted an extensive BACM/MSM analysis for paved road dust, which resulted in the inclusion of BCM-14 in the control strategy. There were no other potential control measures identified that would be surplus to the control strategy and result in quantifiable emission reductions within 2 years of being triggered.

iv. Unpaved Road Dust

a. Overview

Source category 645 – Unpaved Road Dust includes particulate emissions from vehicles traveling over unpaved roads or surfaces. The force and weight of vehicles on unpaved road surfaces grinds and minimizes surface materials on these roads. These particles are lifted and dropped onto the road surface, where they are then exposed and carried off by air currents. Determining the correct strategies in minimizing particulate matter emissions originating from unpaved roads is complex due to available control options that are broad in scope, effectiveness, and cost. For example, although paving is highly effective in terms of minimizing fugitive dust on unpaved roads, doing so is extremely costly and may not be optimal, or feasible, for industrial roads subject to heavy vehicle usage. Water and chemical suppressants, although requiring frequent re-application, may be a more feasible option as the associated costs are lower. Additionally, measures such as limiting access to unpaved roads based on vehicle type, vehicle speed, and vehicle daily trips (VDT) can be considered.[28]

[28] EPA, "Compilation of Air Pollutant Emissions Factors, Volume 1: Stationary Point and Area Sources," Chapter 13, Section 2.2, available at *https://www.epa.gov/sites/default/files/2020-10/documents/13.2.2_unpaved_roads.pdf* (last updated November 2006)

Unpaved road sources contribute 1.67 tpd of direct $PM_{2.5}$ emissions by 2030, representing 3.1 percent of the total PM2.5 emissions in the Basin. The Rule 403 series and multiple source-specific rules regulate fugitive particulate emissions, including those categorized as unpaved road fugitive dust. These rules reduce ambient concentrations of particulate matter by requiring actions to prevent, reduce, or mitigate fugitive dust emissions.

The PM2.5 Plan includes BCM-19 – Emission Reductions from Unpaved Road Dust Sources, which seeks to further assess the feasibility of paving as a PM2.5 control method for unpaved lots, roads, and shoulders. However, as mentioned above, other means exist to control emissions from unpaved roads and the remainder of the evaluation will therefore focus on these methods.

b. Evaluation

Unpaved road dust was evaluated in Appendix III as part of the BACM/MSM demonstration and a potential control measure was identified which served as the foundation for BCM-19. South Coast AQMD's existing rules for unpaved road dust are summarized in Table V-27, while Table V-28 summarizes control measures in other jurisdictions.

TABLE V-27
SOUTH COAST AQMD'S EXISTING RULES COVERING UNPAVED ROAD DUST

South Coast AQMD Rule	Applicability	Control Measure
Rule 403 – Fugitive Dust (Amended 6/3/05)	Applies to any activity or man-made condition capable of generating fugitive dust. Exemptions: • Unpaved roads used solely for the maintenance of wind-generating equipment • Unpaved public alleys as defined in Rule 1186 • Unpaved service roads that are less than 50 feet in width, are within 25 feet of the property line, and have less than 20 vehicle trips per day	Performance standards: • Dust must not remain visible beyond the property line of the emission source and the dust emission cannot exceed 20% opacity if the emission is the result of vehicle movement. For unpaved roads/lots, stabilize soil to meet the performance standards. Stabilize disturbed soil throughout a construction site and between structures. Apply water to unpaved shoulders prior to clearing. Apply chemical dust suppressants and/or washed gravel to maintain a stabilized surface after completing road shoulder maintenance. Limit vehicular travel to established unpaved roads (haul routes) and unpaved parking lots. For vacant lots that are 0.1 acres or larger and have a cumulative area of 500 square feet or more driven over and/or used by motor vehicles and/or off-road vehicles, prevent motor vehicle and/or off-road vehicle trespassing, parking and/or access by installing barriers, curbs, fences, gates, posts, signs, shrubs, trees or other effective control measures.

South Coast AQMD Rule	Applicability	Control Measure
Rule 403.2 – Fugitive Dust from Large Roadway Projects (Adopted 6/3/22)	Applies to large roadway projects conducted in close proximity to an area of public exposure or sensitive receptors.	For projects located within 500 feet of an area of public exposure or 1,000 feet of a sensitive receptor, requires: • the appointment of a Dust Control Supervisor who has completed the South Coast AQMD Fugitive Dust Control Class; and • that speeds be restricted to 15 mph on unpaved roads; and • that either water or a chemical stabilizer be applied to all unpaved roads.
Rule 1127 – Emission Reductions from Livestock Waste (Adopted 8/6/04)	Applies to dairy farms and related operations such as heifer and calf farms and manure processing operations.	Pave feedlanes at least 8 feet on the corral side of the feedlane fence.
Rule 1156 – Further Reductions of Particulate Emissions from Cement Manufacturing Facilities (Amended 11/6/15)	Applies to all operations, materials handling, and transport at a cement manufacturing facility.	For haul roads, chemical dust suppressants must be applied at least twice per year, signs must be posted requiring trucks to use those roads unless traveling to maintenance areas, and a 35 mph speed limit must be enforced. For other unpaved roadways, chemical dust suppressants must either be applied twice per year or a gravel pad must be used and speed must be limited to 15 mph. For roadways and other unpaved areas, dust emissions exceeding 20 percent or 50 percent opacity based on the average of 12 or 5 consecutive readings, respectively, is not allowed.

South Coast AQMD Rule	Applicability	Control Measure
Rule 1157 – PM10 Emissions Reductions from Aggregate and Related Operations (Amended 9/8/06)	Applies to all permanent and temporary aggregate and related operations.	Chemical stabilizers applied on internal unpaved haul roads to maintain a stabilized surface. Signs posted stating haul trucks must not use these roads unless traveling to maintenance areas. Apply chemical stabilizers to maintain a stabilized surface or gravel pad on unpaved non-haul roads and parking and staging areas.
Rule 1158 – Storage, Handling, and Transport of Coke, Coal and Sulfur (Amended 7/11/08)	Applies to the operator of a facility that produces, stores, handles, transports, or uses coke, coal or sulfur.	Requires paving of ground surfaces where material accumulations occur. Requires paving of roads used for transporting or moving material excluding material storage areas. Requires trucks to be driven only on paved roads.
Rule 1186 – PM10 Emissions from Paved and Unpaved Roads, and Livestock Operations (Amended 7/11/08)	Applies to specified land uses and activities which result in fugitive dust as a result of vehicular travel on paved and unpaved public roads, and at livestock operations. <u>Exemptions:</u> • Essential public services that are in compliance with SCAQMD Rule 403 (Fugitive Dust); • Visible roadway accumulations on roads with less than 500 Average Daily Trips (ADT). • Roads closed to vehicles; • Events that lead to a State	Annual treatment of unpaved roads that have greater than the ADT of all unpaved roads within a jurisdiction by either: • Paving at least 1 mile of such roads • Applying chemical stabilization to 2 miles of such roads • Installing signage at 1/4 mile intervals that prohibits vehicular speeds in excess of 15 mph; speed bumps; or maintaining road in manner that prohibits travel at speeds in excess of 15 mph For livestock operations, a requirement that all unpaved access connections and unpaved feed lane access areas are either paved or covered with gravel.

TABLE V-28
OTHER JURISDICTION'S RULES COVERING UNPAVED ROAD DUST

Rule	Applicability	Control Measure
SJVAPCD Rule 8051 – Open Areas (Amended 9/21/23)	Applies to any open area with at least 0.5 acres within urban areas or 3.0 acres within rural areas and at least 1,000 square feet of disturbed surface area. Exemptions: Exemptions listed in 8011; Any weed abatement activity utilizing mowing and/or cutting, and which leaves at least three inches of stubble immediately after such mowing/cutting has occurred.	Control measures include: • Apply and maintain water or dust suppressants to all unvegetated areas; • Establish vegetation on all previously disturbed areas; • Pave, apply and maintain gravel, or apply and maintain chemical/organic stabilizers/suppressants. For open areas: Implement, apply, maintain, and reapply, if necessary, at least one or a combination of the Control Measures to comply at all times with the conditions for a stabilized surface and limit VDE to 20% opacity as defined in Rule 8011. For vehicle use in open areas: Prevent unauthorized vehicle access upon evidence of trespassing by posting "No Trespassing" signs or installing physical barriers such as fences, gates, posts, and/or other appropriate barriers to effectively prevent access to the area.

Rule	Applicability	Control Measure
SJVAPCD Rule 8061 – Paved and Unpaved Roads (Amended 8/19/04)	Applies to any new or existing public or private paved or unpaved road, road construction project, or road modification project <u>Exemptions:</u> • Exemptions in Rule 8011; • Any unpaved road segment with less than 26 annual average daily vehicle trips (AADT); • Maintenance and resurfacing of existing paved roads do not apply to section 5.2 of this rule; • Agricultural sources subject to Rule 8081; • Emergency activities performed to ensure public health and safety; • Equipment used to remove debris beyond the capabilities of PM10-efficient street sweepers.	<u>Control measures include:</u> • Watering; • Uniform layer of washed gravel; • Roadmix; • Paving; • Chemical/organic dust stabilizer/suppressants; • APCO-approved method that limits VDE to 20% opacity. On any unpaved road segment with AADT equal to or greater than 26, limit VDE to 20% opacity and comply with the requirements of a stabilized unpaved road by application and/or re-application of at least one control measure or implement an APCO-approved Fugitive PM10 Management Plan specified in Rule 8011. Construction of any new unpaved road within an urban area is prohibited unless the road meets the definition of a temporary unpaved road within an urban area. Establish a maximum speed limit of 25 mph on each unpaved road with AADT equal to or greater than 26.

Rule	Applicability	Control Measure
SJVAPCD Rule 8071 – Unpaved Vehicle/Equipment Traffic Areas (Amended 9/16/04)	Applies to any unpaved vehicle/equipment traffic area Exemptions: • Unpaved vehicle and equipment traffic areas with less than 50 AADT; Agricultural sources subject to the requirements of Rule 8081.	Control measures include: • Watering; • Uniform layer of washed gravel; • Roadmix; • Paving; • Vegetative Materials; • Chemical/organic dust stabilizer/suppressants; • APCO-approved method that limits VDE to 20% opacity. Limit VDE to 20% opacity and comply with the requirements of a stabilized unpaved road by application and/or re-application of at least one control measure or implement an APCO-approved Fugitive PM_{10} Management Plan specified in Rule 8011: • Where 50 or more AADT will occur; • For unpaved vehicle/equipment traffic areas with 150 VDT, or 150 VDT that are utilized intermittently for a period of 30 days or less during the calendar year during the period that the unpaved vehicle/equipment traffic area is utilized; • On each day that 25 or more VDT with 3 or more axles will occur on an unpaved vehicle/equipment traffic area. The District must be notified at least 48 hours before a special event that will result in 1,000 or more vehicles traveling/parking on an unpaved area by the owner/operator. During the duration of the special event vehicle travel/parking, the owner/operator shall limit VDE to 20% opacity and comply with the requirements of a stabilized unpaved road by the application and/or reapplication/maintenance of water or chemical/organic dust stabilizers/suppressants.

Rule	Applicability	Control Measure
SJVAPCD Rule 8081 – Agricultural Sources (Amended 9/16/04)	Applies to off-field agricultural sources. Exemptions: • On-field agricultural sources; • Unpaved road segments with less than 75 VDT; Any unpaved vehicle and equipment parking and traffic area less than 1.0 acre and more than one mile from an urban area, or with less than 50 AADT or less than 150 VDT that are utilized intermittently for a period of 30 days or less during the calendar year.	Control measures include: • Watering; • Uniform layer of washed gravel; • Roadmix; • Paving; • Chemical/organic dust stabilizer/suppressants; • APCO approved method that limits VDE to 20% opacity On each day that 75 or more VDT, or 25 or more VDT with 3 or more axles, will occur on an unpaved road segment, limit VDE to 20% opacity and comply with the requirements of a stabilized unpaved road by application and/or re-application/maintenance of at least one control measure (including vegetative materials) or implement an approved Fugitive PM_{10} Management Plan as specified in section 7.0. Where 50 or more AADT will occur on an unpaved vehicle/equipment traffic area, limit VDE to 20% opacity and comply with the requirements of a stabilized unpaved road by the application and/or reapplication/maintenance of at least one control measure or implement an approved Fugitive PM_{10} Management Plan as specified in section 7.0. For unpaved vehicle/equipment traffic areas with 150 or more VDT, or 150 or more VDT that are utilized intermittently for a period of 30 days or less during the calendar year, implement at least one control option. On each day that 25 or more VDT with 3 or more axles will occur on an unpaved vehicle/equipment traffic area, the owner shall limit VDE to 20% opacity and comply with the requirements of a stabilized unpaved road by the application and/or re-application/maintenance of at least one of the control measures.

Rule	Applicability	Control Measure
Clark County Division of Air Quality Section 91 – Fugitive Dust from Unpaved Roads, Unpaved Alleys, and Unpaved Easement Roads (Amended 4/15/14)	Applies to unpaved roads, unpaved alleys, unpaved easements, and unpaved access roads for utilities and railroads. <u>Exemptions:</u> • Non-commercial, non- institutional private driveways, horse trails, hiking paths, bicycle paths, or other similar paths that have been officially designated by a governing body for exclusive use for purposes other than travel by motor vehicles; • Stationary sources, except that these control measures shall be considered as part of a BACT determination.	Implement the following control measures for all unpaved roads having an ADT of 150 or more: • Paving; • Apply Dust Palliatives in compliance with stabilization standards; • Apply and maintain an alternative control measure approved in writing by the Control Officer and Region IX Administrator. Unless as an interim component of an active paving project, no unpaved roads or alleys can be constructed in public thoroughfares in hydrographic area 212, 216, and 217. Control measures are considered effectively implemented when opacity does not exceed 20%.

South Coast AQMD's rules seek to limit VDE, restrict vehicle speed, and require paving, watering, or stabilizing of road surfaces and are generally more stringent compared to rules in other districts. For example, SJVAPCD Rule 8051 and South Coast AQMD Rule 403 both require control measures for disturbed open areas. However, Rule 8051 applies to open areas of at least 0.5 acres within urban areas or 3.0 acres within rural areas and at least 1,000 square feet of disturbed surface area, while Rule 403 applies to lots that are 0.1 acres or larger and have a cumulative disturbed surface area of 500 square feet or more. Only one measure, SJVAPCD Rule 8061, was determined to be potentially more stringent as it prohibits new unpaved roads within urban areas unless the road is a temporary unpaved road. South Coast AQMD does not have an identical requirement. However, the South Coast Air Basin is highly urbanized and it is likely that few, if any, new roads are unpaved. Any new unpaved roads within urban

areas are likely temporary and other South Coast AQMD rules already control emissions from these sources.

c. Conclusion

The South Coast Air Basin is a highly urbanized and highly paved environment. This contrasts with other jurisdictions included in this analysis, such as Clark County, Nevada and the San Joaquin Valley, where unpaved surfaces are much more common. Although there are approximately 1,900 miles of unpaved roads within the Basin, many of these are not well-traveled or are unsuitable for paving. For example, unpaved roads are located within regional parks or national forests. Mitigation measures other than paving, such as enforcing speed limits, are likely already in place in these locations.

Unpaved road emissions are regulated by multiple South Coast AQMD rules and the PM2.5 Plan includes BCM-19, which seeks further emission reductions from unpaved roads. Staff evaluated available control measures and did not identify any unpaved road dust controls that could be implemented and achieve quantifiable emission reductions within 2 years of being triggered. Therefore, no contingency measure is proposed.

v. Fugitive Windblown Dust

a. Overview

Source category 650 – Fugitive Windblown Dust includes particulate emissions resulting from wind erosion of exposed agricultural lands (non-pasture), erosion of pasture lands, and soil from unpaved roads and associated areas. Due to environmental complexities and the understanding that windblown activities occur to some extent at all times, it can be challenging to design control measures to minimize particulate matter emissions from this category. In the 2030 baseline emissions inventory, fugitive windblown dust sources contribute 0.21 tpd direct PM2.5 emissions, representing 0.4 percent of the total PM2.5 emissions in the Basin. Rule 403 and multiple source-specific rules regulate fugitive windblown dust from a wide range of activities (e.g., farming, storage, transferring materials within an open area, etc.).

b. Evaluation

Within the South Coast AQMD, fugitive windblown dust is primarily regulated by Rule 403, while multiple source-specific rules also have requirements to prevent wind-driven fugitive dust from being generated, including Rule 1156 for cement manufacturing facilities, Rule 1157 for aggregate and related operations, and Rule 1158 for storage, handling, and transport of coke, coal and sulfur. Rule 403 and other rules define wind-driven fugitive dust as “visible emissions (or particulate matter emissions) from any disturbed surface area which is generated by wind action alone.” Examples of applicable fugitive dust source types include, but are not limited to:

- Wind blowing across the surface of landfills can carry dust into the air;
- Any large areas with unpaved surfaces such as parking lots, open fields, or vacant lots can be a

source of fugitive windblown dust; and

- Outdoor open storage and improper handling of materials can contribute to fugitive dust in windy conditions.

Some industrial operations and construction/demolition activities can create an environment where materials become airborne due to wind if the site is not properly maintained and contained. Therefore, various man-made activities can also contribute indirectly to fugitive windblown dust, and measures need to be implemented to prevent, reduce, and mitigate wind-driven fugitive dust emissions.

Rule 403 establishes a visible opacity requirement and a number of dust control requirements to prevent wind-driven fugitive dust emissions from active and inactive operations, including best available control measures for all construction activities, contingency control measures for large operations, and conservation management practices for confined animal facilities. In addition, Rule 223 has feed and waste mitigation measures for dairy and poultry CAFs designed to reduce windblown dust.

South Coast AQMD's rule requirements for this source category and the control measures required by other jurisdictions were evaluated. Table V-29 and Table V-30 summarize the control measures representative of the available control measures for fugitive windblown dust by South Coast AQMD and other jurisdictions, respectively.

TABLE V-29
SOUTH COAST AQMD'S RULES FOR FUGITIVE WINDBLOWN DUST

South Coast AQMD Rule	Applicability	Control Measure
Rule 223 – Emission Reduction Permits for Large Confined Animal Facilities (Adopted 6/2/06)	Applies to dairies with ≥ 1,000 cows and poultry farms with ≥ 650,000 chickens.	<u>Dairy operations:</u> • Store grain in a weatherproof storage structure from October through May • Cover silage piles, except where feed is being removed • Cover dry manure and separated solids piles from October through May <u>Poultry operations:</u> • Store grain in a weatherproof storage structure from October through May • Cover waste outside the housing from October through May
Rule 403 – Fugitive Dust (Amended 6/3/05)	Applies to any activity or man-made condition capable of generating fugitive dust.	Requires that windblown dust emissions from any active operation, open storage pile, or disturbed surface area not remain visible in the atmosphere beyond the property line of the source.

South Coast AQMD Rule	Applicability	Control Measure
	Exemptions: • Dairy farms • Confined animal facilities with combined disturbed surface areas ≤ 1 acre • Agricultural vegetative crop operations with combined disturbed surface areas ≤ 10 acres • Agricultural vegetative crop operations with combined disturbed surface areas > 10 acres, provided that they implement conservation management practices • Active operations conducted during emergency life-threatening situations or state emergency • Essential service utilities operations • Contractors upon contract completion • Grading contractors upon contract completion • Weed abatement operations by counties or fire departments • Sandblasting operations	Application of best available control measures for active operations to minimize dust. For inactive disturbed surface areas: • Apply water to at least 80% of all inactive disturbed surface areas on a daily basis when there is evidence of wind-driven fugitive dust • Apply dust suppressants in sufficient quantities • Establish vegetative ground cover within 21 days after active operations have ceased. For unpaved roads: • Water all roads used for vehicular traffic at least once per every 2 hours of active operations, 3 times per normal 8 hour work day • Restrict vehicle speed to 15 mph • Apply a chemical stabilizer to all unpaved road surfaces in sufficient quantity and frequency to maintain a stabilized surface. For open storage piles: • Apply chemical stabilizers • Apply water to at least 80% of the surface area of all open storage piles on a daily basis when there is evidence of wind-driven fugitive dust • Install temporary coverings • Install a 3-sided enclosure with walls with no more than 50% porosity which extend, at least, to the top of the pile. For disturbed surface areas: Apply water to all unstabilized disturbed areas 3 times/day. If there is any evidence of wind-driven fugitive dust, watering frequency is increased to a minimum of 4 times/day For vacant land: In vacant lots that are 0.1 acres or larger and have a cumulative area of 500 square feet or more driven over and/or used by motor vehicles and/or off-road vehicles, prevent motor vehicle

South Coast AQMD Rule	Applicability	Control Measure
		and/or off-road vehicle trespassing, parking and/or access by installing barriers, curbs, fences, gates, posts, signs, shrubs, trees or other effective control measures.
Rule 1156 – Further Reductions of Particulate Emissions from Cement Manufacturing Facilities (Amended 11/6/15)	Applies to all operations, materials handling, and transport at a cement manufacturing facility, including, but not limited to, kiln and clinker cooler, material storage, crushing, drying, screening, milling, conveying, bulk loading and unloading systems, internal roadways, material transport, and track-out	<u>For crushing, screening, milling, grinding, blending, drying, heating, mixing, sacking, palletizing, packaging, and other related operations:</u> • Use wind fences on at least two sides of the primary crusher with one side facing the prevailing winds. This structure shall be equipped and operated with a wet suppression system • Apply dust suppressants during all operations to dampen and stabilize materials and prevent visible emissions <u>For clinker material storage:</u> • Use a 3-sided barrier with roof, provided the open side is covered with a wind fence material of a maximum 20% porosity, allowing a removal opening for vehicle access <u>For active open non-clinker material storage:</u> • Apply chemical dust suppressants to stabilize the entire surface area of the pile; or • Install and maintain a 3-side barrier or wind fences with one side facing the prevailing winds and with at least two feet of visible freeboard from the top of the storage pile to provide wind sheltering, maintain surface stabilization of the entire pile, and store the materials completely inside the three-sided structure at all times; or • Install and maintain a 3-sided barrier with roof, or wind fences with roof, to provide wind sheltering; or • Install and maintain a tarp over the entire surface area of the storage pile.
Rule 1157 – PM10 Emission Reductions from Aggregate and Related Operations (Amended 9/8/06)	Applies to all permanent and temporary aggregate and related operations	<u>Performance standards:</u> • Prohibit discharge of fugitive dust emissions exceeding 20% opacity from any activity, equipment, storage pile, or disturbed surface area, based on an average of 12

South Coast AQMD Rule	Applicability	Control Measure
		consecutive readings of South Coast AQMD Opacity Test Method 9B • Prohibit discharge of fugitive dust emissions exceeding 50% opacity based on five consecutive readings of Opacity Test Method 9B • Prohibit any visible fugitive dust plume from exceeding 100 ft in any direction from any activity, equipment, storage pile, or disturbed surface area. <u>For storage piles:</u> • Stabilize the entire surface area of the open storage piles of materials, except for areas that are actively disturbed during loading/unloading activities • Re-apply dust suppressants to re-stabilized disturbed areas of the piles at the end of each work day • Prohibit open storage piles taller than 8 ft if within 300 feet of buildings or homes. Alternatively, irrigate to stabilize the entire pile surface
Rule 1158 – Storage, Handling, and Transport of Coke, Coal and Sulfur (Amended 7/11/08)	Applies to the operator of a facility that produces, stores, handles, transports, or uses coke, coal or sulfur	<u>Control measures:</u> • Water spray system sufficient to control fugitive dust emissions during operations of material transfer and ships or railcars loading • Prohibit fugitive dust emissions exceeding 10% opacity • Apply chemical stabilizers to control fugitive dust emissions • Install temporary covers

South Coast AQMD Rule	Applicability	Control Measure
Rule 1460 – Control of Particulate Emissions from Metal Recycling and Shredding Operations (Adopted 11/4/22)	Applies to owners or operators of a Metal Recycling Facility or Metal Shredding Facility.	• Clean traffic areas and ground surfaces where scrap metal operations take places. All materials collected during cleaning must be stored in covered containers • Apply sufficient water during loading/unloading of scrap metal, transportation throughout facility, and during processing activities **Fugitive dust minimization Best Management Practices (BMPs)** <u>For scrap metal storage piles</u>: • Apply sufficient water daily, except on days of 0.1 inches of precipitation; and • Store within an enclosure with three walls that extend 2 ft. above the height of the piles; or • Store within a three-sided windscreen with no more than 50% porosity, at least 2 ft. above the height of the piles <u>For high value grade metal piles</u>: • Cover with 12 mil intact plastic sheeting; • Store within an enclosure with three walls that extend 2 ft. above the height of the piles; • Store within a three-sided windscreen with no more than 50% porosity, at least 2 ft. above the height of the piles; or • Apply sufficient water daily, except on days of 0.1 inches of precipitation <u>Within 100 m from a sensitive receptor</u>: • Cease scrap metal unloading/loading, sorting, shearing, baling, torch cutting, and shredding activities for 15 min if wind speed is > 25 mph averaged over 1 min <u>Metal shredder residue</u>: • Store within a three-walled enclosure that extends 2 ft above the height of the residue; and • Retain the metal shredder residue in the perimeter of the enclosure <u>Vehicle egress</u>: • Utilize a wheel shaker or wheel spreading device; • Maintain a wheel washing system on the manufacturer's specification; or

South Coast AQMD Rule	Applicability	Control Measure
		• A paved surface from facility loading/unloading area leading to a paved public road Other BMPs: • Limit vehicle speed at 15 mph • Maintain paved vehicle traffic areas and the areas where scrap metal unloading/loading, sorting, shearing, baling, torch cutting, shredding, and storage activities take place • Not allow track out to exceed 25 ft in cumulative length from the facility. Remove all track out at the conclusion of each workday or evening shift • Store waste material in a covered container

TABLE V-30
OTHER JURISDICTIONS' CONTROL MEASURES FOR FUGITIVE WINDBLOWN DUST

Rule	Applicability	Control Measure
SJVAPCD Rule 4550 – Conservation Management Practices (includes District CMP handbook and CMP list) (Re-adopted 8/19/04)	Applies to agricultural operation sites Exceptions: • Agricultural operation sites less than 100 acres; • Woodland and wasteland not under cultivation or used for pasture; • Agricultural operation sites with low limit thresholds for the number of dairy cows, cattle turkeys, chickens, or laying hens	Conservation management practices (CMPs) are provided for: • Poultry Operation: Open Areas (Vegetation, Reduced Tillage, Windblocks, Dust Suppressants) • Overall Management/Feeding: Dairy and Feedlot Operations (Downwind Shelterbelts/Boundary Trees, Bulk Materials Control) • Cropland: Other (Alternate Till, Wind Barrier, Surface Roughening, Permanent Crops, Mulching, Cover Crops, Bulk Materials Control, Night Farming) • Poultry Operations: Manure Handling & Storage (Outdoor Storage, Time of Manure Spreading) • Owner shall implement applicable CMPs, after preparing and submitting a CMP application to the Air Pollution Control Officer (APCO) for approval, for each agricultural operation site. This shall be done no later than ten days after notification by the APCO of the CMP application approval.
SJVAPCD Rule 8051 – Open Areas (Amended 9/21/23)	Applies to any open area with at least 0.5 acres within urban areas or 3.0 acres within rural areas and at least 1,000 square feet of disturbed surface area. Exemptions: • Exemptions listed in 8011; Any weed abatement activity utilizing mowing and/or cutting, and which leaves at least three inches of stubble immediately after such mowing/cutting has occurred.	Control measures include: • Apply and maintain water or dust suppressants to all unvegetated areas; • Establish vegetation on all previously disturbed areas; • Pave, apply and maintain gravel, or apply and maintain chemical/organic stabilizers/suppressants. For open areas: Implement, apply, maintain, and reapply, if necessary, at least one or a combination of the Control Measures to comply at all times with the conditions for a stabilized surface and limit VDE to

Rule	Applicability	Control Measure
		20% opacity as defined in Rule 8011. For vehicle use in open areas: Prevent unauthorized vehicle access upon evidence of trespassing by posting "No Trespassing" signs or installing physical barriers such as fences, gates, posts, and/or other appropriate barriers to effectively prevent access to the area.
SJVAPCD Rule 8081 – Agricultural Sources (Amended 9/16/04)	This rule applies to off-field agricultural sources. Exemptions: • On-field agricultural sources; • Any outdoor storage, handling, or transport of bulk materials that would be damaged by wetting; • Outdoor storage of any bulk storage at a single site where no material is actively being added or removed and the area size is less than 100 cubic yards; • Transport of bulk materials in an outdoor area for a distance of twelve feet or less with the use of a chute or conveyor device.	Control measures include: • Apply water or suitable chemical/organic stabilizers/suppressants; • Construct and maintain wind barriers with less than 50% porosity. Control measures for storage of bulk materials: • Comply with conditions for a stabilized surface; • Cover bulk materials with tarps, plastics, or other suitable materials and anchor the cover; • Construct and maintain fences or wind barriers with less than 50% porosity along with applying water or suitable chemical/organic stabilizers/suppressants; • Utilize a 3-sided structure with a height at least equal to the height of the storage pile and with less than 50% porosity. Control measures for on-site transporting of bulk materials: • Limit vehicular speed while traveling; • Load all haul trucks such that the freeboard is not less than 6 inches when material is transported on any paved public access road and apply water to the top of the load or cover haul trucks with a suitable closure. Control measures for off-site transporting of bulk materials: • Clean the interior of the cargo

Rule	Applicability	Control Measure
		compartment or cover the cargo compartment before the empty truck leaves the site; • Prevent spillage or loss of bulk material from cargo openings; • Load all haul trucks such that the freeboard is not less than 6 inches when material is transported on any paved public access road and apply water to the top of the load or cover haul trucks with a suitable closure. <u>Control measures for outdoor transport of bulk materials with a chute or conveyor:</u> • Fully enclose the chute or conveyor; • Operate water spray equipment that wets materials; • Wash separated or screened materials to remove conveyed materials. • Implement a 20% opacity VDE limit or comply with the conditions for a stabilized surface (as defined in Rule 8011), using the control measures listed above, prior to doing any outdoor handling, storage, and transporting of bulk materials.
ICAPCD Rule 804 – Open Areas (Amended 9/11/18)	Applies to any open area with at least 0.5 acres within urban areas or 3.0 acres within rural areas and at least 1,000 square feet of disturbed surface area. <u>Exemptions:</u> • Exemptions listed in ICAPCD Rule 800, Section E; • Agricultural Operation Sites subject to ICAPCD Rule 806; • Recreational OHV Use Areas on public lands subject to ICAPCD Rule 800.	<u>Control measures include:</u> • Apply and maintain water or dust suppressant(s) to all unvegetated areas; • Establish vegetation on all disturbed areas; • Pave, apply and maintain Gravel, or apply and maintain Chemical Stabilizers/Suppressants; • Implement alternative BACM if approved by both the APCD and EPA. Alternative BACM may be approved by the APCD and EPA in accordance with a technical evaluation demonstrating that the proposed alternative BACM achieves particulate matter emission

Rule	Applicability	Control Measure
		reductions equivalent to the BACM measures identified above and that the dust control method will achieve a stabilized surface and meet the 20% opacity requirement. <u>For open areas:</u> • Comply with one or more of the Control Measures to comply with the conditions of a Stabilized Surface (as defined in ICAPCD Rule 800) and limit VDE to 20% opacity. <u>For vehicle use in open areas:</u> Within 30 days following initial discovery of evidence of trespass, prevent unauthorized vehicle access by posting "No Trespassing" signs or installing physical barriers such as fences, gates, posts, and/or appropriate barriers to effectively prevent access to the area.

Rule	Applicability	Control Measure
Clark County Division of Air Quality (CCDAQ) Section 90 — Fugitive Dust from Open Areas and Vacant Lots (Amended 1/21/2020)	The provisions of this regulation shall apply to Open Areas and Vacant Lots which are located in a PM10 nonattainment area. <u>Exemptions:</u> • Farm cultural practices or the raising of fowl or animals. • Stationary sources, defined as buildings, structures, facilities, or installations that emit or may emit any regulated air pollutant, except that these control measures shall be considered as part of a BACT determination.	One or more of the following control measures shall be applied to open areas and vacant lots greater than 5,000 square feet that are disturbed: • Prevent motor vehicle and/or off-road vehicle trespassing, parking, and/or access by installing barriers, curbs, fences, gates, posts, signs, shrubs, trees, or other effective traffic control measures where there is evidence of soil disturbance; • Uniformly apply and maintain surface gravel or Dust Palliatives to all areas disturbed by Motor Vehicles in compliance with one of the stabilization standards described in this rule; • Apply and maintain an alternative control measure approved in writing by the Control Officer and the Region IX EPA Administrator. One or more of the following control measures shall be applied if machinery is used to clear weeds and/or trash from open areas and vacant lots greater than 5,000 square feet: • Pre-wet surface soils before mechanized weed abatement and/or trash removal occurs; • Maintain dust control measures while mechanized weed abatement and/or trash removal is occurring; • Pave, apply gravel, apply water, or apply a suitable Dust Palliative after mechanized weed abatement and/or trash removal occurs. Submit dust mitigation plans for open areas and vacant lots having a cumulative area of 10,000 acres or greater.

Our evaluation of available control measures for this category did not identify any available measures that are not being implemented in South Coast AQMD rules. Each of these rules requires the use of one or more control measures that requires the applicable sources to meet at least one of three conditions:

- Maintain a stabilized surface (e.g., any disturbed surface area or open bulk storage pile that is resistant to windblown fugitive dust emissions); or
- A 20 percent opacity VDE limit; or
- A three-sided walled enclosure with no more than 50 percent porosity.

Typically, those conditions need to be met for the applicable source to be in compliance with the rule. Evaluation of control measures in other jurisdictions in Table V-27 did not identify any potential new control measures to consider as contingency measures. In fact, some of South Coast AQMD's source-specific rules require more stringent opacity and porosity requirements compared to other districts' rules. For example, Rule 1156 requires a three-sided walled enclosure with a maximum 20 percent porosity, and Rule 1158 limits visible emissions to 10 percent opacity, both of which are more stringent than control measures in other jurisdictions. In addition, Rule 403 has lower thresholds (0.1 acres or 500 square feet of vehicle-driven area) for vacant lots, compared to SJVAPCD (0.5 acres for urban or 3.0 acres for rural area and 1,000 square feet of disturbed surface area), ICAPCD (0.5 acres for urban or 3.0 acres for rural area and 1,000 square feet of disturbed surface area), or CCDAQ (5,000 square feet of disturbed surface area).

c. Conclusion

Stringent requirements for fugitive windblown dust are already in place in the Basin, and staff did not identify any potential contingency measures that could be triggered within 2 years and achieve quantifiable emission reductions.

3. Fires

Source Category 660 – Fires includes emissions from automobile fires and structure fires. The structural fire subcategory includes residential and commercial structures as well as mobile home fires. The fires source category contributes 0.41 tpd direct PM2.5, 0.08 tpd NOx, and zero NH3 emissions to the 2030 emissions inventory. The reported emissions are based on the number of vehicle fires per year and based on structural fires data from California Fire Incident Reporting System from the California State Fire Marshall's Office.[103] Considering the fires under this source category are non-routine and unpredictable, no control measures have been identified to mitigate emissions from these sources.

4. Managed Burning and Disposal (Open Burning)

a. Overview

Source category 670 – Managed Burning and Disposal consists of numerous sub-categories including various agricultural burning, forest management, and non-agricultural open burning. This source category

contributes 0.08 tpd direct PM2.5, 0.29 tpd NOx, and 0.03 NH3 emissions to the 2030 emissions inventory. Over 80 percent of the emissions involve range improvement and prescribed burning. South Coast AQMD Rule 444 – Open Burning has strict requirements for when and which types of burns are allowed.

1. Burning of Agricultural Materials:

Agricultural burning involves open burning of vegetative materials produced from growing and harvesting of crops. It includes the burning of grass and weeds in fence rows, ditch banks and berms in no-till orchard operations, the burning of fields being prepared for cultivation, the burning of agricultural wastes, and the operation or maintenance of a system for the delivery of water for agricultural operations.

2. Land Management and Hazard Reduction Burning:

Prescribed burning is the planned application of fire conducted by state and federal land managers, local governments, utilities and private land owners to meet planned resource management objectives, such as forest management, wildlife habitat management, range improvement, fire hazard reduction, wilderness management, weed abatement, watershed rehabilitation, vegetation manipulation, disease and pest prevention, and ecosystem management. Hazard reduction burning involves the disposal of dry brush surrounding homes and businesses in the wildland-urban interface in order to ensure a barrier of fire protection of 100 feet in all directions.

b. Evaluation

Table V-31 summarizes Rule 444 requirements and Table V-32 summarizes the control measures in other jurisdictions.

TABLE V-31
RULE 444 REQUIREMENTS

Applicability	Requirements
• Agricultural burning • Disposal of Russian thistle • Prescribed burning • Fire prevention/suppression training; • Open detonation or use of pyrotechnics • Fire hazard removal • Disposal of infectious waste, other than hospital waste, research of testing materials, equipment or techniques • Disposal of contraband • Residential burning • Beach burning. Exemptions: • Fire suppression training by fire agencies • Open burning to protect crops from freezing • Open burning on islands located 15 miles or more from the mainland • Fireworks display • Explosives detonation • Recreational and ceremonial fires • Food preparation fires and fires for warmth at social gatherings.	• No specific agricultural crop phase outs or bans. • Burning of waste/garbage is prohibited. • No burning except on permissive burn days or marginal burn days on which burning is permitted in the applicable source or receptor area, and such burning is not prohibited by the applicable public fire protection agency. • Specific requirements for burn authorization requests and permit conditions for each category of burning.

TABLE V-32
OTHER CONTROL MEASURES CONSIDERED (MANAGED BURNING AND DISPOSAL)

Measure	Applicability	Requirements
SJVAPCD Rule 4103 – Open Burning (Amended 4/15/10)	Open burning conducted in the San Joaquin Valley Air Basin, except for prescribed burning and hazard reduction burning (regulated under District Rule 4106) Exemptions: • Fires used for cooking, campfires, and religious fires with clean fuel, dry wood or charcoal • Emergency burning by a fire agency • Respectful burning of an unserviceable American Flag • Bags used for agricultural chemicals • Raisin trays.	• No burning of garbage or other materials • Burning shall be allocated by the APCO dependent on dispersion conditions and shall avoid negative impacts to receptors • No permit shall be issued for the burning of the field crops, prunings, weed abatement, orchard removals, vineyard removals, surface harvested prunings and other materials, except for crops covered by section 5.5.2 • Additional requirements for burning times, drying times, contraband burning • Permit required for burning of Russian Thistle • Conditional burning permit required for diseased materials with specific requirements • Burn plans required for fire suppression training, burning of contraband

Measure	Applicability	Requirements
SJVAPCD Rule 4106 – Prescribed Burning and Hazard Reduction Burning (Adopted 6/21/01)	Applies to all prescribed burning and to hazard reduction burning in wildland-urban interface.	• No burning of garbage or green waste • District allocates burning permits based on predicted meteorological conditions and whether contaminants could create or contribute to an exceedance of an ambient air quality standard or impact smoke sensitive areas • Requirements such as minimizing smoke, ignition devices, keeping vegetation free of dirt, soil, and moisture • Requirement for prescribed burn conductors to complete prescribed burning smoke management training class approved by the APCO • Permits required for all hazard reduction burning, valid only on days that burning is not prohibited by the CARB, by the District
BAAQMD Regulation 5 – Open Burning (Adopted 11/20/19)	Open burning activities Exemptions: • Fires set only for cooking • Fires burning as safety flares or for the combustion of waste gases • Flame cultivation when the burning is performed with LPG or natural gas-fired burners designed and used to kill seedling grass and weeds and the growth is such that the combustion will not continue without the burner • Fires set for the purposes of fire training using one gallon or less of flammable liquid per fire.	• No specific agricultural crop phase-outs or bans • Recreational fires allowed on non-curtailment days • On permissive burn days, numerous select fire types are allowed with permission from the APCO.

Measure	Applicability	Requirements
SMAQMD Rule 501 – Agriculture Burning (Amended 4/3/97)	Agricultural burning, including: • Agricultural waste disease prevention • Range improvement • Forest, wildlife and game habitat, irrigation system, and wild land vegetation management • Paper containers of agricultural chemicals. Contains similar exemptions as San Joaquin Valley for agricultural operations, including burning of bags used for agricultural chemicals and emergency agricultural burns which would cause	• No specific crop phase outs or bans (subject to air basin-wide rice burning reduction) • Permit holder must contact District for permission to burn and ensure that it is not a no- burn day and must contact the fire protection agency having jurisdiction over the burn location • Contains specific drying time requirements for different agricultural materials.
VCAPCD Rule 56 – Open Burning (Adopted 11/11/03)	Combustible materials in open outdoor fires Exemptions: • Fires used only for the heating or cooking of food for human consumption • Recreational fires confined to a fireplace or barbecue pit • Flag burning • Fire suppression training • Fire agency or public officer may set fires to reduce hazards as needed.	• No specific crop phase-outs or bans • Permit required for open burning • Burning only allowed on permissive burn days • Open burning allowed for the disposal of agricultural wastes in the pursuit of agricultural operations, range improvement burning, wildland vegetation management burning, levee, reservoir, or ditch maintenance and the disposal of Russian thistle • Burn times, drying times, and permit conditions also specified.

Measure	Applicability	Requirements
PCAPCD Rule 301 – Nonagricultural Burning Smoke Management (Amended 8/9/18)	Open outdoor fires, including the use of burn barrels Exemptions: • Fire hazard reduction burning • Public officer waiver • Recreational or cooking fire • American Flag • Open burning conducted by public officers.	• No person shall ignite or allow open outdoor burning without a valid burn permit from the District for fire hazard reduction, mechanized burner, open burning conducted by public officers, right of way clearing, levee, ditch and reservoir maintenance. • Separate burn permit required from fire protection agency with jurisdiction in area of the proposed burn project. • Air Pollution Control Officer may prohibit or add additional specific burn permit conditions.

Staff did not identify any more stringent requirements in other districts' rules except SJVAPCD's near-complete prohibition of agricultural burning by 2025. Staff evaluated potential control measures for agricultural, prescribed, and training burns as part of the BACM/MSM analysis in Appendix III. The analysis found that agricultural burning is extremely limited in the Basin and the high incremental cost of chipping and grinding compared to burning renders this measure infeasible. Further, reductions that would be achieved (< 0.01 tpd PM2.5) would have an inconsequential impact on air quality. Regarding prescribed burns, Appendix III discusses why it is infeasible to place additional restrictions on a critical public safety program that is proven to reduce wildfire severity. For the same reasons, it is unreasonable to consider a contingency measure for prescribed burns.

c. Conclusion

Staff does not propose any contingency measures for this source category. Appendix III provides detailed discussions on the prescribed burns category.

5. Commercial Cooking

a. Overview

Source category 690 – Commercial Cooking mostly includes emissions from commercial charbroiling, deep fat frying, and general cooking. The majority of emissions in this category come from charbroiling, which consists of two types of commercial charbroilers: chain-driven and under-fired. A chain-driven charbroiler

is a semi-enclosed broiler that moves food mechanically through the device on a grated grill to cook the food for a specific amount of time. An under-fired charbroiler has a metal "grid," a heavy-duty grill similar to that of a home barbecue, with gas burners, electric heating elements, or solid fuel (wood or charcoal) located under the grill to provide heat to cook the food. Under-fired charbroilers are widely used in commercial kitchens to cook meats, including beef, burgers, and chicken. These heavy-duty appliances commonly use evenly spaced, gas-fired burners to produce direct-flame, radiant heat a few inches below slatted, cast-iron cooking surfaces.[29] The slatted cooking surface allows fat, oil, and grease (FOG) from the meat to fall into the burner flames, which produces flaring that brings the flame into direct contact with the meat. Charbroilers do not include flat-top or plancha grills with continuous cooking surfaces that prevent the flame from directly contacting the meat.

Commercial cooking sources contribute 12.30 tpd direct PM2.5 emissions and zero NOx and NH3 emissions to the 2030 emissions inventory. Commercial charbroiling contributes about 75 percent of the PM2.5 emissions from commercial cooking. The remaining emissions are identified as "unspecified cooking operations." Therefore, the remainder of this analysis focuses on commercial charbroiling emissions.

The primary source of PM2.5 from charbroiling is the burning of FOG and entrainment of the resulting aerosols in the products of combustion from the cooking flames. It is estimated that greater than 85 percent (by weight) of FOG particles from under-fired charbroilers have aerodynamic diameters less than 1 µm.[30] The smoke and vapors generated by cooking on either type of charbroiler contain water, VOC, and PM. Larger particles and grease are typically captured by the grease filter of the ventilation hood over the charbroiler. The remaining VOC and particulate pollution are exhausted unless a secondary control is installed.

Catalytic oxidizers are used to control PM2.5 emissions from chain-driven charbroilers, but they are not effective for reducing emissions from under-fired charbroilers. For under-fired charbroilers, the exhaust from these devices loses heat as it is directed to the control device, and the reactions at the catalyst cannot take place under these lower temperatures. In a chain-driven charbroiler, charbroiling exhaust is directed through the catalytic oxidizer with little loss of temperature. Thus, electrostatic precipitators (ESP) and filter media are anticipated to be the potential control technologies for reducing PM2.5 emissions from

[29] Specifications for Commercial Hoods and Kitchen Ventilation in the 2019 California Mechanical Code are classified under four duty categories: light, medium, heavy, and extra-heavy duty cooking service. Gas underfired charbroilers are listed as heavy-duty cooking appliances. Charbroilers utilizing solid fuel (e.g., charcoal, wood) are classified as extra-heavy-duty and are outside the scope of this evaluation. Available at *https://epubs.iapmo.org/2019/CMC/index.html#p=136*

[30] South Coast AQMD, Approve and Adopt Technology Advancement Office Clean Fuels Program 2017 Annual Report and 2018 Plan Update and Resolution, Receive and File Revised Membership of Technology Advancement Advisory Group, and Approve and Adopt Membership Changes for Clean Fuels Advisory Group (March 2, 2018). Available at *http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2018/2018-mar2-034.pdf* (accessed June 16, 2022)

under-fired charbroilers.[31]

b. Evaluation

Rule 1138 reduces emissions by requiring catalytic oxidizers for chain-driven charbroilers that cook greater than or equal to 875 pounds of meat per week. Currently, Rule 1138 does not require emissions controls for under-fired charbroilers.

A thorough evaluation of the stringency of Rule 1138 as it compares to other districts' rules was conducted as part of the BACM/MSM analysis in Appendix III. Staff concluded that the applicability threshold for chain-driven charbroilers in Rule 1138 would need to be lowered to satisfy MSM requirements and, therefore, BCM-12 – Further Emission Reductions from Commercial Cooking is included in the control strategy.

c. Conclusion

The BACM/MSM analysis in Appendix III contains an exhaustive evaluation of potential controls for this source category and staff did not identify any areas where the analysis could be expanded. Therefore, there are no potential contingency measures for charbroilers that would be surplus to the control strategy.

6. Other (Miscellaneous Processes)

There are no direct PM2.5 or NOx emissions from this source category; however, there are 28.03 tpd of NH3 emissions in the 2030 baseline. Humans and pets are the source of these NH3 emissions and it would therefore be unreasonable to propose contingency measures for this source category.

[31] San Joaquin Valley Air Pollution Control District. *Commercial Underfired Charbroiler Emissions Control Technologies.* Available at *http://www.valleyair.org/Grants/documents/rctp/Charbroiler-Control-Technologies.pdf* (accessed 06/01/2022)

South Coast Air Basin Attainment Plan for the 2012 Annual PM2.5 Standard

ATTACHMENT A: California Smog Check Contingency Measure State Implementation Plan Revision

California Smog Check Contingency Measure State Implementation Plan Revision

Released: September 15, 2023

CALIFORNIA
AIR RESOURCES BOARD

Table of Contents

Executive Summary

The *California Smog Check Contingency Measure State Implementation Plan Revision* (Measure) addresses State Implementation Plan (SIP) contingency measure requirements of the federal Clean Air Act (Act) for certain areas designated as nonattainment of the national ambient air quality standards (NAAQS or standards) within the State. This Measure is necessary to address contingency measure requirements and respond to recent court actions to meet statutory deadlines related to contingency measures. This Measure includes an action that is triggered if a nonattainment area fails to attain by the applicable attainment date, fails to meet a reasonable further progress (RFP) milestone, fails to meet a quantitative milestone, or fails to submit a required quantitative milestone report or milestone compliance demonstration (collectively referred to as "Triggering Events").

The Motor Vehicle Inspection and Maintenance Program (Smog Check Program) is a vehicle inspection and maintenance program administered by the California Bureau of Automotive Repair (BAR) that identifies vehicles with faulty emission control components. Smog Check inspections are required biennially as a part of the vehicle registration process and/or when a vehicle changes ownership or is registered for the first time in California. In 2017, Assembly Bill (AB) 1274 added Health and Safety Code (H&SC) § 44011(a)(4)(B)(ii) which allowed vehicles eight or less model-years old to be exempt from requirements for Smog Check inspections. In lieu of an inspection, this law requires seven and eight model-year old vehicles owners to pay an annual Smog Abatement Fee of $25, $21 of which goes to the Air Pollution Control Fund for use to incentivize clean vehicles and equipment through the Carl Moyer Memorial Air Quality Standards Attainment Program (Moyer Program). This law also specifies that this exemption is allowed unless CARB determines that exempting these vehicles prohibits the State from meeting SIP commitments. At that time, the AB 1274 analysis[1] indicated that the emissions reductions from the increase in funding to the Moyer Program would outweigh the benefits of requiring seven and eight model-year old vehicles to obtain a Smog Check inspection.

CARB staff has now determined that removal of these exemptions may be needed to meet the contingency measure SIP requirements. CARB staff has also determined that in all of the relevant nonattainment areas, requiring a Smog Check inspection on eight model-year old vehicles provides more emission reductions than the potential loss in Moyer Program emission reductions that would result from the foregone funding. In 2017, when AB 1274 enacted this change in Smog Check exemptions, the benefit from additional funding for Moyer Program projects was estimated to outweigh the disbenefit from exempting additional vehicles. However, since 2017 the Program has successfully incentivized the

[1] *Bill Analysis - AB-1274 Smog check: exemption. (ca.gov)*

turnover of many dirty engines and equipment and Moyer Program projects are now less cost-effective than before, resulting in a net benefit from this Measure.

If a Triggering Event occurs, the Measure would:

- Change the existing smog check inspection exemptions in the California Smog Check Program in the applicable nonattainment area(s);
- Apply to the California nonattainment area(s) and standard(s) for which the Triggering Event occurs, from those listed on the next page in Table 1.; and
- Be implemented within 30 days of the effective date of a U.S. EPA finding that a Triggering Event occurred.

Seven areas in California under State jurisdiction are designated as nonattainment for the 75 parts per billion (ppb) 8-hour ozone standard, and ten areas in California under State jurisdiction are designated as nonattainment for the 70 ppb 8-hour ozone standard, with classifications of Moderate, Serious, Severe or Extreme. Additionally, the San Joaquin Valley is designated as nonattainment for the 80 ppb 8-hour ozone standard, the 12 microgram per meter cubed ($\mu g/m^3$) annual, 15 $\mu g/m^3$ annual, and 35 $\mu g/m^3$ 24-hour PM2.5 standards. The South Coast Air Basin is also designated as nonattainment for the 12 $\mu g/m^3$ annual PM2.5 standard. For all of these standards, nonattainment areas were or will be required to submit SIP revisions meeting contingency measure and other applicable requirements of the Act.

CARB staff has worked with local air districts to prepare contingency measure SIP revisions which were adopted and submitted to the U.S. Environmental Protection Agency (U.S. EPA) through CARB. Further, in 2018, CARB staff submitted the *2018 Updates to the California State Implementation Plan* (2018 SIP Update) which included a statewide contingency measure that was developed following U.S. EPA guidance available at the time. However, multiple lawsuits challenging U.S. EPA's interpretation of the Act led to U.S. EPA's determination that the previously submitted 2018 SIP Update contingency measures did not fully meet the Act's requirements. CARB staff is now proposing to submit the Measure to be consistent with U.S. EPA's current interpretation of the contingency measure provisions of the Act. The Measure as included in this SIP revision will be applicable for the California nonattainment areas and standards as listed in Table 1.

Table 1. Nonattainment Areas and Applicable Standards

Area	Applicable Standards
Coachella Valley	70 ppb Ozone, 75 ppb Ozone
Eastern Kern County	70 ppb Ozone, 75 ppb Ozone
Mariposa County	70 ppb Ozone
Sacramento Metro Area	70 ppb Ozone, 75 ppb Ozone
San Diego County	70 ppb Ozone, 75 ppb Ozone
San Joaquin Valley	70 ppb Ozone, 75 ppb Ozone, 80 ppb Ozone, 15 $\mu g/m^3$ PM2.5, 35 $\mu g/m^3$ PM2.5, 12 $\mu g/m^3$ PM2.5
South Coast Air Basin	12 $\mu g/m^3$ PM2.5, 70 ppb Ozone, 75 ppb Ozone
Ventura County	70 ppb Ozone
Western Mojave Desert	70 ppb Ozone, 75 ppb Ozone
Western Nevada	70 ppb Ozone

CARB staff initiated the public process with release of a concept document and workshop in August 2023 to solicit input from the public. The concept document and other materials were available in English and Spanish, and the workshop provided a forum in both English and Spanish for the proposed Measure to be discussed in a public setting and provide additional opportunity for public feedback, input, and ideas. CARB staff also analyzed the impacts of the Measure on vehicle owners in disadvantaged communities (DACs). CARB staff compared the proportion of the vehicles subject to the Measure if triggered to those registered in DACs to the proportion of vehicles subject to the Measure in total using DMV data. CARB staff found that, in all nonattainment areas, the proportion of vehicle owners potentially impacted by the Measure, if triggered, is not disproportionate to the population as a whole.

CARB staff has determined that the Measure meets the Act contingency measure requirements and that exercising H&SC § 44011(a)(4)(B)(ii) is needed to meet the SIP requirements.

Further, CARB staff last submitted updates to the Smog Check Program to U.S. EPA for incorporation into the California SIP in 2009 and U.S. EPA approved them on July 1, 2010.[2] As previously mentioned, the additional exemptions from the Smog Check Program were made by AB 1274 in 2017. As a part of this SIP revision, CARB staff is submitting H&SC § 44011(a)(4)(A) and (B) into the California SIP to incorporate these changes in the Smog Check Program.

The Board is scheduled to consider the Measure on October 26, 2023. CARB staff recommends the Board to adopt the Measure addressing contingency measure requirements for the applicable standards and nonattainment areas as listed in Table 1 and approve submittal into the California SIP of California H&SC sections 44011(a)(4)(A) and (B). If adopted, CARB staff will submit the Measure and H&SC sections 44011(a)(4)(A) and (B) to U.S. EPA as a revision to the California SIP.

[2] 75 Fed. Reg. 38023 (July 1, 2010)

Section 1. Contingency Requirements and Litigation

The Clean Air Act ("Act") specifies that SIPs must provide for contingency measures, defined in section 172(c)(9) as "specific measures to be undertaken if the area fails to make reasonable further progress (RFP), or to attain the national primary ambient air quality standard by the attainment date…."[3] The Act is silent though on the specific level of emission reductions that must flow from contingency measures. In the absence of specific requirements for the amount of emission reductions, in 1992, U.S. EPA conveyed that the contingency measures should, at a minimum, ensure that an appropriate level of emissions reduction progress continues to be made if attainment of RFP is not achieved and additional planning by the State is needed (57 Federal Register 13510, 13512 (April 16, 1992)). While U.S. EPA's ozone guidance states "contingency measures should represent one year's worth of progress amounting to reductions of 3 percent of the baseline emissions inventory for the nonattainment area", U.S. EPA has accepted contingency measures that equal less than one year's worth of RFP in some situations. Specifically, U.S. EPA has historically accepted lesser amounts as they see appropriate considering "U.S. EPA's long-standing recommendation that states should consider 'the potential nature and extent of any attainment shortfall for the area' and that contingency measures 'should represent a portion of the actual emissions reductions necessary to bring about attainment in the area.'"[4]

In recent years, court decisions, as described below, have excluded a category of contingency measures from what U.S. EPA may properly approve. Historically, U.S. EPA allowed contingency measure requirements to be met via excess emission reductions from ongoing implementation of adopted emission reduction programs. In the past, CARB used this method to meet contingency measure requirements. In 2016, in *Bahr v. U.S. Environmental Protection Agency*[5] *(Bahr),* the Ninth Circuit determined U.S. EPA erred in approving a contingency measure that relied on an already-implemented measure for a nonattainment area in Arizona, thereby rejecting U.S. EPA's longstanding interpretation of section 172(c)(9) of the Act. U.S. EPA staff interpreted this decision to mean that contingency measures must include a future action triggered by a Triggering Event. This decision was applicable to only the states covered by the Ninth Circuit. In the rest of the country, U.S. EPA still allowed contingency measures using their pre-Bahr stance. In January 2021, in *Sierra Club v. Environmental Protection Agency*[6], the United States Court of Appeals for the D.C. Circuit, ruled that already implemented measures do not qualify as contingency measures for the rest of the country (*Sierra Club*).

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[3] 42 U.S.C. § 7502(c)(9).

[4] See, e.g. 78 Fed.Reg. 37741, 37750 (Jun. 24, 2013), approval finalized with 78 Fed.Reg. 64402 (Oct. 29, 2013).

[5] *Bahr v. U.S. Environmental Protection Agency,* (9th Cir. 2016) 836 F.3d 1218.

[6] *Sierra Club v. Environmental Protection Agency,* (D.C. Cir. 2021) 985 F.3d 1055.

In response to *Bahr* and as part of the 75 ppb 8-hour ozone SIPs due in 2016, CARB staff developed the statewide Enhanced Enforcement Contingency Measure (Enforcement Contingency Measure) as a part of the *2018 Updates to the California State Implementation Plan* to address the need for a triggered action as a part of the contingency measure requirement. CARB staff worked closely with U.S. EPA regional staff in developing the contingency measure package that included the triggered Enforcement Contingency Measure, a district triggered measure and emission reductions from implementing CARB's mobile source emissions program. However, as part of the *San Joaquin Valley 2016 Ozone Plan for 2008 8-hour Ozone Standard* SIP action, U.S. EPA wrote in their final approval that the Enforcement Contingency Measure did not satisfy requirements to be approved as a "standalone contingency measure" and approved it only as a "SIP strengthening" measure[7]. U.S. EPA did approve the San Joaquin Valley Air Pollution Control District triggered measure and the implementation of the mobile reductions along with a CARB emission reduction commitment as meeting the contingency measure requirement for this SIP.

Subsequently, the Association of Irritated Residents filed a lawsuit against the U.S. EPA for its approval of various elements within the *San Joaquin Valley 2016 Ozone Plan for 2008 8--hour Ozone Standard*, including the contingency measure. The Ninth Circuit issued its decision in *Association of Irritated Residents v. EPA*[8] (*AIR*) that U.S. EPA's approval of the contingency element was arbitrary and capricious and rejected the triggered contingency measure that achieves much less than one year's worth of RFP. Most importantly, the Ninth Circuit said that, in line with U.S. EPA's longstanding interpretation of what is required of a contingency measure and the purpose it serves, together with *Bahr*, all reductions needed to satisfy the Act's contingency measure requirements must come from the contingency measure itself. The Ninth Circuit also said that the amount of reductions needed for contingency should not be reduced absent U.S. EPA adequately explaining its change from its historic stance on the amount of reductions required. U.S. EPA staff has interpreted *AIR* to mean that triggered contingency measures must achieve the entirety of the amount of emission reductions needed for the contingency measure requirement on their own. In addition, surplus emission reductions from ongoing programs cannot reduce the amount of reductions needed for the contingency measure requirements.

In response to *Bahr* and *Sierra Club*, in 2021, U.S. EPA convened a nationwide internal task force to develop guidance to support states in their development of contingency measures. The draft guidance was released in March 2023 and is currently undergoing a public review process. The draft guidance proposes a new method for how to calculate one year's worth of progress for the targeted amount of contingency measures reductions and provides new clarification on the reasoned justification U.S. EPA requires to facilitate approval of contingency measures with lesser amounts of reductions. Per the draft guidance, such a

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[7] 87 Fed. Reg. 59688 (October 3, 2022)

[8] *Association of Irritated Residents v. U.S. Environmental Protection Agency*, (9th Cir. 2021) 10 F.4th 937

reasoned justification would need to include an infeasibility analysis detailing why there are insufficient measures to meet one year's worth of progress. U.S. EPA relied on the draft guidance when they proposed a federal implementation plan to meet the PM2.5 contingency measure requirements in the San Joaquin Valley on August 8, 2023[9].

Section 2. CARB's Opportunities for Contingency Measures

Much has changed since U.S. EPA's 1992 guidance on contingency measures. Control programs across the country have matured as have the health-based standards. U.S. EPA strengthened ozone standards in 1997, 2008 and 2015 with attainment dates out to 2037 for areas in "extreme" nonattainment. California has the only three extreme ozone nonattainment areas in the country for the 2015 ozone NAAQS. Extreme ozone nonattainment areas are allowed to use a provision in the Act where emission reduction measures can wait for technology to advance. California also has multiple PM2.5 nonattainment areas with the highest possible classification and greatest attainment challenges. Thus, control measures are needed for meeting the NAAQS as expeditiously as possible, rather than being held in reserve.

To address contingency measure requirements given the courts' decisions and U.S. EPA's draft guidance, CARB staff and local air districts would need to develop a measure or measures that, when triggered by a Triggering Event, will achieve one year's worth of progress for the given nonattainment area unless it is determined that it is infeasible to achieve one year's worth of emission reductions. Given CARB's wide array of mobile source control programs, the relatively limited portion of emissions primarily regulated by the local air districts, and the fact that primarily-federally regulated sources are expected to account for approximately 52 percent of statewide nitrogen oxides (NOx) emissions by 2037[10], finding triggered measures that will achieve the required reductions is nearly impossible. That said, even discounting the amount to reflect the proportion of sources that are primarily federally regulated, additional control measures that can be identified by CARB staff are scarce or nonexistent that would achieve the required emissions reductions needed for a contingency measure.

Adding to the difficulty of identifying available control measures, not only does the suite of contingency measures need to achieve a large amount of reductions, but they will also need to achieve these reductions in the year following the year in which the Triggering Event has been identified. Although the newly released draft guidance proposes allowing for up to two years to achieve those reductions, control measures achieving the level of reductions required often take more than two years to implement and will likely not result in immediate reductions. In California's 2022 State SIP Strategy, CARB's three largest NOx reduction

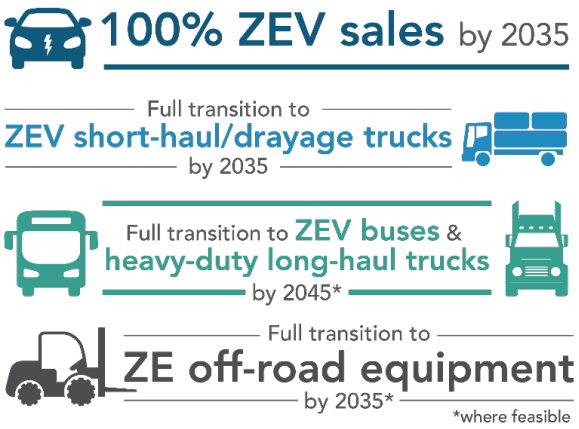
[9] 88 Fed. Reg. 53431 (August 8, 2023)
[10] Source: CARB 2022 CEPAM v1.01; based on 2037 emissions totals.

measures, In-Use Locomotive Regulation, Advanced Clean Fleets, and Transportation Refrigeration Unit II, rely on accelerated turnover of older engines/trucks. The need for buildout of potential infrastructure upgrades and market-readiness of new equipment options that meet requirements limits the availability to have significant emission reductions in a short amount of time. Options for a technically and economically feasible triggered measure that can be implemented and achieve the necessary reductions in the time frame required are scarce in California.

CARB has over 50 years of experience reducing emissions from mobile sources like cars and trucks, as well as other sources of pollution under State authority. The Reasonably Available Control Measures for State Sources analysis that CARB included in all of the 70 ppb 8-hour ozone SIPs illustrates the reach of CARB's current programs and regulations, many of which set the standard nationally for other states to follow. Few sources CARB has primary regulatory authority over remain without a control measure, and all control measures that are in place support the attainment of the NAAQS. There is a lack of additional control measures that would be able to achieve the necessary reductions for a contingency measure. Due to the unique air quality challenges California faces, should such additional measures exist, CARB would pursue those measures to support expeditious attainment of the NAAQS and would not reserve such measures for contingency purposes. Nonetheless, CARB staff has continued to explore options for potential statewide contingency measures utilizing its authorities and applying draft guidance.

A central difficulty in considering a statewide contingency measure under CARB's authority, is that CARB is already fully committed to driving sources of air pollution in California to zero-emission everywhere feasible and as expeditiously as possible. In 2020, Governor Newsom signed Executive Order N-79-20 (*Figure 1*) that established a first-in-the-nation goal for 100 percent of California sales of new passenger cars and trucks to be zero emission by 2035. The Governor's order also set a goal to transition 100 percent of the drayage truck fleet to zero- emission by 2035, all off-road equipment where feasible to zero -emission by 2035, and the remainder of the medium and heavy-duty vehicles to zero--emission where feasible by 2045.

Figure 1 - Governor Newsom Executive Order N-79-20



California is committed to achieving these goals, and CARB is pursuing an aggressive control program in conjunction with other state and local agencies. CARB's programs not only go beyond emissions standards and programs set at the federal level, but many include zero-emissions requirements or otherwise, through incentives and voluntary programs, that drive mobile sources to zero-emissions, as listed in Table 2 below. CARB is also exploring and developing a variety of new measures to drive more source categories to zero-emissions and reduce emissions even further, as detailed in the 2022 State SIP Strategy. With most source categories being driven to zero-emissions as expeditiously as possible, opportunities for having triggered measure that could reduce NOx, reactive organic gases (ROG) and PM2.5 emissions by the amount required for contingency measures are scarce.

Table 2. Emissions Sources and Respective CARB Programs with a Zero-Emissions Requirement/Component

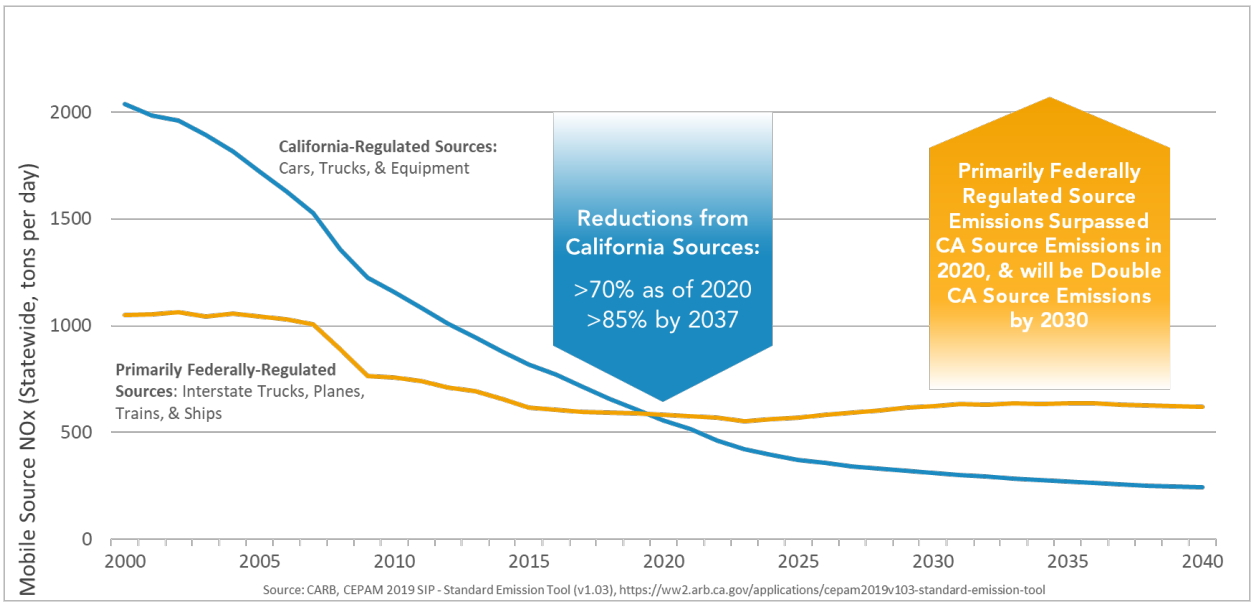
Emission Source	Regulatory Programs
Light-Duty Passenger Vehicles and Light-Duty Trucks	• Advanced Clean Cars Program (I and II), including the Zero Emission Vehicle Regulation • Clean Miles Standard
Motorcycles	• On-Road Motorcycle Regulation*
Medium Duty-Trucks	• Advanced Clean Cars Program (I and II), including the Zero Emission Vehicle Regulation • Zero-Emission Powertrain Certification Regulation • Advanced Clean Trucks Regulation • Advanced Clean Fleets Regulation
Heavy-Duty Trucks	• Zero-Emission Powertrain Certification Regulation • Advanced Clean Trucks Regulation • Advanced Clean Fleets Regulation
Heavy-Duty Urban Buses	• Innovative Clean Transit • Advanced Clean Fleets Regulation
Other Buses, Other Buses – Motor Coach	• Zero-Emission Airport Shuttle Regulation • Advanced Clean Fleets Regulation
Commercial Harbor Craft	• Commercial Harbor Craft Regulation
Recreational Boats	• Spark-Ignition Marine Engine Standards*
Transport Refrigeration Units	• Airborne Toxic Control Measure for In-Use Diesel-Fueled Transport Refrigeration Units (Parts I and II*)
Industrial Equipment	• Zero-Emission Forklifts* • Off-Road Zero-Emission Targeted Manufacturer Rule*
Construction and Mining	• Off-Road Zero-Emission Targeted Manufacturer Rule*
Airport Ground Support Equipment	• Zero-Emission Forklifts*
Port Operations and Rail Operations	• Cargo Handling Equipment Regulation • Off-Road Zero-Emission Targeted Manufacturer Rule*
Lawn and Garden	• Small Off-Road Engine Regulation • Off-Road Zero-Emission Targeted Manufacturer Rule*
Ocean-Going Vessels	• At Berth Regulation
Locomotives	• In-Use Locomotive Regulation

*Indicates program or regulation is in development

Most air pollution sources in California that are not as well controlled are primarily-federally regulated sources. (Figure 2). This includes interstate trucks, ships, locomotives, aircraft, and certain categories of off-road equipment, constituting a large source of potential emissions reductions. Since these are primarily regulated at the federal and, in some cases,

international level, options to implement a contingency measure with reductions approximately equivalent to one year's worth of progress are limited.

Figure 2 - State vs. Federal Mobile Source NOx Emissions



CARB staff has analyzed CARB's suite of control measures for all sources under CARB authority to identify potential contingency measure options. CARB currently has programs in place or under development for most sources and have evaluated a variety of regulatory mechanisms within existing and new programs for potential contingency triggers. After conducting a full analysis of measures for contingency measure opportunities, CARB staff determined that changes in the Smog Check Program are appropriate to use to meet the Act contingency measure requirement. The Measure was found to be the most feasible option given timing and technical constraints for adoption and implementation. The full infeasibility analysis can be found in Appendix A. Further, U.S. EPA recently released their own infeasibility analysis[11] in which they came to the same conclusion with respect to the scarcity of available contingency measures in CARB's mobile source control programs.

With this proposal, CARB staff would adopt and submit the Measure for the 70 ppb 8-hour ozone, 75 ppb 8-hour ozone, 80 ppb 8-hour ozone, the 12 $\mu g/m^3$ and 15 $\mu g/m^3$ annual PM2.5, and 35 $\mu g/m^3$ 24-hour PM2.5 standards for the relevant nonattainment areas to address the contingency measure requirements of the Act as interpreted by U.S. EPA in the draft guidance. The Measure consists of a triggered contingency measure that, if triggered,

[11] EPA Source Category and Control Measure Assessment and Reasoned Justification Technical Support Document; Federal Implementation Plan for Contingency Measures for the Fine Particulate Matter Standards; San Joaquin Valley, California. *https://www.regulations.gov/docket/EPA-R09-OAR-2023-0352*

would change the exemptions for motor vehicles in the California Smog Check Program for the relevant local air district and applicable standard as specified in Table 1 that, together with the local air districts' contingency measures, addresses the contingency measure requirements of the Act. A detailed description of the Measure is described in Section 4 below.

Section 3. California Smog Check Program

The Smog Check Program is a vehicle inspection and maintenance program administered by BAR. The Smog Check Program aims to reduce air pollution in the state by identifying vehicles with harmful excess emissions for repair or retirement. While BAR administers the Program, the California Department of Motor Vehicles (DMV) provides the vehicle registration and licensing information to support administration and enforcement of the Smog Check Program. Smog Check inspections are required biennially as a part of the vehicle registration process and/or when a vehicle changes ownership or is registered for the first time in California, depending on the area and severity of the air quality problem. Certain areas with worse air quality issues are subject to an enhanced version of the Program with stricter requirements. All gasoline-powered vehicles, hybrid vehicles, and alternative-fuel vehicles that are model-year 1976 and newer, as well as all diesel vehicles model-year 1998 and newer with a gross-vehicle weight rating of 14,000 pounds and less, are subject to Smog Check inspections.

However, there are several exceptions. Motorcycles and electric-powered vehicles are not subject to the Smog Check Program. Additionally, in 2017, California Assembly Bill (AB) 1274 was enacted, which amended the H&SC to exempt vehicles up to eight model -years old (MYO); previously, vehicles had been exempt up to six MYO. These seven and eight MYO vehicles that would otherwise be subject to a Smog Check inspection must pay an annual Smog Abatement Fee of $25, $21 of which goes to the Air Pollution Control Fund for use through the Moyer Program. Per H&SC § 44011(a)(4)(B)(ii), these motor vehicles eight or less MYO are exempted from biennial Smog Check inspection, unless CARB finds that providing an exception for these vehicles will prohibit the state from meeting the state commitments with respect to the SIP.

In 2017, when this change in Smog Check exemptions was enacted, the benefit from additional funding for Moyer Program projects was estimated to outweigh the disbenefit from exempting additional vehicles. However, since 2017, the cost-effectiveness of Moyer Program projects has increased as the program has successfully incentivized the turnover of many dirty engines and equipment. Moyer Program projects are now less cost-effective than before, resulting in a net benefit from this Measure.

As such, the ability to make the relevant finding for H&SC § 44011(a)(4)(B)(ii) purposes is within CARB's authority, and the other State agencies that implement California's Smog Check Program will be bound by it. CARB staff last submitted updates to the Smog Check Program to U.S. EPA for incorporation into the California SIP in 2009 and approved by U.S. EPA on July 1, 2010.[12] As previously mentioned, the additional exemptions from the Smog Check Program were made by AB 1274 in 2017. As a part of this SIP revision, CARB

[12] 75 Fed. Reg. 38023 (July 1, 2010)

staff is also proposing the Board approve submittal of H&SC § 44011(a)(4)(A) and (B) into the California SIP to incorporate these changes in the Smog Check Program. The H&SC sections are included in Appendix D.

Further the Smog Check Program meets federal requirements for an inspection and maintenance (I/M) program. On March 23, 2023, CARB adopted the California Smog Check Performance Standard Modeling (PSM) and Program Certification for the 70 parts per billion (ppb) 8-hour Ozone Standard (Smog Check Certification) to address I/M SIP requirements for the 70 ppb 8-hour ozone standard. CARB staff submitted it to U.S. EPA as a SIP revision. The Smog Check Certification demonstrated that the California's Smog Check Program meets the applicable federal I/M program requirements for all the 70 ppb 8-hour ozone nonattainment areas in California.

Section 4. Smog Check Contingency Measure

The Measure will consist of changing the existing Smog Check inspection exemptions in California's Smog Check Program in any applicable nonattainment area listed in Table 1. that fails to satisfy any one of the following (failures of which are collectively referred to as "Triggering Events"):

- Attain by the applicable attainment date;
- Meet a reasonable further progress (RFP) milestone;
- Meet a quantitative milestone; or
- Submit a required quantitative milestone report or milestone compliance demonstration.

The Measure will be initiated within 30 days of the effective date of a U.S. EPA determination of a Triggering Event. The exemption will change from the existing eight or less MYO to seven or less MYO in the applicable nonattainment area. If triggered, these additional vehicles would then be subject to Smog Check inspections based on the area in which the vehicle is registered (i.e., enhanced, basic, and change of ownership), resulting in additional emissions control equipment failures being identified and corrected, thereby reducing emissions that typically result when emissions control equipment is not performing as designed. The emissions reduction estimates from the Measure are detailed for each nonattainment area in Section 5 of this report. The methodology for calculating these estimates can be found in Appendix B. The Measure can be triggered a second time for a nonattainment area; if triggered a second time, the Smog Check exemption would then only apply to vehicles six or less MYO.

Implementation of the Measure will require coordination with other California State agencies. Their relevant roles and responsibilities are outlined below.

- **Bureau of Automotive Repair:** BAR, as part of the Department of Consumer Affairs, provides oversight of the automotive repair industry and administers vehicle emissions reduction and safety programs. Specifically, as it pertains to the Measure, BAR administers and enforces the Smog Check Program.
- **California Department of Motor Vehicles:** DMV administers vehicle registration and licensing and supports BAR in administering the Smog Check Program.

CARB staff will work closely with BAR and DMV staff throughout the process and leading up to a possible Triggering Event, so that both agencies have as much notice as possible for the work that will be required for full implementation of the Measure. For most potential failures to attain a relevant standard, preliminary data for the relevant ozone or PM2.5 season is available earlier and U.S. EPA makes their failure to attain findings six months after the attainment date, so CARB staff will be able to notify and work with BAR and DMV preemptively to ensure the Measure implementation is as smooth as possible.

CARB staff has quantified the emission reductions that would be achieved from implementation of the Measure, if triggered, and have documented the results in Section 5 of this report. The emission reductions anticipated are surplus to the current Smog Check Program in the nonattainment areas and they are not otherwise required by or assumed in a SIP-related program, or any other adopted State air quality program. The changes to Smog Check exemptions are enforceable since DMV requires a vehicle owner to obtain a Smog Check inspection certificate indicating a vehicle has passed its Smog Check inspection to renew their vehicle registration. The reductions from the Measure are permanent in that, if triggered, the vehicle will need to be repaired in order to renew their registration.

A. Implementation

Within 30 days of the effective date of U.S. EPA determining an applicable Triggering Event occurred, CARB will transmit a letter to BAR and DMV conveying its finding under H&SC § 44011(a)(4)(B)(ii) that providing the exception for certain motor vehicles from Smog Check inspection in specific nonattainment areas (defined by specified ZIP Codes) will prohibit the State from meeting commitments with respect to the SIP as required by the Act. This letter will explain that the Measure is being triggered to meet contingency measure requirements under Act section 172(c)(9) and/or 182(c)(9), and effectuating the change to the Smog Check exemptions for motor vehicles from eight or less MYO to seven or less MYO throughout the applicable nonattainment area (or six or less MYO in cases of the second trigger).

Prior to CARB staff submitting a letter to BAR and DMV, CARB staff will coordinate with BAR and DMV if there is potential for contingency to be triggered in the nonattainment areas in Table 1. CARB staff will meet regularly with BAR and DMV staff throughout the process to implement this Measure. Upon receipt of the CARB letter and the applicable ZIP Codes, CARB, BAR and DMV staff will begin implementation of the change in exemption length to Smog Check and take the following actions:

- DMV will update their Smog Check renewal programing to require a Smog Check inspection for the eight MYO vehicles (or seven MYO in the case of a second trigger) in the ZIP Codes provided by CARB staff;
- The eight to seven MYO (or seven to six MYO) exemption change will begin for registrations expiring beginning January 1st of the applicable year considering the time it takes for DMV to program this change and their registration renewal process;
- 60 days before the expiration date of the vehicle registration, DMV will send out registration renewals that include these newly impacted vehicles along with those already subject to Smog Check inspection;
- The notice will include information on the change in exemptions, reason for change, and resources for obtaining a Smog Check inspection from a certified station;

- CARB staff will work with DMV to develop and include an informational paper that will accompany the registration renewal with the information as included in the notice; and
- BAR and DMV will administer and enforce the new changes to the Smog Check Program.

B. Title VI and Environmental Justice

Title VI of the Civil Rights Act of 1964 (Title VI) provides that no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance. Other relevant federal laws prohibit discrimination in the use of federal funds based on disability, sex, and age.[13] As a recipient of federal funds, CARB must ensure it complies with Title VI and U.S. EPA's Title VI implementation regulations[14] in its relevant programs and policies.

CARB's public process to engage with stakeholders in development of the Measures, its equity analysis of the Measure, and information about CARB's Civil Rights Policy and Compliant process is summarized below.

Public Process

In developing the proposed Measure, CARB staff engaged in a thorough public process that addresses the requirements of Title VI. CARB staff initiated the public process with release of a concept document and hosting a remote online workshop in August 2023 to solicit input from the public.[15] The workshop was hosted through Zoom in the late afternoon to allow more community members to participate without needing to travel. The public notice for the workshop provided a contact for special accommodation requests by interested stakeholders, and CARB staff also made available on the notice and its website a staff email address to accept public questions and comments. The concept document and other materials were available in English and Spanish on the website and through emails sent to relevant email list serves, including the Environmental Justice Stakeholders Group. The workshop included translation services that provided a forum in both English and Spanish for the proposed Measure to be discussed in a public setting and provide additional opportunity for public feedback, input, and ideas. After the workshop, CARB staff

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[13] Section 504 of the Rehabilitation Act of 1973, as amended, 29 U.S.C. § 794; Title IX of the Education Amendments of 1972, as amended, 20 U.S.C. §§ 1681 et seq.; Age Discrimination Act of 1975, 42 U.S.C. §§ 6101 et seq.; and Federal Water Pollution Control Act Amendments of 1972, Pub. L. 92-500 § 13, 86 Stat. 903 (codified as amended at 33 U.S.C. § 1251 (1972)).

[14] 40 C.F.R. Part 7.

[15] *https://ww2.arb.ca.gov/resources/documents/california-smog-check-contingency-measure*

has made the recording of the workshop available on its website. CARB staff considered the public feedback it received in developing the Measure. CARB staff will continue to address the requirements of Title VI in the event implementation of the Measure is triggered and provide continuing opportunities for public feedback.

Racial Equity, Environmental Justice, and Equity Analysis

Central to CARB's mission is the commitment to racial equity and environmental justice and ensuring a clean and healthy environment for all Californians. Many low-income and overburdened communities within the nonattainment areas, and across the State, continue to experience disproportionately high levels of air pollution and the resulting detrimental impacts to their health. To address longstanding environmental and health inequities from elevated levels of criteria pollutants (and toxic air contaminants), CARB prioritizes environmental justice, incorporating racial equity, and conducting meaningful community engagement in its policy and planning efforts and programs. It is imperative to optimize California's control programs to maximize emissions reductions and provide targeted near-term benefits in those communities that continue to bear the brunt of poor air quality.

Across the agency, CARB is engaged in specific localized efforts include development of community air monitoring networks to learn about local exposures, development of a racial equity assessment lens to consider benefits and burdens of CARB programmatic work in the planning stages, continuously increasing and improving community engagement efforts, and implementation of Assembly Bill (AB) 617 (C. Garcia, Chapter 136, Statutes of 2017), known as the Community Air Protection Program[10]. Significant progress has been made to address air pollution statewide and in local communities, and it is imperative to also ensure all Californians have access to healthy air quality.

Specific to this Measure, given the existing disproportionate impacts overburdened communities already face, CARB staff sought to evaluate whether the proposed Measure would itself impact disproportionately burden certain communities. In conducting this evaluation, CARB staff analyzed whether there would be disproportionate impact on disadvantaged communities within the affected nonattainment areas if the Measure is triggered.

CARB staff also analyzed the impacts of the Measure on vehicle owners in disadvantaged communities (DACs). CARB staff evaluated the potential impacts on owners of 8 MYO vehicles that reside in disadvantaged communities (DACs), which are defined by California Senate Bill 535[16] as census tracts receiving the highest 25 percent of overall scores in *CalEnviroScreen 4.0*[17]. These communities face the highest air pollution and other

[16] De Leon, *https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201120120SB535*
[17] *https://oehha.ca.gov/calenviroscreen*

environmental burdens, and CARB staff is working to ensure that policy changes do not have a negative disproportionate impact on these populations.

In order to evaluate whether vehicle owners in DACs will be disproportionately impacted by this Measure if it is triggered, CARB staff compared the proportion of 8 MYO vehicles subject to the Smog Check inspection that are registered in DACs in each nonattainment area to the proportion of vehicles that are subject to the Smog Check inspection at some point in their lifetime that are registered in DACs for each nonattainment area. CARB staff used DMV data reflecting vehicle registrations as of 2021; thus, model year 2013 was used to represent 8 MYO vehicles and calculate the proportion of vehicles subject to the change. CARB staff assumes that the proportion of 8 MYO vehicles subject to the Smog Check inspection will be approximately equivalent in future attainment years. Based on this analysis for all areas in Table 1, CARB staff found that the proportion of vehicle owners potentially impacted by the Measure, if triggered, is not disproportionate to the population as a whole in each of the nonattainment areas analyzed. The proportion of people impacted with vehicles registered in DACs is about equal to the proportion of vehicle owners residing in DACs area-wide and generally represent a relatively small portion of the total population being impacted.

$$\frac{8MYO\ vehicles\ registered\ in\ DACs\ in\ nonattainment\ area}{8MYO\ vehicles\ registered\ in\ nonattainment\ area} = \frac{all\ vehicles\ registered\ in\ DACs\ in\ nonttainment\ area}{all\ vehicles\ registered\ in\ nonattainment\ area}$$

If the Measure is triggered, though, there could be other potential impacts to vehicle owners that should be considered. The main impacts to vehicle owners are the additional monetary cost and time of obtaining a Smog Check inspection and potential repairs one year earlier than previously required. The inspection and certification costs are mostly offset by the Smog Abatement Fee that exempted vehicle owners must pay. A Smog Check inspection averages $55 and is required every other year in most areas of the State. The Smog Abatement Fee is $25 and paid annually as a part of renewal of vehicle registration, thus two years of the Smog Abatement Fee is roughly equivalent to the average cost of a Smog Check Inspection.

Repair costs can range, but generally cost $750 on average, which could be a significant cost burden. However, financial assistance is available through BAR's Consumer Assistance Program, which provides up to $1,200 for repair costs. In terms of time to obtain a Smog Check inspection which can vary significantly due to location, many vehicles require regular service throughout the year, and owners may be able to schedule a Smog Check inspection concurrently. Additionally, the potential foregone dollars to the Moyer Program may reduce additional opportunities for emission reductions in districts where the local air district dedicates Moyer Program funds exclusively to disadvantaged communities. CARB staff will

continue to explore additional activities or funding opportunities to mitigate these potential disproportionate impacts.

Civil Rights Policy and Discrimination Complaint Process

Under CARB's written Civil Rights Policy and Discrimination Complaint process (Civil Rights Policy), CARB has a policy of nondiscrimination in its programs and activities and implements a process for discrimination complaints filed with CARB, which is available on CARB's website. The Civil Rights Officer coordinates implementation of CARB's nondiscrimination activities, including as the Equal Employment Opportunity (EEO) Officer for employment purposes, and who can be reached at *EEOP@arb.ca.gov*, or (279) 208-7110.[18]

The Civil Rights Policy and Discrimination Complaint Process provides the following information about the nondiscrimination policy and its applicability:

> It is the California Air Resources Board (CARB) policy to provide fair and equal access to the benefits of a program or activity administered by CARB. CARB will not tolerate discrimination against any person(s) seeking to participate in, or receive the benefits of, any program or activity offered or conducted by CARB. Members of the public who believe they were unlawfully denied full and equal access to an CARB program or activity may file a civil rights complaint with CARB under this policy. This non-discrimination policy also applies to people or entities, including contractors, subcontractors, or grantees that CARB utilizes to provide benefits and services to members of the public. [. . .]

As described in the Civil Rights Policy and Discrimination Complaint Process, the Civil Rights Officer coordinates implementation of nondiscrimination activities:

> CARB's Executive Officer will have final authority and responsibility for compliance with this policy. CARB's Civil Rights Officer, on behalf of the Executive Officer, will coordinate this policy's implementation within CARB, including work with the Ombudsman's Office, Office of Communications, and the staff and managers within a program or activity offered by CARB. The Civil Rights Officer coordinates compliance efforts, receives inquiries concerning non-discrimination requirements, and ensures CARB is complying with state and federal reporting and record retention requirements, including those required by Code of Federal Regulations, title 40, section 7.10 et seq.

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[18] CARB. California Air Resources Board and Civil Rights. *https://ww2.arb.ca.gov/california-air-resources-board-and-civil-rights*; Civil Rights Policy and Discrimination Compliant Process. November 1, 2016. *https://ww2.arb.ca.gov/sites/default/files/2023-01/2016-11-03%20CARB%20Civil%20Rights%20Policy%20Revised%20Final.pdf*

The Civil Rights Policy and Discrimination Complaint Process also describes in detail the complaint procedure, as follows:

> A Civil rights complaint may be filed against CARB or other people or entities affiliated with CARB, including contractors, subcontractors, or grantees that CARB utilizes to provide benefits and services to members of the public. The complainant must file his or her complaint within one year of the alleged discrimination. This one-year time limit may be extended up to, but no more than, an additional 90 days if the complainant first obtained knowledge of the facts of the alleged violation after the expiration of the one-year time limit. [. . .]
>
> The Civil Rights Officer will review the facts presented and collected and reach a determination on the merits of the complaint based on a preponderance of the evidence. The Civil Rights Officer will inform the complainant in writing when CARB has reached a determination on the merits of the discrimination complaint. Where the complainant has articulated facts that do not appear discriminatory but warrants further review, the Civil Rights Officer, in his or her discretion, may forward the complaint to a party within CARB for action. The Civil Rights Officer will inform the complainant, either verbally or in writing, before facilitating the transfer. [. . .]
>
> CARB will not tolerate retaliation against a complainant or a participant in the complaint process. Anyone who believes that they have been subject to retaliation in violation of this policy may file a complaint of retaliation with CARB following the procedures outlined in this policy.

There is a Civil Rights Complaint Form available[19] on the webpage, which should be used by members of the public to file a complaint of discrimination against CARB that an individual believes occurred during the administration of its programs and services offered to the public. As described on CARB's webpage, for all complaints submitted, the Civil Rights Officer will review the complaint to determine if there is a prima facie complaint (which means, if all facts alleged were true, would a violation of the applicable policy exist). If the Civil Rights Officer identifies a prima facie complaint in the jurisdiction of the Civil Rights Office, the Civil Rights Office will investigate and determine whether there is a violation of the policy.

The laws and regulations that CARB implements through this policy include:

- Code of Federal Regulations, Title 40 Parts 5 and 7;
- Title VI of the U.S. Civil Rights Act of 1964, as amended;

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[19] CARB. Civil Rights Complaint Form. July 2019. *https://ww2.arb.ca.gov/sites/default/files/2023-01/eo_eeo_033_civil_rights_complaints_form.pdf*

- Section 504 of the Rehabilitation Act of 1973;
- Age Discrimination Act of 1975;
- Title IX of the Education Amendments of 1972;
- California Government Code, title 2, Division 3, Part 1, Chapter 2, Article 9.5, *Discrimination*, section 11135 et seq.; and
- California Code of Regulations, title 2, section 10000 et seq.

As part of its overarching civil rights and environmental justice efforts, CARB is in the process of updating its Civil Rights Policy and will make those publicly available once complete. These updates will reflect available U.S. EPA and U.S. Department of Justice resources for Title VI and environmental justice policies. CARB encourages U.S. EPA to issue additional guidance to further clarify Title VI requirements and expectations to assist state implementation efforts.

C. Fiscal Impacts to State Programs

The Measure has some fiscal impacts. Previously exempted vehicles will no longer pay the annual Smog Abatement Fee of $25, but instead pay the biennial Smog Check inspection certification fee of $8.25, which is directed to BAR to fund the Smog Check Program. Of the Smog Abatement fee, $21 is directed to the Air Pollution Control Fund to fund the Moyer Program, which will no longer be collected if the exemption changes. If the Measure is triggered, this will result in fewer funds being directed towards the Air Pollution Control Fund for the Moyer Program, but an increase in certification fees for BAR. For each nonattainment area and standard, CARB staff used the estimated number of vehicles impacted by the change in exemption model year to estimate the fiscal impact of a potential change in exemption if the Measure is triggered. The estimated loss of funding if triggered is detailed for each nonattainment area in Section 5.

The potential loss of funds resulting from the Measure being triggered in an area may result in a loss of funds for the Moyer Program, which could result in fewer Moyer Program projects and fewer opportunities for additional emission reductions. If the Measure is triggered in a nonattainment area, the monetary impacts will be statewide. The Moyer Program funds are collected statewide but allocated to each local air district according to requirements set by H&SC §44299.2. For South Coast Air Basin only, the allocation is based on human population relative to the State as a whole. For the remaining local air districts, funds are allocated based on each local air district's population, air quality, and historical allocation awarded in Fiscal Year (FY) 2002-2003. CARB staff used the statewide average cost effectiveness of Moyer Program projects to estimate the Moyer Program emission reductions impact if the Measure is triggered. Based on CARB staff analysis, the resulting potential foregone emissions reductions from fewer potential projects funded through the Moyer Program will not outweigh the emissions reductions benefit from the Measure. The

estimated loss in potential emissions reductions from the Moyer Program is detailed below in each nonattainment area section of this report. The methodology for calculating the impact of the loss of Moyer Program funds can be found in Appendix C.

D. CEQA

CARB staff has determined that the Measure is exempt from CEQA under the "general rule" or "common sense" exemption (14 CCR 15061(b)(3)). The common sense exemption states a project is exempt from CEQA if "the activity is covered by the general rule that CEQA applies only to projects which have the potential for causing a significant effect on the environment. Where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA." The Measure addresses contingency measure requirements under the Act and would remove an exemption from a Smog Check inspection for certain model year vehicles only in the event a Triggering Event occurs. The Measure would only go into effect in the area in which it is triggered. The change in exemptions for vehicles required to obtain a Smog Check inspection, only if triggered by an applicable event, would not require new equipment and has no potential to adversely affect air quality or any other environmental resource area. Based on CARB staff's review it can be seen with certainty that there is no possibility that the Measure may result in a significant adverse impact on the environment; therefore, this activity is exempt from CEQA.

CARB staff has also determined that the Measure is categorically exempt from CEQA under the "Class 8" exemption (Cal. Code Regs., tit. 14, § 15308). Class 8 exemptions apply to "actions taken by regulatory agencies, as authorized by state or local ordinance, to assure the maintenance, restoration, enhancement, or protection of the environment where the regulatory process involves procedures for protection of the environment." The proposed Measure is an action by CARB, a regulatory agency, to protect the environment in the event a Triggering Event occurs. The Measure will assure the maintenance and enhancement of the environment by removing exemptions from the Smog Check Program, resulting in additional emissions control equipment failures being identified and corrected, thereby reducing emissions that typically result when emissions control equipment is not performing as designed. CARB staff analysis indicates air emission benefits exceed the disbenefits in each relevant air basin. Therefore, the Smog Check Contingency Measure is also exempt as a Class 8 exemption.

Section 5. Nonattainment Area Analyses

California's nonattainment challenge for ozone and PM2.5 NAAQS in most of the State is driven in part due to motor vehicle emissions. While CARB's regulations require motor vehicles to meet emission standards throughout their useful lives, this is not guaranteed. CARB staff recommends the Board exercise the authority under this statute and find that exempting motor vehicles that are less than 8 years old from the requirements is preventing the State from meeting its commitments under the Act related to complying with the Act's contingency measure requirements. Subjecting vehicles to the Smog Check Program to reduce emissions as a contingency measure when a Triggering Event occurs would help the State meet its contingency measure requirement under the Act. In addition to CARB's actions, each local air district has either included a complementary contingency measure or measures in their SIP or will provide a reasoned justification for why they are unable to provide contingency measures for the full amount of reductions as specified in the draft guidance. Below, for each nonattainment area listed in Table 1, CARB staff is providing the estimate of the one year's worth of progress, estimate of contingency measure reductions, equity impacts, and Moyer Program impacts.

A. Coachella Valley

The Measure complements local air district efforts to meet contingency measure requirements for the 75 ppb and 70 ppb 8-hour ozone standards. The required amount of emission reductions from contingency measures, or one year's worth (OYW) of progress based on the draft guidance, is shown in Table 3.

Table 3. Coachella Valley OYW of Progress
(reductions calculated on summer planning inventory)

Standard	Attainment Year	NOx (tpd)	ROG (tpd)
75 ppb 8-hour Ozone	2031	0.34	0.14
70 ppb 8-hour Ozone	2037	0.17	0.10

Table 4 documents the emission reductions that occur after the attainment year due to implementation of the Measure if triggered.

Table 4. Coachella Valley Potential Reductions from Measure
(reductions calculated on summer planning inventory)

Standard	Attainment Year	NOx Benefits (tpd)	ROG Benefits (tpd)
75 ppb 8-hour Ozone	2031	0.008	0.003
70 ppb 8-hour Ozone	2037	0.008	0.003

Equity Impacts

Table 5 documents the potential impact of the Measure on DACs as identified in *CalEnviroScreen 4.0* in the Coachella Valley. The proportion of vehicles that are registered in DACs and would be impacted if the Measure is triggered is proportional to the general population of all vehicles registered in DACs overall, about 4 percent. There is not expected to be a disproportionate impact on disadvantaged communities should the measure be triggered.

Table 5. Coachella Valley Vehicle Populations

All Vehicles	All Vehicles Population	8MYO Vehicles* (MY 2013)	8MYO Vehicles* (MY 2013) Population
Total Vehicle Population	320,375	Vehicle Population	14,622
Vehicle Population in DACs	15,492	Vehicle Population in DACs	640
Proportion DAC	4.84%	Proportion DAC	4.38%

*MY 2013 Vehicle populations were used to represent 8MYO vehicles.

Carl Moyer Impacts

Should the Measure be triggered in Coachella Valley, the potential funds lost by year is listed below in Table 6. The loss in funding would have statewide impacts as the funds are collected and redistributed to districts based on the formula H&SC § 44299.2. Based on statewide cost effectiveness and historical allocations to each local air district, the estimated loss in potential emission reduction benefits in Coachella Valley if the Measure is triggered is shown in Table 7.

Table 6. Coachella Valley 8 MYO Smog Abatement Fees

Standard	Attainment Year	Potential Dollars
75 ppb 8-hour Ozone	2031	$ 311,468
70 ppb 8-hour Ozone	2037	$ 325,868

Table 7. Coachella Valley Carl Moyer Program Potential Foregone Emissions Reductions

(reductions calculated on annual planning inventory consistent with Moyer Program cost-effectiveness)

Standard	Attainment Year	NOx (tpd)
75 ppb 8-hour Ozone	2031	0.0002
70 ppb 8-hour Ozone	2037	0.0002

B. Eastern Kern County

The Measure complements local air district efforts to meet contingency measure requirements for the 75 ppb and 70 ppb 8-hour ozone standards. The required amount of emission reductions from contingency measures, or OYW of progress based on the draft guidance, is shown in Table 8.

Table 8. Eastern Kern County OYW of Progress

(reductions calculated on summer planning inventory)

Standard	Attainment Year	NOx (tpd)	ROG (tpd)
75 ppb 8-hour Ozone	2026	0.30	0.08
70 ppb 8-hour Ozone	2032	0.26	0.07

Table 9 documents the emission reductions that would occur after the attainment year due to implementation of the Measure if triggered.

Table 9. Eastern Kern County Potential Reductions from Measure
(reductions calculated on summer planning inventory)

Standard	Attainment Year	NOx Benefits (tpd)	ROG Benefits (tpd)
75 ppb 8-hour Ozone	2026	0.003	0.001
70 ppb 8-hour Ozone	2032	0.003	0.001

Equity Impacts

Table 10 documents the potential impact of the Measure on DACs as identified in *CalEnviroScreen 4.0* in Eastern Kern County. The proportion of vehicles that are registered in DACs and would be impacted if the Measure is triggered is proportional to the general population of all vehicles registered in DACs overall, about 4 percent. There is not expected to be a disproportionate impact on disadvantaged communities, should the measure be triggered.

Table 10. Eastern Kern County Vehicle Populations
(vehicle populations calculated from EMFAC2021 Fleet Database)

All Vehicles	All Vehicles Population	8MYO Vehicles* (MY 2013)	8MYO Vehicles* (MY 2013) Population
Total Vehicle Population	86,909	Vehicle Population	4,209
Vehicle Population in DACs	3,640	Vehicle Population in DACs	174
Proportion DAC	4.19%	Proportion DAC	4.12%

*MY 2013 Vehicle populations were used to represent 8MYO vehicles.

Carl Moyer Impacts

Should the Measure be triggered in Eastern Kern County, the potential funds lost statewide by year is listed below in Table 11. Based on statewide cost effectiveness and historical allocations to each local air district, the loss in potential emission reduction benefits in Eastern Kern County if the Measure is triggered is shown in Table 12.

Table 11. Eastern Kern County 8 MYO Smog Abatement Fees

Standard	Attainment Year	Potential Dollars
75 ppb 8-hour Ozone	2026	$ 112,514
70 ppb 8-hour Ozone	2032	$ 116,670

Table 12. Eastern Kern Carl Moyer Program Potential Foregone Emissions Reductions
(reductions calculated on annual planning inventory consistent with Moyer Program cost-effectiveness)

Standard	Attainment Year	NOx (tpd)
75 ppb 8-hour Ozone	2026	0.000003
70 ppb 8-hour Ozone	2032	0.000003

C. Mariposa County

The Measure complements local air district efforts to meet contingency measure requirements for the 70 ppb 8-hour ozone standard. The required amount of emission reductions from contingency measures, or OYW of progress based on the draft guidance, is shown in Table 13.

Table 13. Mariposa County OYW of Progress
(reductions calculated on summer planning inventory)

Standard	Attainment Year	NOx (tpd)	ROG (tpd)
70 ppb 8-hour Ozone	2026	0.02	0.13

Table 14 documents the emission reductions that would occur after the attainment year due to implementation of the Measure if triggered.

Table 14. Mariposa County Potential Reductions from Measure
(reductions calculated on summer planning inventory)

Standard	Attainment Year	NOx Benefits (tpd)	ROG Benefits (tpd)
70 ppb 8-hour Ozone	2026	0.0003	0.0001

Equity Impacts

Per scores in *CalEnviroScreen 4.0*, there are very few vehicles registered in DACs in Mariposa County. There is not expected to be a disproportionate impact on disadvantaged communities should the measure be triggered.

Carl Moyer Impacts

Should the Measure be triggered in Mariposa County, the potential funds lost by year is listed below in Table 15. Based on district allocations of Moyer Program funds per H&SC §44299.2, Mariposa County receives $200,000 regardless of the funding available statewide. Thus, there will be no emissions disbenefit from a decrease in Moyer Funds in Mariposa County if the measure is triggered, shown in Table 16.

Table 15. Mariposa County 8 MYO Smog Abatement Fees

Standard	Attainment Year	Potential Dollars
70 ppb 8-hour Ozone	2026	$ 8,691

Table 16. Mariposa County Carl Moyer Program Potential Foregone Emissions Reductions

(reductions calculated on annual planning inventory consistent with Moyer Program cost-effectiveness)

Standard	Attainment Year	NOx (tpd)
70 ppb 8-hour Ozone	2026	0.000

D. Sacramento Metro Area

The Measure complements the local air districts' efforts to meet contingency measure requirements for the 75 ppb and 70 ppb 8-hour ozone standards. The required amount of emission reductions from contingency measures, or OYW of progress based on the draft guidance, is shown in Table 17.

Table 17. Sacramento Metro OYW of Progress

(reductions calculated on summer planning inventory)

Standard	Attainment Year	NOx (tpd)	ROG (tpd)
75 ppb 8-hour Ozone	2024	2.20	1.78
70 ppb 8-hour Ozone	2032	1.26	0.99

Table 18 documents the emission reductions that occur after the attainment year due to implementation of the Measure if triggered.

Table 18. Sacramento Metro Area Potential Reductions from Measure
(reductions calculated on summer planning inventory)

Standard	Attainment Year	NOx Benefits (tpd)	ROG Benefits (tpd)
75 ppb 8-hour Ozone	2024	0.077	0.037
70 ppb 8-hour Ozone	2032	0.047	0.015

Equity Impacts

Table 19 documents the potential impact of the Measure on DACs as identified in *CalEnviroScreen 4.0* in the Sacramento Metro area. The proportion of vehicles that are registered in DACs and would be impacted if the Measure is triggered is proportional to the general population of all vehicles registered in DACs overall, about 7 percent. There is not expected to be a disproportionate impact on disadvantaged communities should the measure be triggered.

Table 19 Sacramento Metro Area Vehicle Populations
(vehicle populations calculated from EMFAC2021 Fleet Database)

All Vehicles		8 MYO Vehicles (MY 2013)	
Total Vehicle Population	1,766,464	MY13 Vehicle Population	88,163
Vehicle Population in DACs	135,377	MY13 Vehicle Population in DACs	6,387
Proportion DAC	7.66%	Proportion DAC	7.24%

Carl Moyer Impacts

Should the Measure be triggered in the Sacramento Metro Area, the potential funds lost by year is listed below in Table 20. Based on statewide cost effectiveness and historical allocations to each local air district, the loss in potential emission reduction benefits in Sacramento Metro Area if the Measure is triggered is shown in Table 21.

Table 20. Sacramento Metro Area 8 MYO Smog Abatement Fees

Standard	Attainment Year	Potential Dollars
75 ppb 8-hour Ozone	2024	$ 2,554,206
70 ppb 8-hour Ozone	2032	$ 2,020,844

Table 21. Sacramento Metro Area Carl Moyer Program Potential Foregone Emissions Reductions

(reductions calculated on annual planning inventory consistent with Moyer Program cost-effectiveness)

Standard	Attainment Year	NOx (tpd)
75 ppb 8-hour Ozone	2024	0.0009
70 ppb 8-hour Ozone	2032	0.0007

E. San Diego County

The Measure complements local air district efforts to meet contingency measure requirements for the 75 ppb and 70 ppb 8-hour ozone standards. The required amount of emission reductions from contingency measures, or OYW of progress based on the draft guidance, is shown in Table 22.

Table 22. San Diego County OYW of Progress

(reductions calculated on summer planning inventory)

Standard	Attainment Year	NOx (tpd)	ROG (tpd)
75 ppb 8-hour Ozone	2026	2.19	1.97
70 ppb 8-hour Ozone	2032	1.26	0.89

Table 23 documents the emission reductions that occur after the attainment year due to implementation of the Measure if triggered.

Table 23. San Diego County Potential Reductions from Measure
(reductions calculated on summer planning inventory)

Standard	Attainment Year	NOx Benefits (tpd)	ROG Benefits (tpd)
75 ppb 8-hour Ozone	2026	0.065	0.027
70 ppb 8-hour Ozone	2032	0.056	0.016

Equity Impacts

Table 24 documents the potential impact of the Measure on DACs as identified in *CalEnviroScreen 4.0* in San Diego County. The proportion of vehicles that are registered in DACs and would be impacted if the Measure is triggered is proportional to the general population of all vehicles registered in DACs overall, about 5.5 percent. There is not expected to be a disproportionate impact on disadvantaged communities, should the measure be triggered.

Table 24. San Diego County Vehicle Populations
(vehicle populations calculated from EMFAC2021 Fleet Database)

All Vehicles		8 MYO Vehicles (MY 2013)	
Total Vehicle Population	2,360,242	MY13 Vehicle Population	117,373
Vehicle Population in DACs	146,252	MY13 Vehicle Population in DACs	6,433
Proportion DAC	6.20%	Proportion DAC	5.48%

Carl Moyer Impacts

Should the Measure be triggered in San Diego County, the potential funds lost by year is listed below in Table 25. Based on statewide cost effectiveness and historical allocations to each local air district, the loss in potential emission reduction benefits in San Diego County if the Measure is triggered is shown in Table 26.

Table 25. San Diego County 8 MYO Smog Abatement Fees

Standard	Attainment Year	Potential Dollars
75 ppb 8-hour Ozone	2026	$ 2,308,061
70 ppb 8-hour Ozone	2032	$ 2,341,248

Table 26. San Diego County Carl Moyer Program Potential Foregone Emissions Reductions

(reductions calculated on annual planning inventory consistent with Moyer Program cost-effectiveness)

Standard	Attainment Year	NOx (tpd)
75 ppb 8-hour Ozone	2026	0.001
70 ppb 8-hour Ozone	2032	0.001

F. San Joaquin Valley

The Measure complements district efforts to meet contingency measure requirements for the 80 ppb, 75 ppb and 70 ppb 8-hour ozone standards, the 15 ug/m^3 and 12 ug/m^3 annual PM2.5 standards, and the 35 ug/m^3 24-hour PM2.5 standard. On May 18, 2023, specific to PM2.5 standards, the San Joaquin Valley Air Pollution Control District adopted their *PM2.5 Contingency Measure SIP Revision* which was submitted to U.S. EPA by CARB staff. Further, on June 23, 2023, CARB staff committed to submit to U.S. EPA a triggered contingency measure under State authority for the PM2.5 standards. If adopted, the Measure will be submitted to U.S. EPA to fulfill that commitment.

The required amount of emission reductions from contingency measures, or OYW of progress based on the draft guidance, is shown in Table 27 for the 80 ppb, 75 ppb and 70 ppb 8-hour ozone standards.

Table 27. San Joaquin Valley OYW of Progress

(reductions calculated on summer planning inventory)

Standard	Attainment Year	NOx (tpd)	ROG (tpd)
80 ppb 8-hour ozone	2023	7.57	2.40
75 ppb 8-hour Ozone	2031	4.25	1.88
70 ppb 8-hour Ozone	2037	2.35	1.73

Table 28 documents the emission reductions that occur after the attainment year due to implementation of the Measure if triggered.

Table 28. San Joaquin Valley Potential Reductions from Measure
(reductions calculated on summer planning inventory for ozone, annual planning inventory for PM2.5)

Standard	Attainment Year	NOx Benefits (tpd)	ROG Benefits (tpd)
80 ppb 8-hour Ozone	2023	0.112	0.056
15 µg/m^3 Annual PM2.5	2023	0.117	0.052
35 µg/m^3 24-hour PM2.5	2024	0.120	0.052
12 µg/m^3 Annual PM2.5	2030	0.086	0.027
75 ppb 8-hour Ozone	2031	0.079	0.025
70 ppb 8-hour Ozone	2037	0.076	0.024

Equity Impacts

Table 29 documents the potential impact of the Measure on DACs as identified in *CalEnviroScreen 4.0* in the San Joaquin Valley. The proportion of vehicles that are registered in DACs and would be impacted if the Measure is triggered is proportional to the general population of all vehicles registered in DACs overall, about 28-29 percent, though the percentage of people residing in DACs in San Joaquin Valley is relatively higher compared to other districts. There is not expected to be a disproportionate impact on disadvantaged communities should the measure be triggered.

Table 29. San Joaquin Valley Vehicle Populations
(vehicle populations calculated from EMFAC2021 Fleet Database)

All Vehicles		8 MYO Vehicles (MY 2013)	
Total Vehicle Population	2,493,831	MY13 Vehicle Population	113,744
Vehicle Population in DACs	738,064	MY13 Vehicle Population in DACs	31,906
Proportion DAC	29.60%	Proportion DAC	28.05%

Carl Moyer Impacts

Should the Measure be triggered in San Joaquin Valley, the potential funds lost by year is listed below in Table 30. Based on statewide cost effectiveness and historical allocations to each local air district, the loss in potential emission reduction benefits in the San Joaquin Valley if the Measure is triggered is shown in Table 31.

Table 30. San Joaquin Valley 8 MYO Smog Abatement Fees

Standard	Attainment Year	Potential Dollars[20]
80 ppb 8-hour Ozone	2023	$ 3,781,802
15 µg/m^3 Annual PM2.5	2023	$ 3,781,802
35 µg/m^3 Annual PM2.5	2024	$ 3,880,753
12 µg/m^3 Annual PM2.5	2030	$ 3,171,435
75 ppb 8-hour Ozone	2031	$ 3,167,124
70 ppb 8-hour Ozone	2037	$ 3,300,289

Table 31 San Joaquin Valley Carl Moyer Program Potential Foregone Emissions Reductions

(reductions calculated on annual planning inventory consistent with Moyer Program cost-effectiveness)

Standard	Attainment Year	NOx (tpd)
80 ppb 8-hour Ozone	2023	0.004
15 µg/m^3 Annual PM2.5	2023	0.004
35 µg/m^3 Annual PM2.5	2024	0.004
12 µg/m^3 Annual PM2.5	2030	0.003
75 ppb 8-hour Ozone	2031	0.003
70 ppb 8-hour Ozone	2037	0.003

[20] For years with multiple standards/ triggers in the same year, the loss in smog abatement fees would only be triggered once.

G. South Coast Air Basin

The Measure complements local air district efforts to meet contingency measure requirements for the 75 ppb and 70 ppb 8-hour ozone standards, and the 12 ug/m^3 annual PM2.5 standard. The required amount of emission reductions from contingency measures, or OYW of progress based on the draft guidance, is shown in Table 32 for the 75 ppb and 70 ppb 8-hour ozone standards.

Table 32. South Coast Air Basin OYW of Progress
(reductions calculated on summer planning inventory)

Standard	Attainment Year	NOx (tpd)	ROG (tpd)
75 ppb 8-hour Ozone	2031	4.12	6.38
70 ppb 8-hour Ozone	2037	2.62	3.54

Table 33 documents the emission reductions that occur after the attainment or final RFP milestone year due to implementation of the Measure if triggered.

Table 33. South Coast Air Basin Potential Reductions from Measure
(reductions calculated on summer planning inventory for ozone, annual planning inventory for PM2.5)

Standard	Attainment/RFP Year	NOx Benefits (tpd)	ROG Benefits (tpd)
75 ppb 8-hour Ozone	2029	0.295	0.096
70 ppb 8-hour Ozone	2035	0.254	0.077
12 µg/m^3 Annual PM2.5	2030	0.300	0.093

Equity Impacts

Table 34 documents the potential impact of the Measure on DACs as identified in *CalEnviroScreen 4.0* in the South Coast Air Basin. The proportion of vehicles that are registered in DACs and would be impacted if the Measure is triggered is lower than the proportion of the general population of all vehicles registered in DACs overall, though the percentage of people residing in DACs in the South Coast Air Basin is relatively higher compared to other local air districts. There is not expected to be a disproportionate impact on disadvantaged communities should the measure be triggered.

Table 34. South Coast Vehicle Populations
(vehicle populations calculated from EMFAC2021 Fleet Database)

All Vehicles		8 MYO Vehicles (MY 2013)	
Total Vehicle Population	11,296,609	MY13 Vehicle Population	504,562
Vehicle Population in DACs	3,324,206	MY13 Vehicle Population in DACs	129,225
Proportion DAC	29.43%	Proportion DAC	25.61%

Carl Moyer Impacts

Should the measure be triggered in the South Coast Air Basin, the potential funds lost by year is listed below in Table 35. Based on statewide cost effectiveness and historical allocations to each local air district, the loss in potential emission reduction benefits in the South Coast Air Basin if the Measure is triggered is shown in Table 36.

Table 35. South Coast 8 MYO Smog Abatement Fees

Standard	Attainment/RFP Year	Potential Dollars
75 ppb 8-hour Ozone	2029	$ 11,273,782
70 ppb 8-hour Ozone	2035	$ 11,195,217
12 μg/m^3 Annual PM2.5	2030	$ 11,122,871

Table 36. South Coast Carl Moyer Program Potential Foregone Emissions Reductions
(reductions calculated on annual planning inventory consistent with Moyer Program cost-effectiveness)

Standard	Attainment/RFP Year	NOx (tpd)
75 ppb 8-hour Ozone	2029	0.024
70 ppb 8-hour Ozone	2035	0.024
12 μg/m^3 Annual PM2.5	2030	0.024

H. Ventura County

The Measure complements local air district efforts to meet contingency measure requirements for the 70 ppb 8-hour ozone standard. The required amount of emission reductions from contingency measures, or OYW of progress based on the draft guidance, is shown in Table 37.

Table 37. Ventura County OYW of Progress
(reductions calculated on summer planning inventory)

Standard	Attainment Year	NOx (tpd)	ROG (tpd)
70 ppb 8-hour Ozone	2026	0.48	0.20

Table 38 documents the emission reductions that occur after the attainment year due to implementation of the Measure if triggered.

Table 38. Ventura County Potential Reductions from Measure
(reductions calculated on summer planning inventory)

Standard	Attainment Year	NOx Benefits (tpd)	ROG Benefits (tpd)
70 ppb 8-hour Ozone	2026	0.013	0.005

Equity Impacts

Table 39 documents the potential impact of the Measure on DACs as identified in *CalEnviroScreen 4.0* in Ventura County. The proportion of vehicles that are registered in DACs and would be impacted if the Measure is triggered is proportional to the general population of all vehicles registered in DACs overall, about 3 percent. There is not expected to be a disproportionate impact on disadvantaged communities, should the measure be triggered.

Table 39. Ventura County Vehicle Populations
(vehicle populations calculated from EMFAC2021 Fleet Database)

All Vehicles		8 MYO Vehicles (MY 2013)	
Total Vehicle Population	661,147	MY13 Vehicle Population	29,970
Vehicle Population in DACs	22,466	MY13 Vehicle Population in DACs	899
Proportion DAC	3.40%	Proportion DAC	3.00%

Carl Moyer Impacts

Should the Measure be triggered in Ventura County, the potential funds lost by year is listed below in Table 40. Based on statewide cost effectiveness and historical allocations to each local air district, the loss in potential emission reduction benefits in Ventura County if the Measure is triggered is shown in Table 41.

Table 40. Ventura County 8 MYO Smog Abatement Fees

Standard	Attainment Year	Potential Dollars
70 ppb 8-hour Ozone	2026	$ 459,328

Table 41. Ventura County Carl Moyer Program Potential Foregone Emissions Reductions
(reductions calculated on annual planning inventory consistent with Moyer Program cost-effectiveness)

Standard	Attainment Year	NOx (tpd)
70 ppb 8-hour Ozone	2026	0.00008

I. West Mojave Desert

The Measure complements local air districts efforts to meet contingency measure requirements for the 75 ppb and 70 ppb 8-hour ozone standards. The required amount of emission reductions from contingency measures, or OYW of progress based on the draft guidance, is shown in Table 42.

Table 42. West Mojave Desert OYW of Progress
(reductions calculated on summer planning inventory)

Standard	Attainment Year	NOx (tpd)	ROG (tpd)
75 ppb 8-hour Ozone	2026	1.50	0.39
70 ppb 8-hour Ozone	2032	1.18	0.35

Table 43 documents the emission reductions that occur after the attainment year due to implementation of the Measure if triggered.

Table 43. West Mojave Desert Potential Reductions from Measure
(reductions calculated on summer planning inventory)

Standard	Attainment Year	NOx Benefits (tpd)	ROG Benefits (tpd)
75 ppb 8-hour Ozone	2026	0.021	0.009
70 ppb 8-hour Ozone	2032	0.018	0.006

Equity Impacts

Table 44 documents the potential impact of the Measure on DACs as identified in *CalEnviroScreen 4.0* in the West Mojave Desert. The proportion of vehicles that are registered in DACs and would be impacted if the Measure is triggered is proportional to the general population of all vehicles registered in DACs overall, about 8.5 percent. There is not expected to be a disproportionate impact on disadvantaged communities, should the measure be triggered.

Table 44. West Mojave Desert Vehicle Populations

(vehicle populations calculated from EMFAC2021 Fleet Database)

All Vehicles		8 MYO Vehicles (MY 2013)	
Total Vehicle Population	665,512	MY13 Vehicle Population	23,721
Vehicle Population in DACs	56,624	MY13 Vehicle Population in DACs	2,047
Proportion DAC	8.5%	Proportion DAC	8.6%

Carl Moyer Impacts

Should the measure be triggered in West Mojave Desert, the potential funds lost by year is listed below in Table 45. Based on statewide cost effectiveness and historical allocations to each local air district, the loss in potential emission reduction benefits in West Mojave Desert if the Measure is triggered is shown in Table 46.

Table 45. West Mojave Desert 8 MYO Smog Abatement Fees

Standard	Attainment Year	Potential Dollars
75 ppb 8-hour Ozone	2026	$ 746,890
70 ppb 8-hour Ozone	2032	$ 752,076

Table 46. West Mojave Desert Carl Moyer Program Potential Foregone Emissions Reductions

(reductions calculated on annual planning inventory consistent with Moyer Program cost-effectiveness)

Standard	Attainment Year	NOx (tpd)
75 ppb 8-hour Ozone	2026	0.00006
70 ppb 8-hour Ozone	2032	0.00006

J. Western Nevada County

The Measure complements local air district efforts to meet contingency measure requirements for the 70 ppb 8-hour ozone standard. The required amount of emission reductions from contingency measures, or OYW of progress based on the draft guidance, is shown in Table 47.

Table 47. Western Nevada County OYW of Progress

(reductions calculated on summer planning inventory)

Standard	Attainment Year	NOx (tpd)	ROG (tpd)
70 ppb 8-hour Ozone	2026	0.09	0.08

Table 48 documents the emission reductions that occur after the attainment year due to implementation of the Measure if triggered.

Table 48. Western Nevada County Potential Reductions from Measure
(reductions calculated on summer planning inventory)

Standard	Attainment Year	NOx Benefits (tpd)	ROG Benefits (tpd)
70 ppb 8-hour Ozone	2026	0.002	0.001

Equity Impacts

Per scores in *CalEnviroScreen 4.0*, there is only one vehicle registered in a DAC within the Western Nevada County nonattainment area. There is not expected to be a disproportionate impact on disadvantaged communities, should the measure be triggered.

Carl Moyer Impacts

Should the Measure be triggered in Western Nevada County, the potential funds lost by year is listed below in Table 49. Based on district allocations of Moyer Program funds per H&SC §44299.2, Northern Sierra Air Quality Management District, the local air district for Western Nevada County, receives $200,000 regardless of the funding available statewide. Thus, there will be no emissions disbenefit from a decrease in Moyer Funds in Western Nevada County if the measure is triggered, shown in Table 50.

Table 49. Western Nevada County 8 MYO Smog Abatement Fees

Standard	Attainment Year	Potential Dollars
70 ppb 8-hour Ozone	2026	$ 79,262

Table 50. Western Nevada County Carl Moyer Program Potential Foregone Emissions Reductions
(reductions calculated on annual planning inventory consistent with Moyer Program cost-effectiveness)

Standard	Attainment Year	NOx Benefits (tpd)
70 ppb 8-hour Ozone	2026	0.000

Section 6. Staff Recommendation

CARB staff recommends the Board:

1. Adopt the Measure addressing contingency measure requirements for the applicable nonattainment areas and standards as listed in Table 1;

2. Approve submittal into the California SIP of H&SC sections 44011(a)(4)(A) and (B); and

3. Direct the Executive Officer to submit the Measure, and H&SC sections 44011(a)(4)(A) and (B), to U.S. EPA as a revision to the California SIP.

Appendix A:
Infeasibility Analysis

Infeasibility Analysis

Measure Analysis

CARB staff analyzed CARB's suite of control measures for all sources under CARB authority to identify potential contingency measure options. CARB control measures reduce NOx, ROG and PM2.5 emissions. CARB currently has programs in place or under development for most of these sources and have evaluated a variety of regulatory mechanisms within existing and new programs for potential contingency triggers.

Criteria for Contingency Feasibility

CARB staff has evaluated potential options for a contingency measure within each of CARB's regulations (Table 51) using three criteria to determine its feasibility given the contingency measure requirements under the Act, recent court decisions and draft guidance. First, each measure was evaluated on whether it could be implemented within 30 days of being triggered and achieve the necessary reductions within 1-2 years of being triggered. Second, the technological feasibility of each option was considered to assess whether the measure would be technically feasible to implement. Measure requirements may be unavailable or cost prohibitive to implement, especially in the time frame required for contingency. Lastly, CARB staff evaluated whether the timeline for adoption would be compatible with the current consent decree deadline of September 30, 2024[21]. The contingency measure must be adopted by CARB and submitted to and fully approved by U.S. EPA by this date to resolve a San Joaquin Valley PM2.5 Federal Implementation Plan (FIP) published by U.S. EPA on August 7, 2023. A CARB statewide measure needing a full regulatory process typically requires five years for development and adoption by CARB and additional time for U.S. EPA's approval process including obtaining an Act waiver or authorization.

Challenges for CARB Measures

Based on CARB's feasibility analysis, there are a few common components of CARB regulations that limit the options for contingency measures. All new engine and emissions standards set by CARB require waivers or authorizations from federal preemption under the Clean Air Act; this process can take anywhere from months to several years, and then U.S. EPA must also act to approve the regulation into the California SIP. Further, CARB regulations that require fleet turnover or new engine standards require a long lead time for implementation. Engine manufacturers would need lead time to design, plan, certify, manufacture, and deploy cleaner engines to meet a new or accelerated engine standard, while fleet regulations necessitate that manufacturing is mature so that there is enough supply available to meet that demand. On the consumer side, additional time would be required for procurement implementation and there may be additional infrastructure

[21] See 87 Fed.Reg. 71631 (Nov. 23, 2022).

needed to meet new requirements. Thus, measures that require fleet turnover or new engine standards are not appropriate to be used as a triggered contingency measure.

CARB regulations are also technology-forcing, which makes it difficult to amend regulations or pull compliance timelines forward with only 1-2 years notice as industry needs time to plan, develop, and implement these new technologies. It would be infeasible to require industry to turn over their fleets within one year if the technology is not readily available at a reasonable cost. CARB regulations are also the most stringent air quality control requirements in the country, so there are few opportunities to require additional stringency. CARB is driving sources under our authority to zero-emission everywhere feasible to ensure attainment of air quality standards across the State, and to support near-source toxics reductions and climate targets. However, the zero-emissions targets also eliminates opportunities for contingency.

Lastly, many of CARB's options for a contingency measure would require a full rulemaking process and would not be adopted by CARB, received an Act waiver/authorization, and approved by U.S. EPA within the timeframe specified, making many of the options infeasible. Based on the U.S. EPA FIP timeline, CARB staff would need to find a measure that could realistically be adopted and approved by U.S. EPA within the next year. However, most CARB measures must go through a regulatory process for adoption that can take approximately five years from start to finish.

Table 51. Assessment of Potential CARB Contingency Measures

Emission Source	Regulatory Programs	Latest Amendment Requirements	Contingency Options	Trigger Feasibility	Technological Feasibility
Light-Duty Passenger Vehicles and Light-Duty Trucks	Advanced Clean Cars Program (I and II), including the Zero Emission Vehicle (ZEV) Regulation	Amended 8/25/22 Requires 100% ZEV new vehicle sales by 2035 and increasingly stringent standards for gasoline cars and passenger trucks.	Pulling compliance timelines forward. Setting more stringent standards.	No; standards need years of lead time to be developed, certified, and implemented; infeasible to implement new standard or manufacturing requirements within 60 days and achieve reductions within one year.	No; current standards and requirements are technology forcing and most stringent in the nation, including a zero-emission requirement. Further stringency would not be feasible.
	Clean Miles Standard	Adopted 5/20/21 Set eVMT (electric miles traveled) and greenhouse gas (GHG) requirements for Transportation Network Companies (TNCs).	Pulling forward timeline to achieve 100% eVMT.	No; standards and fleet requirements need lead time to be implemented; infeasible to implement new standard or purchasing requirements within 60 days and achieve reductions within one year.	No; zero-emissions technology requirement is most stringent standard; TNCs are only a small portion of on-road vehicles, depending on area, may not achieve many reductions.

Emission Source	Regulatory Programs	Latest Amendment Requirements	Contingency Options	Trigger Feasibility	Technological Feasibility
	On Board Diagnostics II (OBD)	Amended July 22, 2021 Required updates to program to address cold start emissions and diesel particulate matter (PM) monitoring. Many of the regulatory changes included phase-ins that are not 100% until 2027.	Removing or pulling phase-in timelines forward. Setting more stringent OBD requirements.	No; OBD requirements need significant lead time to be developed, adopted, and implemented; infeasible to fully implement new requirements within 60 days and achieve similar reductions within one year.	No; the OBD requirements require sufficient lead time to implement with significant development time needed for hardware/ software changes and verification/validation testing.
	California Smog Check Program	Amended 2010 via legislation Smog Check Program enhancements, including new technologies and test methods.	Change the exemptions from 8 to 7 and/or 6 model years. Require annual Smog Check. Require annual Smog Check for only high mileage vehicles.	Yes (changing the exemptions) because it is not a regulatory change; No (other options); Smog Check requirements need significant lead time to be developed, adopted, and implemented; infeasible to fully implement new requirements within 60 days and achieve similar reductions within one year.	Yes (changing the exemptions) and would not have disproportionate impacts; Yes (other options), but would disproportionately impact low-income populations and disadvantaged communities.
	Reformulated Gasoline	Amended May 2003 Required removal of methyl tert-butyl ether (MTBE) and included refinery limits and cap limits.	Require more stringent standards. Change cap limits and refinery limits.	No; fuel standards need years of lead time to be developed, certified, and implemented; infeasible to implement new standard within 60 days and achieve reductions within one year.	No; current standards and requirements are some of most stringent in the world; not feasible to require further stringency of specifications and develop or manufacture in a compressed timeline.
Motorcycles	On-Road Motorcycle Regulation*	Proposed hearing: 2023 May require exhaust emissions standards (harmonize with European standards), evaporative emissions standards, and Zero Emission Motorcycle sales thresholds.	Pulling compliance timelines forward. Require more stringent emissions standards.	No; standards need years of lead time to be developed, certified, and implemented; infeasible to implement new standard within 60 days and achieve reductions within one year.	No; Any increase to the stringency of proposed standards would require an additional 1 to 2 years of lead time for 1) CARB staff to evaluate feasibility, and 2) manufacturers to develop and certify compliant motorcycles.

Emission Source	Regulatory Programs	Latest Amendment Requirements	Contingency Options	Trigger Feasibility	Technological Feasibility
Medium Duty-Trucks	Clean Diesel Fuel	Amended 2013 Established more stringent standards for diesel fuel.	Require more stringent fuel standard.	No; fuel standards need years of lead time to be developed, certified, and implemented; infeasible to implement new standard within 60 days and achieve reductions within one year.	No; infeasible to require more stringent standards in compressed timeline.
	Heavy-Duty Engine and Vehicle Omnibus Regulation	Adopted 8/27/20 Established new low NOx and lower PM tailpipe standards and lengthened the useful life and emissions warranty of in-use heavy-duty diesel engines.	Require more stringent standard, make optional idling standard required. Update testing requirements or corrective action procedures.	No; standards need years of lead time to be implemented; infeasible to implement new sales requirement within 60 days and achieve reductions within one year.	No; infeasible to require more stringent standards in compressed timeline.
	Advanced Clean Trucks Regulation	Adopted 6/25/20 Established manufacturer zero-emission truck sales requirement and company and fleet reporting.	Move up timeline for ZEV sales requirement. Reduce threshold for compliance.	No; manufacturer sales requirements need years of lead time to be implemented; infeasible to implement new sales requirement within 60 days. Sales requirement would not happen immediately or within one year of trigger; infeasible to achieve reductions within one year.	No; current sales requirement is technology forcing and most stringent in the nation.
	Advanced Clean Cars Program (I and II), including the Zero Emission Vehicle Regulation	Amended 8/25/22 Requires 100% ZEV new vehicle sales by 2035 and increasingly stringent standards for gasoline cars and passenger trucks.	Pulling compliance timelines forward. Setting more stringent standards.	No; standards need years of lead time to be developed, certified, and implemented; infeasible to implement new standard or manufacturing requirements within 60 days and achieve reductions within one year.	No; current standards and requirements are technology forcing and most stringent in the nation, including a zero-emission requirement. Further stringency would not be feasible.

Emission Source	Regulatory Programs	Latest Amendment Requirements	Contingency Options	Trigger Feasibility	Technological Feasibility
	Advanced Clean Fleets Regulation	Adopted 4/27/23 Establishes zero-emission purchasing requirements for medium- and heavy-duty vehicle fleets (including state and local agencies, and drayage fleets, high priority, and federal fleets); would also require 100% zero-emission new vehicle sales starting 2040.	Pulling compliance timelines forward. Reduce threshold for compliance.	No; fleet requirements need years of lead time to be implemented; infeasible to implement new purchasing requirements within 60 days. Purchasing requirement and turnover would not happen immediately; infeasible to achieve reductions within one year. Because of near term compliance deadlines, moving forward deadlines would not result in many reductions.	No; current fleet requirements are technology forcing and most stringent in the nation, eventually requiring zero-emissions only.
Heavy-Duty Trucks	Heavy-Duty Low NOx Engine Standards	See Omnibus.	More stringent standards were set with Omnibus Regulation.	No; engine standards need years of lead time to be developed, certified, and implemented; infeasible to implement new standard or purchasing requirements within 60 days and achieve reductions within one year.	No; infeasible to require more stringent technology forcing standards in compressed timeline if technology/ alternatives are not widely available.
	Optional Low-NOx Standards for Heavy-Duty Diesel Engines	Amended 8/27/20 as a part of Omnibus to lower the optional low NOx emission standards for on-road heavy-duty engines.	Make option required.	No; engine standards need years of lead time to be developed, certified, and implemented; infeasible to implement new standard or purchasing requirements within 60 days and achieve reductions within one year.	No; infeasible to require more stringent technology forcing standards in compressed timeline if technology/ alternatives are not widely available.
	Heavy-Duty Inspection and Maintenance Regulation	Adopted 12/9/21 Requires periodic vehicle emissions testing and reporting on nearly all heavy-duty vehicles operating in California.	Increase frequency of testing.	No; increased I/M requirements need significant lead time to be developed, adopted, and implemented; infeasible to fully implement new requirements within 60 days and achieve similar reductions within one year.	Yes, but costs would disproportionally impact small businesses and low-income populations.

Emission Source	Regulatory Programs	Latest Amendment Requirements	Contingency Options	Trigger Feasibility	Technological Feasibility
	Heavy-Duty OBD	Amended July 22, 2021 Required updates to program to address cold start emissions and diesel PM monitoring. Many of the regulatory changes included phase-ins that are not 100% until 2027.	Removing or pulling phase-in timelines forward. Setting more stringent OBD requirements.	No; OBD requirements need significant lead time to be developed, adopted, and implemented; infeasible to fully implement new requirements within 60 days and achieve similar reductions within one year.	No; the OBD requirements require sufficient lead time to implement with significant development time needed for hardware/ software changes and verification/validation testing.
	Heavy-Duty Engine and Vehicle Omnibus Regulation	Adopted 8/27/20 Established new low NOx and lower PM Standards and lengthened the useful life and emissions warranty of in-use heavy-duty diesel engines.	Require more stringent standard, make optional idling standard required. Update testing requirements or corrective action procedures.	No; standards need years of lead time to be developed, certified, and implemented; infeasible to implement new standard or sales requirements within 60 days and achieve reductions within one year.	No; infeasible to require more stringent technology forcing standards in compressed timeline.
	Cleaner In-Use Heavy-Duty Trucks (Truck and Bus Regulation)	Adopted 12/17/10 Requires heavy-duty diesel vehicles that operate in California to reduce exhaust emissions. By January 1, 2023, nearly all trucks and buses will be required to have 2010 or newer model year engines to reduce PM and NOx.	None	-	-
	Zero-Emission Powertrain Certification Regulation	Adopted 12/6/19 Establishes certification requirements for zero-emission powertrains.	None	-	-

Emission Source	Regulatory Programs	Latest Amendment Requirements	Contingency Options	Trigger Feasibility	Technological Feasibility
	Advanced Clean Trucks Regulation	Adopted 6/25/20 Established manufacturer zero-emission truck sales requirement and company and fleet reporting.	Move up timeline for ZEV sales requirement. Reduce threshold for compliance.	No; manufacturer sales requirements need years of lead time to be implemented; infeasible to implement new sales requirement within 60 days. Sales requirement would not happen immediately or within one year of trigger; infeasible to achieve reductions within one year.	No; current sales requirement is technology forcing and most stringent in the nation.
	Advanced Clean Fleets Regulation	Adopted 4/27/23 Establishes zero-emission purchasing requirements for medium- and heavy-duty vehicle fleets (including state and local agencies, and drayage fleets, high priority, and federal fleets); would also require 100% zero-emission new vehicle sales starting 2040.	Pulling compliance timelines forward. Reduce threshold for compliance.	No; fleet requirements need years of lead time to be implemented; infeasible to implement new purchasing requirements within 60 days. Purchasing requirement and turnover would not happen immediately; infeasible to achieve reductions within one year. Because of near term compliance deadlines, moving forward deadlines would not result in many reductions.	No; current fleet requirements are technology forcing and most stringent in the nation, eventually requiring zero-emissions only.
Heavy-Duty Urban Buses	Innovative Clean Transit	Adopted 12/14/2018 Requires all public transit agencies to gradually transition to a 100% zero-emission bus fleet.	Move compliance timelines forward. Remove various exemptions or compliance options.	No; fleet requirements need years of lead time to be implemented; infeasible to implement new purchasing requirements within 60 days. Purchasing requirement and turnover would not happen immediately; infeasible to achieve reductions within one year.	No; current requirements are technology forcing and most stringent (zero-emission requirement). Further stringency is not possible; expediting timelines would not be feasible.

Emission Source	Regulatory Programs	Latest Amendment Requirements	Contingency Options	Trigger Feasibility	Technological Feasibility
	Advanced Clean Fleets Regulation	Adopted 4/27/23 Establishes zero-emission purchasing requirements for medium- and heavy-duty vehicle fleets (including state and local agencies, and drayage fleets, high priority, and federal fleets); would also require 100% zero-emission new vehicle sales starting 2040.	Pulling compliance timelines forward. Reduce threshold for compliance.	No; fleet requirements need years of lead time to be implemented; infeasible to implement new purchasing requirements within 60 days. Purchasing requirement and turnover would not happen immediately; infeasible to achieve reductions within one year. Because of near term compliance deadlines, moving forward deadlines would not result in many reductions.	No; current fleet requirements are technology forcing and most stringent in the nation, eventually requiring zero-emissions only.
Other Buses, Other Buses – Motor Coach	Zero-Emission Airport Shuttle Regulation	Adopted 6/27/19 Requires airport shuttles to transition to zero-emission fleet.	Pull compliance timelines forward. Remove reserve airport shuttle exemption.	No; fleet requirements need years of lead time to be implemented; infeasible to implement new purchasing requirements within 60 days. Purchasing requirement and turnover would not happen immediately; infeasible to achieve reductions within one year.	No; current requirements are technology forcing and most stringent (zero-emission requirement). Further stringency is not possible. Not many shuttles in area, would not achieve many reductions.
	Advanced Clean Fleets Regulation	Adopted 4/27/23 Establishes zero-emission purchasing requirements for medium- and heavy-duty vehicle fleets (including state and local agencies, and drayage fleets, high priority, and federal fleets); would also require 100% zero-emission new vehicle sales starting 2040.	Pulling compliance timelines forward. Reduce threshold for compliance.	No; fleet requirements need years of lead time to be implemented; infeasible to implement new purchasing requirements within 60 days. Purchasing requirement and turnover would not happen immediately; infeasible to achieve reductions within one year. Because of near term compliance deadlines, moving forward deadlines would not result in many reductions.	No; current fleet requirements are technology forcing and most stringent in the nation, eventually requiring zero-emissions only.

Emission Source	Regulatory Programs	Latest Amendment Requirements	Contingency Options	Trigger Feasibility	Technological Feasibility
Commercial Harbor Craft	Commercial Harbor Craft (CHC) Regulation	Amended 3/24/22 Established more stringent standards, all CHC required to use renewable diesel, expanded requirements, and mandates zero-emission and advanced technologies.	Set more stringent standards. Pull compliance timelines forward.	No; Technology requirements and standards need years of lead time to be developed, certified, and implemented; infeasible to implement new standard or requirements within 60 days and achieve reductions within one year.	No; standards set are technology forcing and most stringent; not technologically feasible to require increased stringency in compressed timeline.
Recreational Boats	Spark-Ignition Marine Engine Standards*	Proposed hearing: 2029 Would establish catalyst-based emission standards and percentage of zero-emission technologies for certain applications.	Set more stringent standard.	No; standards need years of lead time to be developed, certified, and implemented; infeasible to implement new standard within 60 days and achieve reductions within one year.	No; standards being set will be most stringent feasible, including zero-emission requirement); would not save a more stringent standard for contingency
Transport Refrigeration Units	Airborne Toxic Control Measure for In-Use Diesel-Fueled Transport Refrigeration Units (TRUs) (Parts I and II*)	Amended 2/24/22 (Part I), Part II proposed CARB hearing in 2025 Requires diesel-powered truck TRUs to transition to zero-emission, PM emission standard for newly manufactured non-truck TRUs. Part II would establish zero-emission options for non-truck TRUs.	Set more stringent standards. Pull compliance timelines forward	No; standards and fleet requirements need years of lead time to be implemented; infeasible to implement new standard or purchasing requirements within 60 days and achieve reductions within one year.	No; current requirements are technology forcing and most stringent (zero-emission requirement). Further stringency is not possible; expediting timelines would not be feasible; would not save a more stringent standard for contingency
Industrial Equipment	Large Spark-Ignition (LSI) Engine Fleet Requirements Regulation	Amended July 2016 Extended recordkeeping requirements, established labeling, initial reporting, and annual reporting requirements.	Set more stringent performance standards	No; standards and fleet requirements need years of lead time to be implemented; infeasible to implement new standard or purchasing requirements within 60 days and achieve reductions within one year.	No; Infeasible to require further stringency within one year given timeline for technology development and certification. See Zero-Emission Forklifts below.

Emission Source	Regulatory Programs	Latest Amendment Requirements	Contingency Options	Trigger Feasibility	Technological Feasibility
	Off-Road Regulation	Amended 11/17/22 Requires phase out of oldest and highest-emitting engines, restricts addition of Tier 3 and 4i engines, mandates renewable diesel for all fleets.	Pull phase-out or compliance timelines forward	No; fleet requirements need years of lead time to be implemented; infeasible to implement new purchasing and turnover requirements within 60 days and achieve reductions within one year.	No; Infeasible to require further stringency within one year given timeline for technology development and certification.
	Zero-Emission Forklifts*	Proposed CARB hearing in 2023. Would require model-year phase-out and reporting requirements and manufacturer sales restrictions.	Pull phase-out or compliance timelines forward	No; standards requirements need years of lead time to be developed, certified, and implemented; infeasible to implement new standard within 60 days and achieve reductions within one year.	No; standards being set will be technology forcing and most stringent feasible, including zero-emission requirement; would not save a more stringent standard for contingency
	Off-Road Zero-Emission Targeted Manufacturer Rule*	Proposed CARB hearing in 2027. Would require manufacturers of off-road equipment and/or engines to produce for sale zero-emission equipment and/or powertrains as a percentage of their annual statewide sales volume.	Pull forward compliance timelines or increase percentage sales requirements	No; Manufacturing and sales requirements need years of lead time to be implemented; infeasible to pull forward standards within 60 days and achieve reductions within one year.	No; standards being set will be technology forcing and most stringent feasible, including zero-emission requirement; would not save a more stringent standard for contingency
Construction and Mining	Off-Road Zero-Emission Targeted Manufacturer Rule*	Proposed CARB hearing in 2027. Would require manufacturers of off-road equipment and/or engines to produce for sale zero-emission equipment and/or powertrains as a percentage of their annual statewide sales volume.	Pull forward compliance timelines or increase percentage sales requirements	No; Manufacturing and sales requirements need years of lead time to be implemented; infeasible to pull forward standards within 60 days and achieve reductions within one year.	No; standards being set will be technology forcing and most stringent feasible, including zero-emission requirement; would not save a more stringent standard for contingency

Emission Source	Regulatory Programs	Latest Amendment Requirements	Contingency Options	Trigger Feasibility	Technological Feasibility
	Off-Road Regulation	Amended 11/17/22 Requires phase out of oldest and highest-emitting engines, restricts addition of Tier 3 and 4i engines, mandates renewable diesel for all fleets.	Pull phase-out or compliance timelines forward	No; fleet requirements need years of lead time to be implemented; infeasible to implement new purchasing and turnover requirements within 60 days and achieve reductions within one year.	No; Infeasible to require further stringency within one year given timeline for technology development and certification.
Airport Ground Support Equipment	Zero-Emission Forklifts*	Proposed CARB hearing in 2023. Would require model-year phase-out and reporting requirements and manufacturer sales restrictions.	Pull phase-out or compliance timelines forward	No; standards requirements need years of lead time to be developed, certified, and implemented; infeasible to implement new standard within 60 days and achieve reductions within one year.	No; standards being set will be technology forcing and most stringent feasible, including zero-emission requirement; would not save a more stringent standard for contingency
	Large Spark-Ignition (LSI) Engine Fleet Requirements Regulation	Amended July 2016 Extended recordkeeping requirements, established labeling, initial reporting, and annual reporting requirements.	Set more stringent performance standards	No; standards and fleet requirements need years of lead time to be implemented; infeasible to implement new standard or purchasing requirements within 60 days and achieve reductions within one year.	No; Infeasible to require further stringency within one year given timeline for technology development and certification.
	Off-Road Regulation	Amended 11/17/22. Requires phase out of oldest and highest-emitting engines, restricts addition of Tier 3 and 4i engines, mandates renewable diesel for all fleets.	Pull phase-out or compliance timelines forward	No; fleet requirements need years of lead time to be implemented; infeasible to implement new purchasing and turnover requirements within 60 days and achieve reductions within one year.	No; Infeasible to require further stringency within one year given timeline for technology development and certification.

Emission Source	Regulatory Programs	Latest Amendment Requirements	Contingency Options	Trigger Feasibility	Technological Feasibility
Port Operations and Rail Operations	Cargo Handling Equipment Regulation*	Proposed CARB hearing in 2025. Amendments to transition to zero-emission technology.	None	No; Standards requirements need years of lead time to be developed, certified, and implemented; infeasible to implement new standard within 60 days and achieve reductions within one year. Fully implemented in 2017 and relies on other engine standards, making it infeasible to trigger without regulatory process changing other standards.	No; Considering regulation to move towards zero-emissions. Currently assessing availability of technologies.
	Off-Road Zero-Emission Targeted Manufacturer Rule*	Proposed CARB hearing in 2027. Would require manufacturers of off-road equipment and/or engines to produce for sale zero-emission equipment and/or powertrains as a percentage of their annual statewide sales volume.	Pull forward compliance timelines or increase percentage sales requirements	No; Manufacturing and sales requirements need years of lead time to be implemented; infeasible to pull forward standards within 60 days and achieve reductions within one year.	No; standards being set will be technology forcing and most stringent feasible, including zero-emission requirement; would not save a more stringent standard for contingency
Lawn and Garden	Small Off-Road Engine (SORE) Regulation	Amended 12/9/21 Requires most newly manufactured SORE to meet emission standards of zero starting in model year (MY) 2024.	Move up implementation deadlines	No; Standards requirements need years of lead time to be implemented; infeasible to pull forward standards within 60 days. Purchasing would not happen immediately or within one year of trigger; infeasible to achieve reductions within one year.	No; current standards and requirements are a technology forcing zero-emission certification requirement. Further stringency would not be possible.

Emission Source	Regulatory Programs	Latest Amendment Requirements	Contingency Options	Trigger Feasibility	Technological Feasibility
Ocean-Going Vessels	At Berth Regulation	Amended 8/27/20 Expands requirements to roll-on roll-off vessels and tankers, smaller fleets, and new ports and terminals.	Remove option to use alternate control technology or set more stringent alternate control technology requirements. Reduce threshold for 'low activity terminals' exemption.	No; control technology requirements need years of lead time to be implemented; infeasible to pull forward standards within 60 days and achieve reductions within one year.	No; regulation already requires use of shore power or alternate control technology for every visit.
	Ocean-going Vessel Fuel Regulation	Amended 2011 Extended clean fuel zone and included exemption window.	Set more stringent requirements	No; fleet requirements need years of lead time to be implemented; infeasible to implement new purchasing and turnover requirements within 60 days and achieve reductions within one year.	No; not feasible to require further stringency in a compressed timeline.
Locomotives	In-Use Locomotive Regulation	Adopted 4/27/23, Requires each operator to deposit funds into spending account for purchasing cleaner locomotive technology, sets idling limits, and requires registration and reporting. Starting in 2030, only locomotives less than 23 years old can operate in the state. Newly built passenger, switch, and industrial locomotives must operate in a zero emission configuration, and in 2035 newly built freight line haul locomotives.	Move up implementation deadlines. Set stricter idling requirements.	No; Fleet requirements need years of lead time to be implemented; infeasible to pull forward standards within 60 days and reductions within one year. No, for idling requirements.	No; current standards and requirements are technology forcing, include a zero-emission requirement. Further stringency would not be possible. No, for idling requirements, CARB is committing to re-evaluate the requirement during next assessment.

Emission Source	Regulatory Programs	Latest Amendment Requirements	Contingency Options	Trigger Feasibility	Technological Feasibility
Areawide Sources	Zero-Emission Standard for Space and Water Heaters	Proposed CARB hearing in 2025. Beginning in 2030, 100% of sales of new space heaters and water heaters would need to meet a zero-emission standard.	Set trigger for more stringent standards or timelines.	No; Standards requirements need years of lead time to be implemented; infeasible to pull forward standards within 60 days. Purchasing would not happen immediately or within one year of trigger; infeasible to achieve reductions within one year.	No; current standards and requirements are a technology forcing zero-emission certification requirement. Further stringency would not be possible.

There were few options identified for a contingency measure based on the infeasibility analysis. As previously stated, there are limitations to utilizing CARB regulations for contingency measures and CARB currently has programs in place or under development for most of these sources to reduce NOx, ROG and PM2.5 emissions. However, the analysis did result in identifying the ability to utilize provisions within the Smog Check Program for a viable contingency measure, which is now being proposed.

Appendix B:
Smog Check Contingency Measure Emissions Benefits Methodology

Smog Check Contingency Measure Emissions Benefits

Table 52. List of Non-Attainment Areas and Attainment Years

Standard	Area	Attainment Year
80 ppb 8-hour Ozone	San Joaquin	2023
75 ppb 8-hour Ozone	Sac Metro	2024
	Eastern Kern	2026
	West Mojave	2026
	San Diego	2026
	South Coast	2029
	Coachella Valley	2031
	SJV	2031
70 ppb 8-hour Ozone	Ventura	2026
	Western Nevada	2026
	Mariposa	2026
	Eastern Kern	2032
	Sacramento Metro	2032
	San Diego	2032
	West Mojave	2032
	South Coast	2035
	Coachella	2037
	SJV	2037
15 ug PM2.5	San Joaquin	2023
35 ug PM2.5	San Joaquin	2024
12 ug PM2.5	San Joaquin	2030
	South Coast	2030

Review Of Current Information

The EMission FACtor (EMFAC) model is California's official emissions inventory model for on-road mobile sources. EMFAC2021 is the latest U.S. Environmental Protection Agency (U.S. EPA) approved version for use in California for State Implementation Plan (SIP) development and transportation conformity analysis[22], and reflects the most recent emission and activity updates and newly adopted regulations at the time of its release. At the present time, almost the entire California vehicle fleet is subjected to the Smog Check Program and hence, in-use testing programs that inform emission rates in EMFAC2021 implicitly incorporate the emissions benefits of California's Smog Check Program in the model output. In addition, EMFAC2021 does not have functionality to output emissions from the light-duty

[22] *https://www.govinfo.gov/content/pkg/FR-2022-11-15/pdf/2022-24790.pdf*

fleet without the effects of Smog Check Program. However, an earlier version of the model, EMFAC2011, used a different modeling framework that allows users to estimate emissions impacts of the Smog Check based on user-defined program requirements specific to each NAA.[23]

Unlike the latest version of the model, EMFAC2011 baseline outputs reflect emissions from a fleet without an I/M Program. Because California's Smog Check Program began in 1984, emissions data without an I/M program in EMFAC2011 were derived from U.S. EPA data collected on approximately 7,000 vehicles in Hammond, Illinois and Ann Arbor, Michigan in the 1990s before an I/M program was in effect.[24] CARB staff used these data for several versions of the model, up through EMFAC2011, to inform emission rates by vehicle technology group for a theoretical California fleet without an I/M program. Using data from CARB's longstanding Light-Duty Vehicle Surveillance Program (VSP), where vehicles failing the California Smog Check Program were tested before and after repairs, CARB staff adjusted baseline emission rates to reflect the benefits of having an I/M program based on requirements for each region in the State.

Approach

Since the Measure would change the current 8 model-year exemption to 7 model-years, CARB staff applied emission benefits of the change to the calendar year when vehicles would become 8 model-years old. Using this approach, all vehicles, regardless of when annual registration is due and the initial I/M Program inspections were performed during the year the vehicles turned 7 model-years old, will reflect the impacts of being initially subject to the I/M Program requirements for a full calendar year.

CARB staff used EMFAC2011 to derive the emissions impact of an I/M Program for each pollutant and vintage of vehicle newly becoming 8 model-years old in the attainment years listed in Table 52. The emissions impact is reflected as a ratio of emissions with no I/M Program relative to a baseline with an I/M program. As a fraction, this would be: (no-I/M) / (I/M), where ratios greater than one reflect the degree of emissions benefits of having an I/M program in place. CARB staff applied the ratios calculated using EMFAC2011 to the output from EMFAC2021[25] because the newest model represents the current California fleetwide emissions reflecting the current model year distribution, populations, accrual rates (miles driven per year), and emissions rates. The details of EMFAC2011 setup and run are provided in in the next section.

CARB staff applied the following equation:

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[23] *https://www.federalregister.gov/documents/2013/03/06/2013-05245/official-release-of-emfac2011-motor-vehicle-emission-factor-model-for-use-in-the-state-of-california*

[24] *https://ww2.arb.ca.gov/sites/default/files/2023-03/emfac2000-ef.pdf*

[25] Downloaded from EMFAC2021 web database: *https://arb.ca.gov/emfac/emissions-inventory*

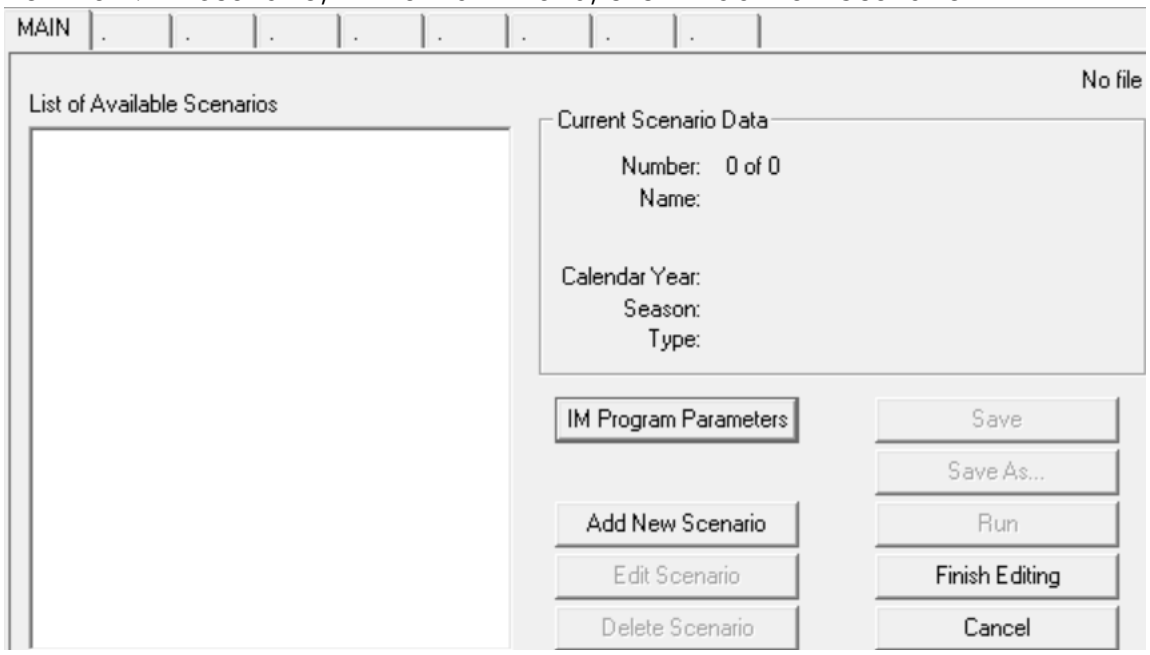
Benefits of removing 8-year exemption = Age 8 No-I/M emissions – Age 8 I/M emissions = (EMFAC2021 Age 8 Gasoline Vehicle Emissions[26] × EMFAC2011 Age 8 No-IM/IM Ratio[27]) – EMFAC2021 Age 8 Gasoline Vehicle Emissions[26]

For ozone nonattainment areas, the estimated benefits include NOx and ROG in tons per day for summer season. For $PM_{2.5}$ nonattainment areas, because EMFAC2011 does not reflect benefits from tailpipe PM emissions from the Smog Check Program, the annual NOx and ROG emission benefits are included instead, as these are precursors to secondary $PM_{2.5}$ formation in the atmosphere.

It should be noted that, some of CARB's recent regulations, including Advanced Clean Cars II (ACC II) and Advanced Clean Fleets (ACF) were finalized and adopted after release of EMFAC2021. Therefore, the emission benefits estimated for this Measure using EMFAC2021 do not reflect the impacts from these regulations.

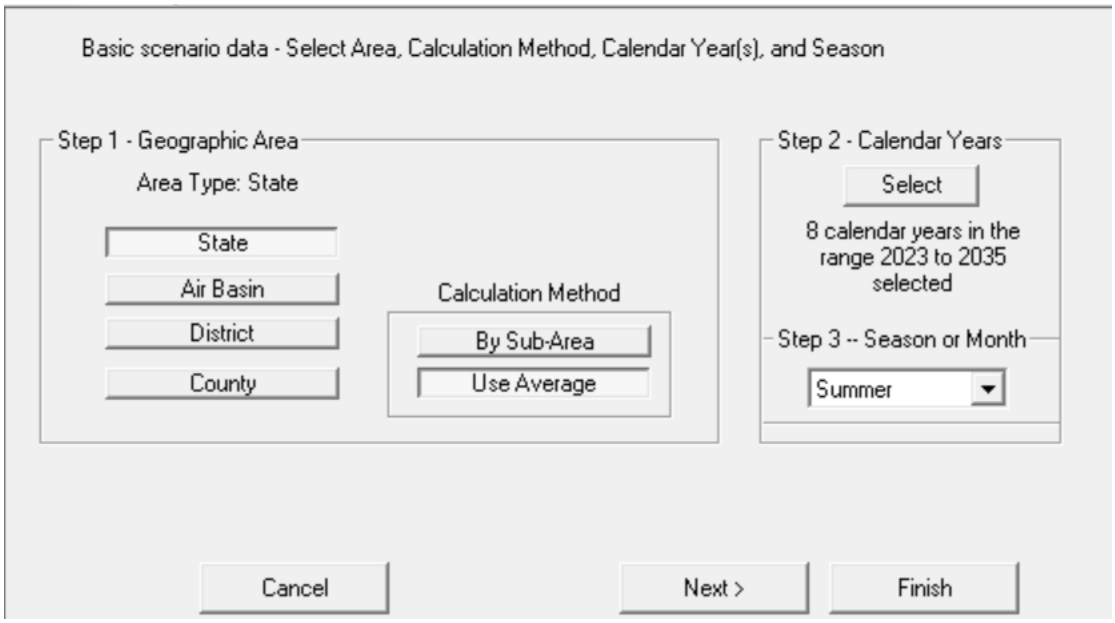
Instructions For Configuring and Running EMFAC2011

1. For the "I/M" scenario, in the main menu, click "Add New Scenario".

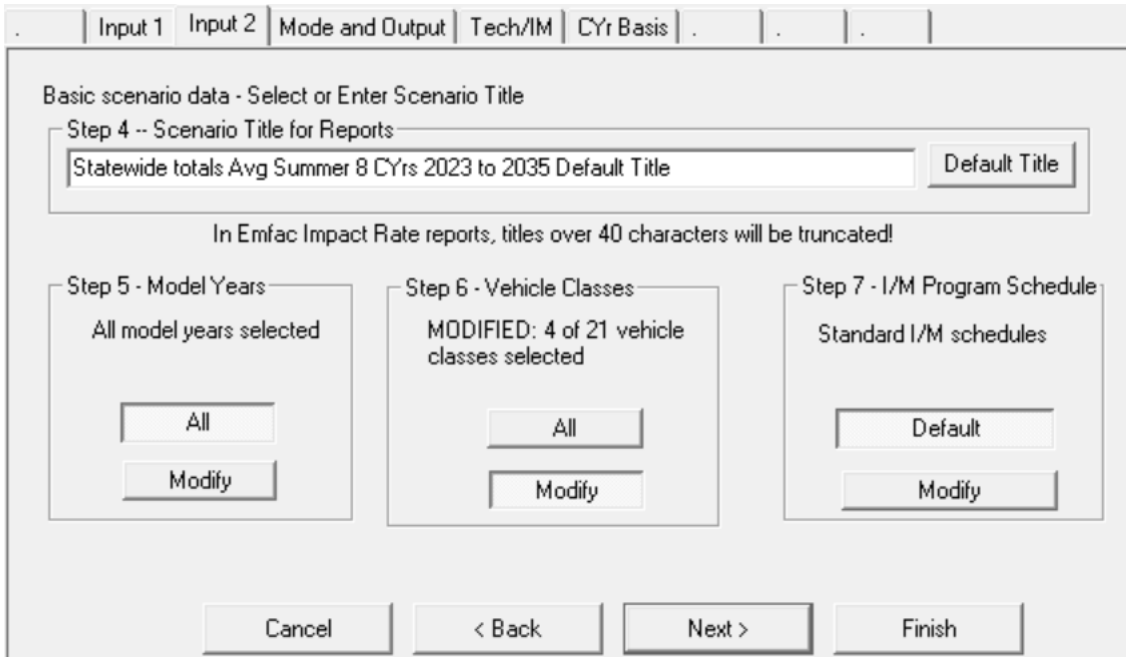


2. Select "State", "Use Average" in "Step 1 – Geographic Area", select modeled calendar year(s) in "Step 2 – Calendar Years", Select "Summer" for ozone NAAs or "Annual" for PM NAAs in "Step 3 - Season or Month", then click "Next".

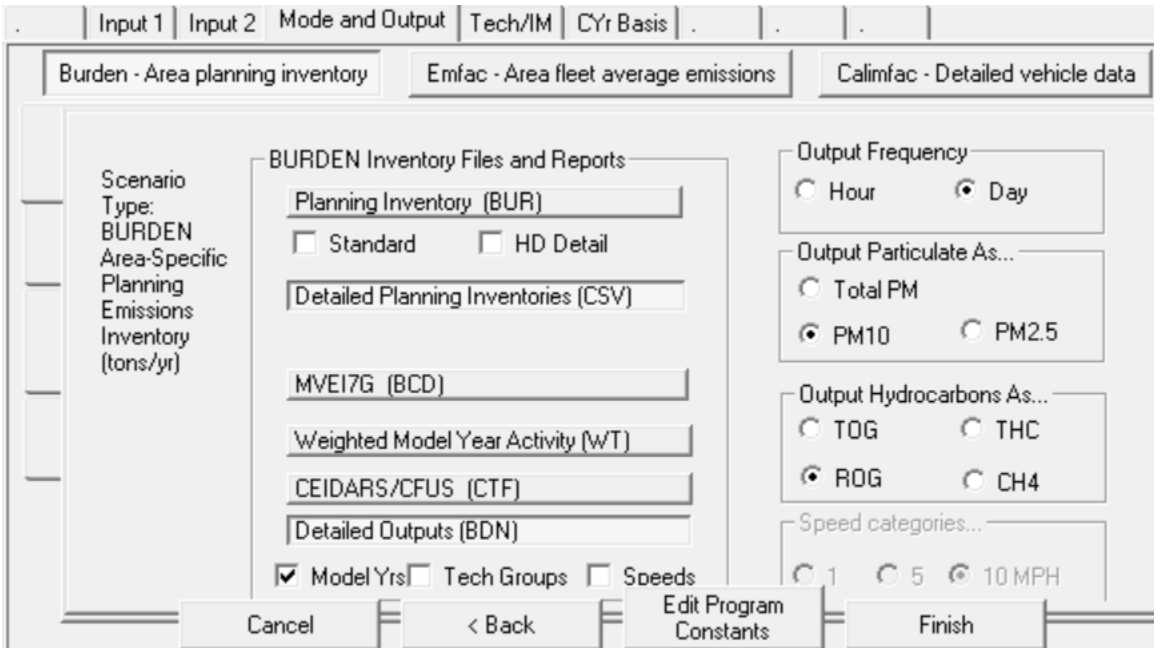
[26] Include all gasoline vehicle classes subject to California Smog Check Program
[27] Derived based on light-duty vehicle classes under 8,500 lbs. in EMFAC2011



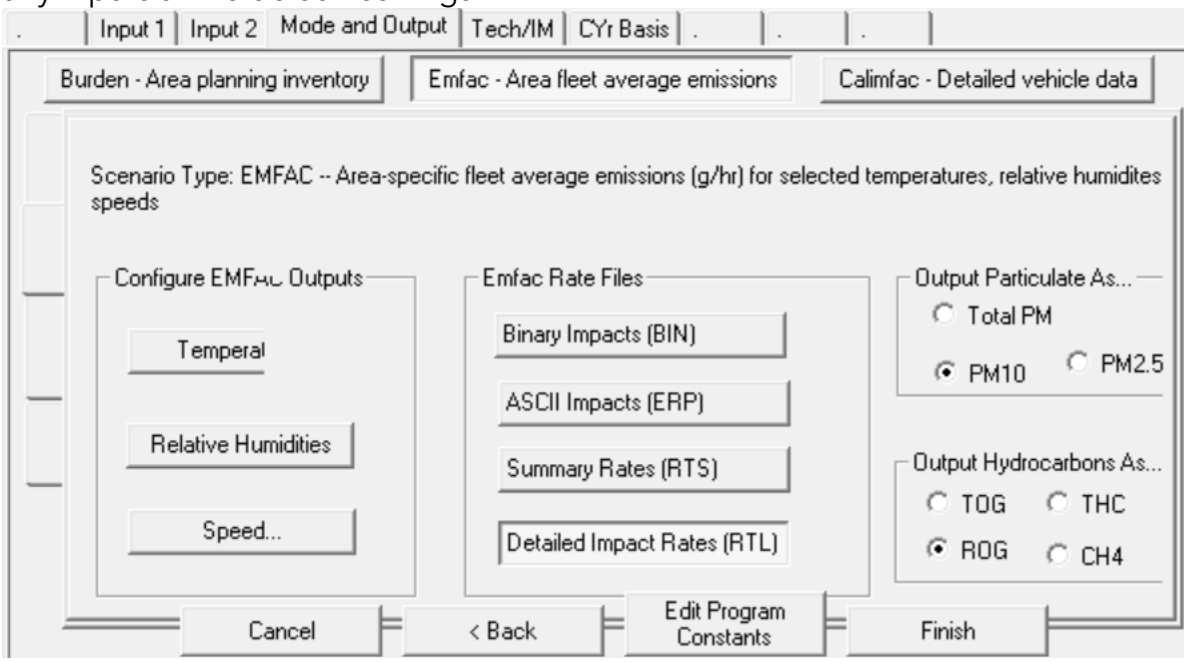
3. Click "Default Title" in "Step 4 – Scenario Title for Reports", select "All" in "Step 5 – Model Years", select "Modify" in "Step 6 – Vehicle Classes" and choose "PC/T1/T2/T3" from the pop-up window, select "Default" in "Step 7 – I/M Program schedule", then click "Next".



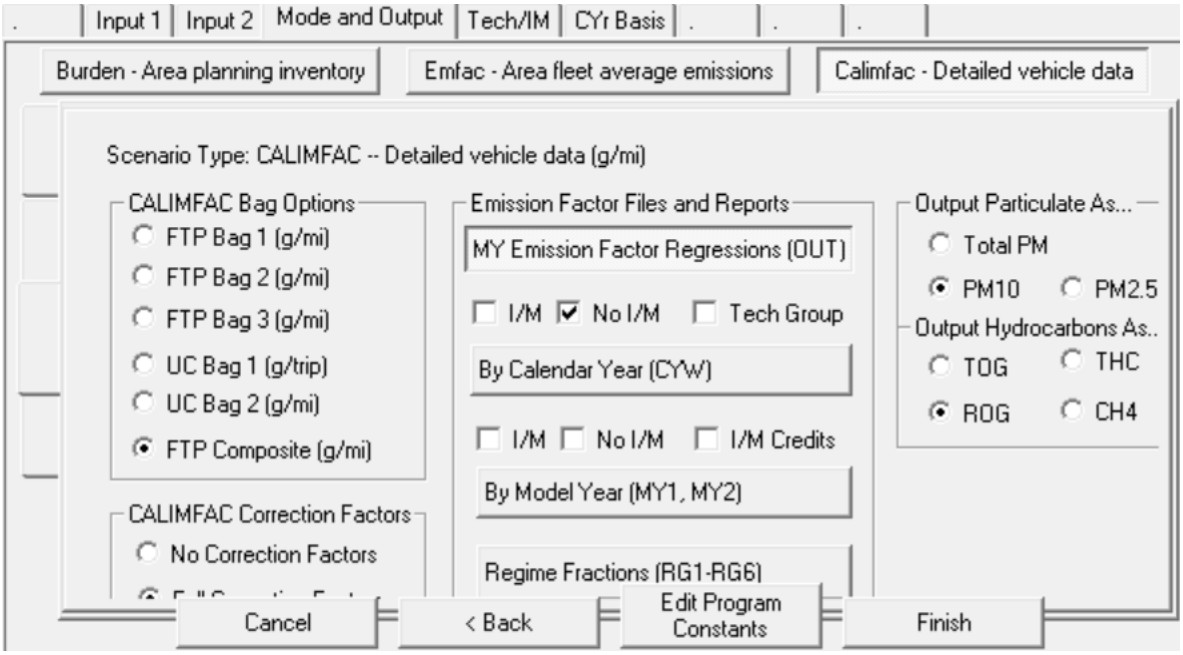
4. In the tab "Burden – Area planning inventory", choose "Detailed Planning Inventories (CSV)" and click "Model Yrs". Select "Output Frequency" as "Day".



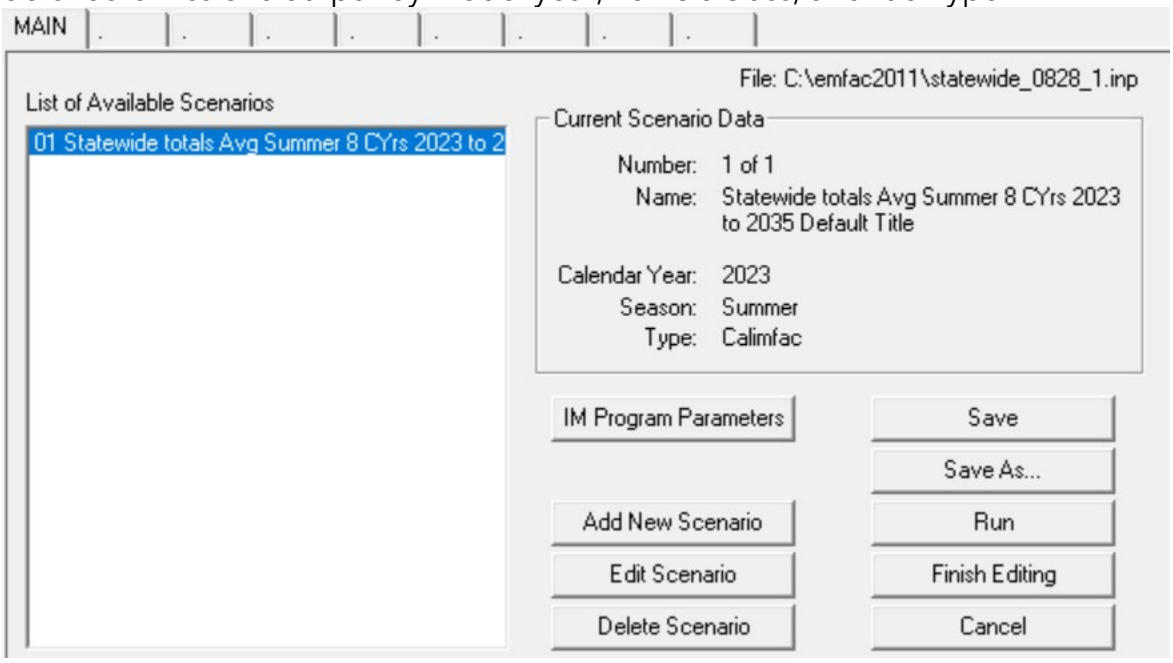
5. No need to change any inputs in tab "Emfac – Area fleet average emissions". Leave any inputs at the default settings.



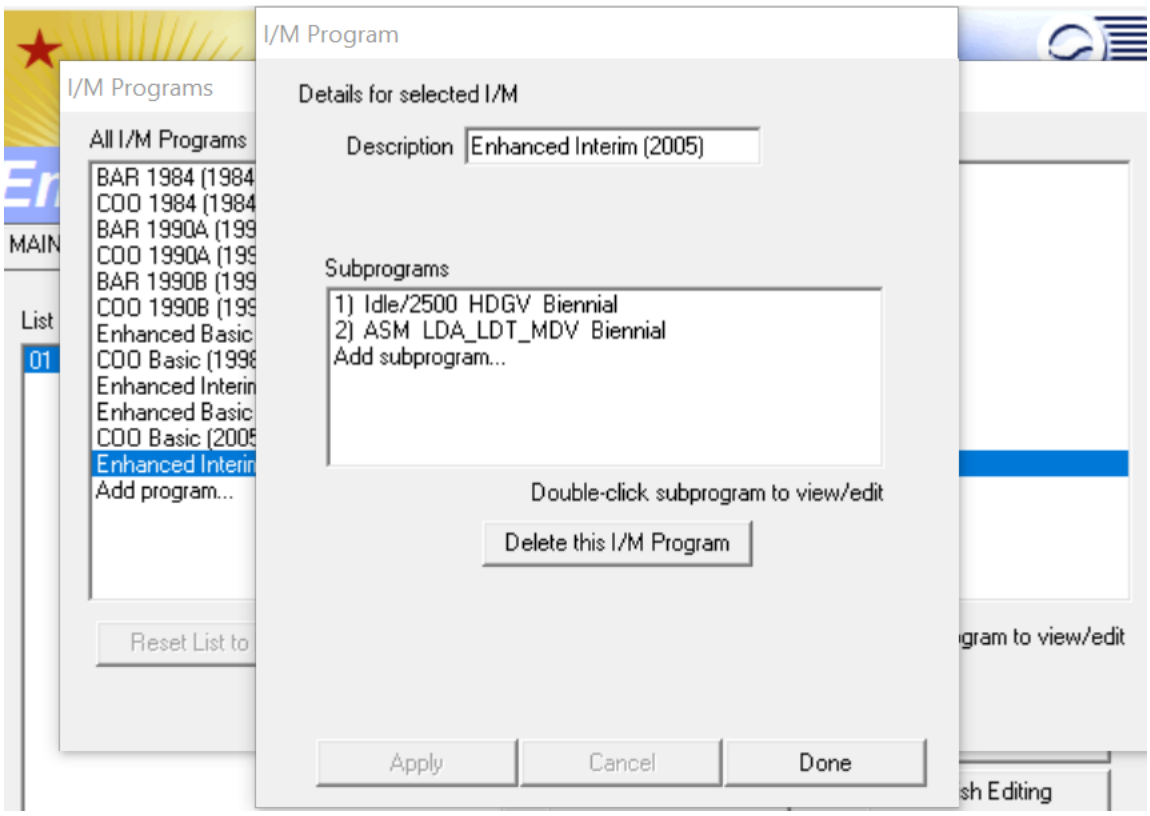
6. No need to change any inputs in tab "Calimfac – Detailed vehicle data". Leave any inputs at the default settings. Click "Finish" to go back to the main menu.



7. In the "MAIN" menu, save the current input by clicking "Save", then click "Run" to start the model run. Only the .bdn output file is needed for data analysis, which shows the detailed emissions output by model year, vehicle class, and fuel type.



8. For "No-I/M" scenario, repeat Steps 1 to 6, except that in the main menu, click "IM Program Parameters", double click each program and delete, and click "Done" to go back to the main menu. Then proceed to Step 7 to start the model run.


I/M Program
I/M Programs
Details for selected I/M
All I/M Programs
Description
Enhanced Interim (2005)
BAR 1984 (1984
COO 1984 (1984
BAR 1990A (199
COO 1990A (199
BAR 1990B (199
COO 1990B (199
Enhanced Basic
COO Basic (1998
Enhanced Interim
Enhanced Basic
COO Basic (2005
Enhanced Interim
Add program...
Subprograms
1) Idle/2500 HDGV Biennial
2) ASM LDA_LDT_MDV Biennial
Add subprogram...
Double-click subprogram to view/edit
Delete this I/M Program
Reset List to
Apply
Cancel
Done
MAIN
List
01
gram to view/edit
sh Editing

Appendix C:
Carl Moyer Program Emissions Impacts Analysis Methodology

Moyer Program Emissions Reductions Estimates Methodology

CARB staff conducted analysis to determine the potential disbenefit of the Measure resulting from a potential loss in funding for the Moyer Program. If the Measure is triggered, the Moyer Program would receive less funding from fewer smog abatement fees being collected, as discussed in section 4C of this document. The calculation of the potential emissions disbenefit from losing Moyer Program funding consisted of two main components:

1. Vehicle Population
2. Moyer Program Statewide NOx Cost Effectiveness

The vehicle populations were estimated using EMFAC2021 and calculated as described in Appendix B. The statewide cost effectiveness was estimated as described in Appendix H of the Fiscal Year 2022-23 Funding Plan for Clean Transportation Incentives.[28]

The methodology for calculating the potential emissions reductions loss is as follows:

First, CARB staff calculated the potential loss in funding by multiplying the smog abatement fee directed towards the Moyer Program of $21 by the estimated vehicle population affected in each area for their respective attainment year. This results in the statewide total potential loss in funding if triggered in the respective area. An example calculation from a theoretical area missing attainment in 2023 is shown below.

$$Total\ potential\ loss\ in\ funding\ resulting\ from\ an\ area\ missing\ attainment\ in\ 2023 = Portion\ of\ smog\ abatement\ fee\ to\ Moyer * 8MYO\ vehicle\ population\ in\ nonattainment\ area\ in\ 2023$$

Next, to find the area-specific foregone funding and related emission reductions, CARB staff used three years of historical Moyer Program funding allocations to local air districts to calculate the average proportion of funding typically awarded to each district. This district allocation calculation is done for each nonattainment area's corresponding local air district. An example calculation for a single local air district (District X) is shown below.

$$District\ Allocation\ (\%) = \frac{Historical\ Average\ allocation\ to\ District\ X\ (\$)}{Total\ Carl\ Moyer\ Program\ Funding\ (\$)}$$

The local air district allocation percentage for each area is then applied to the calculated loss in funding. This results in the potential loss in funding for each specific local air district.

[28] https://ww2.arb.ca.gov/sites/default/files/2022-10/proposed_fy2022_23_funding_plan_final.pdf

$$Loss\ in\ funding\ for\ District\ X\ (\$) = District\ Allocation\ (\%) * Total\ potential\ loss\ in\ funding$$

Divide the total loss in funding calculated for each area by the statewide NOx cost effectiveness and convert to tons per day. Each project is assumed to have a 10-year project life.

$$Loss\ in\ reductions\ (tpd) = \frac{Loss\ in\ funding\ for\ District\ X\ (\$)}{statewide\ NOx\ cost\ effectiveness/10/365\ \left(\frac{\$}{ton}\right)}$$

The result is the total loss in potential emissions reductions for each district from foregone funding for Moyer Program projects.

Appendix D:
California Health and Safety Code § 44011(a)(4)(A) and (B)

State of California

HEALTH AND SAFETY CODE

Section 44011

44011. (a) All motor vehicles powered by internal combustion engines that are registered within an area designated for program coverage shall be required biennially to obtain a certificate of compliance or noncompliance, except for the following:

[redacted]

(4) (A) Except as provided in subparagraph (B), all motor vehicles four or less model-years old.

(B) (i) Beginning January 1, 2005, all motor vehicles six or less model-years old, unless the state board finds that providing an exception for these vehicles will prohibit the state from meeting the requirements of Section 176(c) of the federal Clean Air Act (42 U.S.C. Sec. 7401 et seq.) or the state's commitments with respect to the state implementation plan required by the federal Clean Air Act.

(ii) Notwithstanding clause (i), beginning January 1, 2019, all motor vehicles eight or less model-years old, unless the state board finds that providing an exception for these vehicles will prohibit the state from meeting the requirements of Section 176(c) of the federal Clean Air Act (42 U.S.C. Sec. 7401 et seq.) or the state's commitments with respect to the state implementation plan required by the federal Clean Air Act.

(iii) Clause (ii) does not apply to a motor vehicle that is seven model-years old in year 2018 for which a certificate of compliance has been obtained.

[redacted]

[redacted]

(Amended by Stats. 2017, Ch. 633, Sec. 1. (AB 1274) Effective October 10, 2017.)

South Coast Air Basin Attainment Plan for the 2012 Annual PM2.5 Standard

Appendix V

ATTACHMENT B: CARB'S AREA SOURCE INFEASIBILITY JUSTIFICATION

CARB Reactive Organic Gases Area Source Measure Analysis

CARB adopted the *California Smog Check Contingency Measure* to address contingency measure requirements throughout the State. U.S. EPA proposed to approve the *California Smog Check Contingency Measure* as a contingency measure on December 20, 2023. The Smog Check Contingency Measure, if triggered in a nonattainment area, would reduce the exemption for vehicles that are 8 model years old and newer to seven model years old and newer, thereby increasing the number of vehicles subject to Smog Check. This measure, if triggered, would achieve additional NOx and ROG reductions beyond what is currently achieved by the Smog Check Program by identifying additional emissions control equipment failures from vehicles previously exempt.

The *California Smog Check Contingency Measure* includes, in Appendix A, analysis on the feasibility of contingency measures related to CARB's mobile source control programs that target both ROG and NOx. CARB staff are now evaluating potential options for a contingency measure achieving ROG reductions from area sources that the State has authority to regulate, including both CARB and Department of Pesticide Regulation (DPR) 's regulations (Table 2), to determine feasibility given the contingency measure requirements under the Clean Air Act, recent court decisions and U.S. EPA draft guidance. The State currently has programs in place for these area sources and has evaluated a variety of regulatory mechanisms within existing and new programs for potential contingency triggers. Each measure was evaluated on whether it could be implemented within 60 days of being triggered and achieve the necessary reductions within 1-2 years of being triggered. Additionally, the technological feasibility of each option was considered to assess whether the measure would be technologically feasible to implement. More stringent requirements may be unavailable or economically infeasible to implement, especially in the time frame required for contingency measure implementation. Some measures aim to reduce VOC emissions as opposed to ROG emissions. However, VOC and ROG emissions are virtually equivalent. Thus, both terms are used interchangeably throughout this document.

Challenges for CARB Measures

Based on CARB's feasibility analysis, which is similar to our mobile source analysis, there are a few common components of CARB area source regulations that limit the options for contingency measures. CARB regulations that require development of new emissions control technologies or new product formulations require a long lead time for implementation. Manufacturers would need lead time to research, plan, certify, manufacture, and deploy lower-emitting alternatives to meet a new or accelerated standard.

Additionally, consumer-based regulations necessitate that manufacturing is mature so that there is enough supply available to meet the additional demand. On the consumer side, additional time would be required for procurement implementation based on the new requirements. Thus, measures that require product turnover, new standards or reformulation are not appropriate to be used as a triggered contingency measure given the compressed timeline required for contingency.

CARB regulations are also technology-forcing, which makes it difficult to amend regulations or pull compliance timelines forward with only 1-2 years notice as industry needs time to research, plan, develop, and implement these new technologies and product formulations. It would be infeasible to require industry to purchase and install large numbers of new control technologies within one year if the technology is not readily available at a reasonable cost. CARB regulations are also the most stringent air quality control requirements in the country, so there are few opportunities to require additional stringency. CARB is driving sources under our authority to near-zero and zero-emissions everywhere feasible to provide for attainment of air quality standards across the State, and to support near-source toxics reductions and climate targets. However, these targets which are already being addressed in many CARB regulations also eliminate opportunities for a contingency measure.

Lastly, many of CARB's options for a contingency measure would require a full rulemaking process and would not be adopted by CARB and approved by U.S. EPA within the timeframe needed, making many of the options infeasible. Given U.S. EPA failure to submit and disapproval actions for the 75 ppb 8-hour ozone standard, sanction clocks have started and sanctions could be triggered in San Joaquin Valley, Coachella Valley, Mojave Desert and the Sacramento region in 2024. As such, CARB and these local air districts need to identify measure(s) that could realistically be adopted and submitted to U.S. EPA prior to that time. However, most CARB measures must go through a regulatory process that can take approximately five years from beginning development of a regulation to it being adopted by the CARB Board.

Based on CARB staff analysis, no additional measures were identified at this time to serve as a contingency measure to reduce ROG emissions beyond the California Smog Check Contingency Measure. More detail on the CARB staff analysis, including potential emission reduction options for each area source category are described in the following sections.

Consumer Products

Consumer products refer to chemically formulated products used by household and institutional consumers, such as detergents, personal care and cosmetics products, home

and garden products, and disinfectants. CARB regulations for consumer products aim to reduce the amount of VOCs, toxic air contaminants, and greenhouse gases that are emitted from using these consumer products.

CARB is actively seeking further emission reductions to support ozone attainment in the South Coast and elsewhere in California. Towards this end, CARB's 2022 State SIP Strategy includes a consumer products statewide emissions reduction commitment of 20 tons per day (tpd) of VOCs.

To achieve the 20 tpd VOCs emission reduction, CARB staff anticipates casting a wide net in its review of product categories. CARB staff plans to launch a survey in early 2024 to collect sales and formulation data for products sold recently in California. Survey data will identify opportunities to further reduce ozone formation from consumer products. Staff expects to bring regulatory proposals to the Board by 2027.

The Consumer Products Rulemaking Process

In granting CARB authority to regulate consumer products, which were previously regulated by local air pollution control districts and air quality management districts, it was the Legislature's intent to have a single set of regulatory requirements applicable statewide, rather than a patchwork of regulations. CARB's Consumer Products Regulation applies statewide.

For any consumer products rulemaking, proposed amendments are the culmination of a multi-year public process by CARB to identify the most promising, technically-sound strategies to effectively help California meet its air quality challenges. The recent 2021 rulemaking took close to seven years and included the following three phases of regulatory development: 1) development and implementation of the three-year survey; evaluation and publication of 2013 through 2015 Consumer and Commercial Products Survey data;
2) evaluation of potential regulatory strategies based upon the survey data; and
3) development and refinement of Proposed Amendments.

Manufacturers need lead time to reformulate existing products to meet new VOC standards. Based on previous rulemakings, five significant milestones exist and are associated with reformulating products to meet new consumer product regulatory requirements:
1) research and development; 2) efficacy testing; 3) stability testing; 4) safety testing; and 5) consumer acceptance testing. In addition, manufacturers must make modifications to product labels. While there is some opportunity for manufacturers to run these processes concurrently, often a problem in any one of these milestones require the manufacturer to start the process again.

CARB Contingency Measure Analysis

When setting technology forcing standards, CARB may provide for a Technical Assessment prior to effective dates. This enables CARB to assess progress made by manufacturers in developing complying products. In cases where product development challenges result in infeasibility of timely implementation, the assessment could result in amendments to the standards or to extensions in compliance deadlines.

Additionally, technology forcing standards often require modifications to facilities, equipment, and manufacturing processes. This would be the case if a product is reformulated to use compressed gas propellant instead of liquefied gas propellant. Use of compressed gas propellant requires the purchase and installation of new equipment and modifications to facility assembly lines, necessitating sufficient lead time for implementation as well as certainty about implementation dates for the technology forcing standards. CARB staff will be evaluating increased use of compressed gas propellant for the upcoming consumer product rulemaking.

Trigger Feasibility

To provide reductions qualifying for contingency purposes, CARB would need to adopt regulatory amendments which yield emission reductions that could be implemented within a short period of time from a triggering event.

For a given product category for which CARB proposes more stringent VOC standards, CARB cannot call for earlier implementation of those standards for contingency purposes. This is because CARB already requires implementation under short timelines to maximize air quality benefits in support of expeditious attainment of ambient air quality standards.

Neither can CARB set lower limits for products that would be produced and warehoused, but not sold unless a triggering event occurred. Warehousing of "contingency" products would be cost prohibitive for manufacturers and would not provide the Consumer Products Program with the maximum feasible air quality benefits, as required by the Legislature. Some consumer products also have limited shelf life and given the uncertainty of when a triggering event may occur, such an approach is not feasible.

Technological Feasibility

The Legislature, in Health and Safety Code (H&SC) Section 41712(b)(2) and 41712(d), stipulates that CARB's consumer product regulations must set standards which are commercially and technologically feasible. Therefore, during every consumer products rulemaking, CARB sets VOC limits that are the most technologically and commercially feasible at the time.

CARB Contingency Measure Analysis

CARB's Consumer Products Regulation does not require lower VOC content products in some parts of California, which could then be required in other parts of California in need of contingency reductions.

When proposing more stringent VOC standards, CARB cannot establish two increasingly restrictive sets of VOC limits: one limit in support of attainment, which would go into place by a defined date; and a second, more stringent limit which would only be implemented if contingency needs were triggered. This is because: (1) State law, stated in H&SC section 41712(b)(1), requires CARB to adopt the most stringent feasible standards for attainment purposes; and (2) further reductions from consumer products are needed for attainment of ozone ambient air quality standards.

Neither could CARB set a single, more restrictive VOC standard, implement those requirements, and then hold back a portion of the anticipated emission reductions for contingency purposes while still dedicating the majority of accruing reductions towards attainment targets. In such a case, additional actual emission reductions would not occur if contingency requirements were triggered. This approach would therefore not satisfy requirements for contingency reduction.

Even if no further VOC reductions were needed for attainment, setting more stringent standards for contingency purposes would still not be a viable undertaking. This is because the testing and development of lower VOC products meeting more stringent standards could take years and much investment by manufacturers. Timelines would not mesh with the quick turnaround time needed for contingency reductions. In short, CARB cannot require development of new consumer products just in case additional emission reductions are needed. This means CARB cannot produce contingency reductions by setting more stringent standards for consumer product categories other than those which CARB would regulate further to secure the 20 tpd VOC emission reduction target for attainment purposes.

Further, CARB cannot, when seeking reductions in the very near-term (and consistent with contingency reduction timelines), rely on other jurisdictions whose regulations are resulting in lower-emitting consumer products which they could then offer for sale in California. California's Consumer Products Program is world-leading, cutting-edge and technology forcing. Manufacturers have not already developed products, and marketed them elsewhere, which they could direct to California in case a need for contingency reductions is triggered.

In summary, a consumer product contingency measure seeking additional emission reductions either by setting more restrictive standards, or by accelerating effective dates of standards, is infeasible.

Oil and Gas

For decades, air districts with significant oil production have adopted and implemented rules designed to reduce criteria pollutant precursor emissions from the oil and gas sector to meet national ambient air quality standards (NAAQS) and Clean Air Act requirements. The air district rules control emissions of reactive organic gases (ROG) from tanks, separators, and compressors, and specify requirements for leak detection and repair (LDAR). The air district rules do not cover methane specific sources.

In 2017, CARB adopted the Greenhouse Gas Emission Standards for Crude Oil and Natural Gas Facilities (also known as the Oil and Gas Methane Regulation) to address methane emissions from equipment and processes not already controlled for ROG purposes by existing air district rules. Although the Oil and Gas Methane Regulation is intended to reduce methane emissions, many of the covered sources also emit ROG as co-pollutants, and therefore the regulation also reduces ROG emissions. Only four air districts in California with nonattainment areas have oil and gas equipment subject to the regulation: Sacramento Metropolitan Air Quality Management District, San Joaquin Valley Air Pollution Control District, South Coast Air Quality Management District, and Ventura County Air Pollution Control District. The air district rules and the Oil and Gas Methane Regulation complement one another and together reduce ROG emissions from California's oil and natural gas sector.

Starting in 2012, U.S. EPA established regulations to reduce air pollution from the oil and natural gas industry consisting of new source performance standards. U.S. EPA also promulgated a Control Techniques Guideline in 2016 for the Oil and Natural Gas Industry which requires all states with applicable nonattainment areas to meet the prescribed levels of control in order to satisfy reasonably available control technology requirements. The CTG requirements are met in California via air district rules and CARB's submittal of the Oil and Gas Methane Regulation. In December 2023, U.S. EPA finalized updated regulations for the oil and natural gas industry including more stringent new source performance standards and, for the first time, Emissions Guidelines. U.S. EPA's recent Emissions Guidelines will require that CARB amend the Oil and Gas Methane Regulation to meet the more stringent requirements.

Methane and ROG emissions can originate from oil and gas infrastructure when natural gas is either intentionally released ("vented" emissions) or unintentionally leaked ("fugitive" emissions). Intentional releases can occur due to process designs (e.g., as a fluid to operate pneumatic devices), for safety or maintenance reasons, or for when no other control or disposal options exist (where allowed). Unintentional leaks can occur due to factors such as defects or wear in connections, valves, seals, and similar mechanisms, or due to process

upsets, system malfunctions, or human error. Vented emissions can be controlled primarily by replacing equipment with lower-emitting models or adding vapor collection systems to equipment, and the further controls that will be required under the recent U.S. EPA Emissions Guidelines represent all controls that are technologically feasible. Fugitive emissions are addressed through leak detection and repair (LDAR) to find and fix unintentional leaks. In each of these areas, there are no additional available feasible control measures that could meet the requirements of a contingency measure.

First, there are not currently any additional measures in the Oil and Gas Methane Regulation that could be triggered without undertaking amendments to the regulation. The process for amending a regulation takes years to complete and requires the development of new measures, stakeholder engagement, and the formal regulatory process itself.

Second, even if the length of the regulatory process were not a barrier, no available surplus emission reductions could reasonably be implemented within the short timeframe required upon a triggering event. Implementation of additional controls requires at least two to three years for oil and gas facilities to comply with. New controls are not easily installed on equipment and would take additional time to upgrade, which likely does not fit in the contingency timeline required. Each of the potential emission reduction mechanisms in the Oil and Gas Methane Regulation are analyzed below:

- Reduce venting through equipment replacement or vapor control (control venting emissions):
    - The Oil and Gas Methane Regulation already includes strict venting standards for most categories of equipment designed to vent natural gas as part of normal operation. The areas where further control of vented emissions may be feasible are all being addressed by U.S. EPA's Emissions Guidelines (finalized December 2023), which are standards that CARB must meet for existing sources to demonstrate compliance with the Clean Air Act; these are measures that must be implemented and cannot be held in reserve for use as triggered contingency measures. These include banning all associated gas venting, requiring all pneumatic controllers to be zero-emission, and requiring minimization of emissions from liquids unloading to the greatest extent possible.
- Expand/increase LDAR (control fugitive emissions):
    - Under the Oil and Gas Methane Regulation, LDAR is already mandated on a quarterly basis using a very sensitive methodology (U.S. EPA's Method 21). The only exemption that results in a significant number of sources not being subject to LDAR is for equipment handling exclusively heavy oil[1], which is not

[1] Oil with an API gravity of less than 20.

economically feasible to control based on analysis using currently available data.

In summary, there are no new technologically feasible control measures that CARB can implement in the Oil and Gas Methane Regulation that could meet the triggering timelines and other requirements, and are available to use as contingency measures.

Petroleum Marketing – Vehicle Refueling

Vapor recovery systems are installed at gasoline dispensing facilities (GDFs) to collect, contain, and return gasoline vapors that would otherwise escape into the atmosphere. Gasoline vapor emissions contain smog forming volatile organic compounds (VOCs) that are controlled in two phases at GDFs. Phase I vapor recovery collects vapors displaced from a storage tank when a cargo tank truck delivers gasoline. Phase II vapor recovery collects and stores vapors displaced during the transfer of gasoline from the GDF storage tanks into the vehicle tank. Stored gasoline vapors in the GDF tanks are then transferred into gasoline cargo tank trucks during Phase I activities and returned to gasoline terminals for processing. CARB regulations establish statewide performance standards for vapor recovery systems that must be achieved during the transfer and storage of gasoline. In addition, all vapor recovery systems must undergo CARB certification tests to demonstrate compliance with applicable performance standards before those systems can be sold, offered for sale, or installed in California.

Vapor recovery system performance standards for GDFs have become more stringent over the years. Since 2001, CARB has adopted over a dozen significant advancements as part of the Enhanced Vapor Recovery (EVR) program. Phase I EVR requires more durable and leak-tight components, along with an increased collection efficiency of 98%. Phase II EVR includes three major advancements: (1) dispensing nozzles with less spillage and required compatibility with ORVR (onboard refueling vapor recovery) vehicles, (2) a processor to manage the headspace pressure within the GDF storage tank, and (3) an in-station diagnostic (ISD) system that provides warning alarms to alert a GDF operator of potential vapor recovery system malfunctions. Phase I EVR was fully implemented in 2005 and Phase II EVR was fully implemented by 2011.

Additionally, CARB's air toxic control measure for benzene requires retail GDFs to install Phase I and Phase II systems to reduce public exposure. Exceptions to the measure include gasoline (1) dispensed from or transferred to a storage tank with a capacity less than 260 gallons, (2) dispensed to implements of animal husbandry; or (3) dispensed to vehicles with fuel tanks less than 5 gallons capacity.

CARB Contingency Measure Analysis

Since the implementation of Phase I and Phase II EVR in 2011, CARB staff has made additional improvements to the vapor recovery program. For GDF equipped with underground storage tanks, a total of four regulatory amendments were completed between 2011 and 2023 to strengthen performance standards, adjust implementation dates to reflect evolving technology, clarify dimension requirements for nozzles and vehicle fill pipes, and improve cost effectiveness for system upgrade requirements. Two of the most recently implemented control measures, hose permeation and more stringent nozzle spillage standard, are described below.

- Hose Permeation Standard:
  CARB adopted performance standards for gasoline dispensing hose permeation on July 26, 2012. The intent of this standard is limiting the amount of gasoline that permeates through the dispensing hose. Hose permeation performance standards only apply to hoses in which liquid gasoline contacts the outer hose wall, specifically: Phase II vacuum assist and conventional hoses (latter are installed in facilities that are exempt from Phase II because they fueled predominately vehicles equipped with ORVR). Existing facilities subject to the performance standard were allowed four years from the effective date to attain compliance. The effective date is defined as the date when the first dispensing hose meeting the performance standard is certified by CARB.

  The first conventional and vacuum assist hoses that met the new permeation standard were certified by CARB on June 10, 2014, and September 24, 2014, respectively. These certification dates establish the effective dates and associated four-year periods (commonly referred to as "the four-year clock") for existing subject GDFs to comply. Existing GDFs that used conventional hoses and vacuum assist hoses had until June 10, 2018, and September 24, 2018, respectively to comply with the low permeation hose standard. New GDFs constructed after the effective dates that use vacuum assist or conventional hoses are required to install low permeation hoses at the time of construction.

- More Stringent Nozzle Spillage Standard:
  In April 2015, CARB adopted new performance standards and specifications for Enhanced Conventional (ECO) nozzles that are installed at non-retail GDFs, which are exempt from Phase II requirements by district rules. These GDFs fueled predominantly vehicles that are equipped with ORVR, which collects displaced vapor during vehicle refueling.

  CARB staff have compiled and evaluated mass emission factors for nozzle spillage based on CARB certification test data for three EVR nozzles and two ECO nozzles. In April 2020,

staff found that the mass emission factors based on certification data for all five nozzles are substantially lower than applicable performance standards. This finding demonstrated nozzles are performing much better than predicted for EVR implementation at the time CARB adopted the EVR regulations.

Consequently, in December 2020, the Board approved a more stringent performance standard of 0.05 lbs/kgal for nozzle spillage for both EVR and ECO nozzles to preserve emission reductions that are already occurring and prevent emissions from increasing.

Recent analysis indicates that CARB certified vapor recovery systems designed for use at GDFs are well over 90% effective[2] in reducing VOC emissions that would otherwise be emitted to the atmosphere. Given the maturity and robustness of the program and the stringency of existing control measures that have been implemented statewide, there are no available additional control measures that would be feasible to implement within the timeframes required for contingency measures. Even if more stringent control measures could be adopted, they would not be able to be implemented in the contingency timeframe required as manufacturers and retailers would need more than two years of lead-time, as has been provided in the past, to comply with new standards.

CARB staff believes future amendments will improve existing test procedures and ease the burden of compliance for GDF operators without causing any increase in emissions or costs. Further, absent any changes to vapor recovery controls, CARB staff expects that gasoline vapor emissions will track proportionally to fuel dispensed. As California transitions to more fuel-efficient vehicles, zero emission vehicles, and alternative fuel sources, gasoline consumption and associated vapor emissions are expected to decrease. However, as long as gasoline remains a major fuel source, CARB will need to maintain an active and effective vapor recovery program.

In summary, California has the most comprehensive vapor recovery program applicable to GDFs in the country, and there are no new technologically feasible control measures that could meet the triggering timelines and other requirements, and are available to use as contingency measures. California's program includes:

1. rigorous performance standards for Phase I transfer, Phase II transfer, In-Station Diagnostic systems, hose permeation, storage tank pressure management, and nozzle spillage,
2. strong enforcement of performance standards by local air districts, and

[2] *https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2023/vapor_recovery_2023/isor.pdf*

3. going well beyond US EPA's Stage I (Phase I in California), which is the sole focus of US-EPA's vapor recovery requirements.

Going forward, the vapor recovery program will remain an important part of California's efforts to control regional ozone levels and reduce public exposure to benzene.

Petroleum Marketing – Cargo Tanks

In California, gasoline vapor emissions are controlled to reduce emissions of air pollutants, specifically VOCs and various toxic air contaminants (TACs) such as benzene. Emissions are controlled during the transfer of gasoline from storage tanks at refineries or terminals/bulk plants to tanker trucks also called cargo tanks (CTs). Cargo tanks transport gasoline to service stations also called GDFs. The Cargo Tank Vapor Recovery Program (CTVRP) regulations require annual testing of CTs to ensure that they do not exceed the allowable leak rate. Such tests are performed by CT owner/operators or independent testing contractors. Test results are submitted to CARB CTVRP staff for review and provide the basis for issuing a certification document with a decal, which must be renewed annually. To ensure the integrity of the program, CTVRP staff monitors the testing conducted by CT owners, operators, and contractors. Additionally, CTVRP staff perform random inspections and testing of CTs. Also, loading facilities are prohibited from transferring gasoline to CTs with invalid or expired certifications. Because of the severe and unique air pollution problems facing California, CARB's gasoline vapor control standards for CTs are more stringent than comparable federal standards.

CARB first adopted the cargo tank vapor recovery certification regulations on April 18, 1977. These regulations established a five-minute static pressure test with an allowable leak rate to prevent excessive gasoline vapor emissions and a one-minute test for CARB inspectors to monitor CTs loaded with gasoline. There have been six amendments to this regulation (1984, 1995, 1998, 2013, 2017, 2023). These amendments were mostly administrative in nature. However, the 1995 amendment reduced the allowable leak rate by 50%, making the CTVRP the strictest emission standards in the nation.

Altering of a CT design to control emissions would require input and approval from federal agencies such as Department of Transportation (DoT) and U.S. EPA, along with State agencies such as State Fire Marshal and California Highway Patrol. Getting such approval to implement new controls may take years due to the cumbersome approval process. The CTVRP already requires more stringent emission standards than the U.S. EPA. The current CARB and U.S. EPA standard is measured in Inches of Water Column (WC"). As an example, a cargo tank in California is not allowed to leak more than 0.5 WC" (0.018psi) in a five-minute test. CTs are as vapor tight as the current industry standards and design allows for.

There is currently no design or technology that can reduce this number. Additionally, as mentioned, design alterations would require numerous and lengthy federal, State(s), and local municipalities approvals. Implementation of any new standards would also require long lead times to deploy new technologies and would likely take more than two years. As the population of zero emission vehicles increases on California roads, emissions from CTs will be reduced due to a decline in demand for gasoline.

In summary, due to the timelines involved in development of technology, altering CT designs, and anticipated drop in gasoline demand, there are no new technologically feasible control measures in the CTVRP that could meet the triggering timelines and other requirements, and are available to use as contingency measures.

Portable Fuel Containers (Gas Cans)

Portable Fuel Containers (PFCs), or gas cans, are used to fill a variety of equipment, including lawnmowers, vehicles, and personal watercraft. However, spillage and evaporative emissions can occur, which can result in ozone-forming smog and health related problems. In California, gas cans use low permeation materials and automatic sealing nozzles to minimize or eliminate spillage and evaporative emissions. All gas cans sold in California must be certified by CARB as meeting the low-emission requirements.

CARB staff analyzed PFCs to identify potential contingency measure options. It would not be possible to begin implementation of any contingency measures for PFCs within 60 days. CARB does not regulate consumer use of PFCs and must achieve emission reductions through performance requirements, including emission standards, for new PFCs. Manufacturers would need more than 1-2 years to design, certify, and manufacture PFCs that meet more stringent emission standards. Additionally, CARB regulations typically need to allow additional time for sell-through provisions to allow for consumers and retailers to transition to the new products, which further extends the implementation timeline. Adopting more stringent emission standards is not feasible to implement as a contingency measure because the regulatory process would take approximately 5 years from start to finish. The standards currently in place are also the most stringent standards across the nation.

In summary, there are no new technologically feasible control measures in the PFC regulations that could meet the triggering timelines and other requirements and are available to use as contingency measures.

Pesticides

Pesticides are used for urban and agricultural pest management across the State and are an area-wide source of ROG and other types of emissions. Pesticides are regulated under both

federal and state law. Under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), the U.S. EPA has authority to control pesticide distribution, sale, and use. The Department of Pesticide Regulation (DPR) has primary and broad authority to regulate the sale and use of pesticides in California. The pesticide element of the ozone SIP requires DPR to develop and implement regulations to reduce ROG emissions by specified amounts from agricultural and structural pesticide applications in nonattainment areas. CARB is supporting DPR to use its broad authorities to reduce ROG emissions as well as limit harmful exposures to pesticides impacting communities across the State.

DPR can generally reduce exposures to pesticides through the development and implementation of necessary restrictions on pesticide sales and use and by encouraging integrated pest management. Mitigation measures may be implemented by several methods, including regulations, local permit conditions, pesticide label changes, or product cancellation. Current regulations set limits on applications of certain pesticides and specify methods for application to protect public health. DPR regulations have been found by U.S. EPA to meet RACT, RACM, and BACM requirements as a part of past SIP submittals. Most recently, as a part of the 2022 State SIP Strategy developed to support of attainment of the 70 ppb ozone standard across California, DPR committed to update their 1,3-Dichloropropene (1,3-D) regulations for health risk mitigation and volatile organic compound emissions reductions. The regulatory updates address both cancer and acute risk to non-occupational bystanders through requirements including those on applicators to use totally impermeable film tarpaulins or other mitigation measures that provide a comparable degree of protection from exposure. DPR submitted the rulemaking documents to the Office of Administrative Law on November 7, 2023, for final review and if approved will go into effect on January 1, 2024.

DPR has divided pesticide products into two groups for SIP purposes: fumigants and non-fumigants. The lead time needed to develop regulations for both groups of pesticide products may not fit in the contingency timeline required. For fumigant pesticide products, the primary measure to reduce ROG emissions is to change fumigation methods, such as deeper injection into the soil and covering fumigated areas with tarps that have low permeability. Developing new fumigation methods normally requires several years of research followed by rulemaking that usually requires two years or more to complete. For non-fumigant pesticide products, the primary measure to reduce ROG emissions is to change product formulations to reduce the ROG content. This also takes several years of research and rulemaking to complete. Additionally, changing product formulation normally requires review and registration of a new product by U.S. EPA and this takes a year or more to complete. For both fumigant and non-fumigant products, little work on contingency measures can be done beforehand due to changing pesticide use patterns. Pesticide products that contribute the most emissions currently may not be the ones that contribute

the most in the future due to changing cropping patterns, introduction of new pesticide products, and other factors.

Further, DPR regulations are the most stringent pesticide controls in the country and represent all measures that are technologically feasible at this time. For example, U.S. EPA's Office of Pesticide Programs also works to reduce emissions to reduce toxic exposure and their measures are implemented through nationwide product label changes. U.S. EPA has nearly completed its most recent review of 1,3-D with minimal label changes, while DPR's 1,3-D regulations include fumigation method requirements that will further reduce emissions. CARB and DPR are not aware of any other states with regulatory requirements to reduce ROG emissions from pesticide products.

At this time, no additional measures for regulating pesticides have been identified for use as a contingency measure. However, DPR has developed a process to identify possible additional control measures through its roadmap for sustainable pest management (SPM). SPM is a process of continual improvement that integrates an array of practices and products aimed at creating healthy, resilient ecosystems, farms, communities, cities, landscapes, homes, and gardens. SPM examines the interconnectedness of pest pressures, ecosystem health, and human wellbeing. Going forward, CARB will continue to partner with DPR and explore the best methods to limit pesticide exposures, while also reducing emissions of volatile organic compounds.

Summary

At this time, CARB is including a zero-emission component in most of our regulations, both those already adopted and those that are in development, and the vast majority of these regulations are statewide in scope. Beyond the wide array of sources CARB has been regulating over the last few decades, and especially considering those we are driving to zero-emission, there are few area sources of emissions left for CARB to implement additional controls upon under its authorities for contingency purposes in the Coachella Valley.

Beyond the Smog Check Contingency Measure, no additional contingency measures were identified for mobile and non-mobile sources through CARB's analysis as shown in Table 1. Considering the air quality challenges California faces, if a measure achieving such reductions were feasible, CARB would implement the measure to support expeditious attainment of the NAAQS as the Clean Air Act requires rather than withhold it for contingency measure purposes. Further, should there be a measure achieving the required emission reductions, the measure would likely take more than 1-2 years to implement

during which time the expected emission benefits could be reduced due to natural turnover of products and equipment.

Table 1: Assessment of Potential CARB Contingency Measures

Emission Source	Regulatory Programs	Latest Amendment Requirements	Contingency Options	Trigger Feasibility	Technological Feasibility
Pesticides	Fumigant products ROG reduction	Effective 4/1/16; Revise existing field fumigation methods.; Effective 1/1/24; Restrict use of 1,3-D for only agricultural commodities, set limits on application rate and methods to limit exposure/ emissions.	Require more stringent limitations and stricter application methods.	No; Trigger for use limit for 4 NAAs included in existing regulations; Standards requirements need years of lead time to be implemented; infeasible to pull forward standards within 60 days. Infeasible to achieve reductions within two years.	No; Research needed to achieve additional reductions.
	Non-fumigant products ROG reduction	Effective 11/1/13; Sale and use restrictions for products that have any of 4 primary active ingredients and applied to any of 7 crops in San Joaquin Valley.	Require use of "low-VOC" products.	No; Trigger requiring "low-VOC" products that have any of 4 primary active ingredients and applied to any of 7 crops in San Joaquin Valley included in existing regulations; Standards requirements need years of lead time to be implemented; infeasible to pull forward standards within 60 days. Infeasible to achieve reductions within two years.	No; Research needed to achieve additional reductions.

CARB Contingency Measure Analysis

Emission Source	Regulatory Programs	Latest Amendment Requirements	Contingency Options	Trigger Feasibility	Technological Feasibility
Oil and Gas	Oil and Gas Methane Regulation	Adopted 3/23/17. Requires quarterly monitoring of methane emissions and some equipment will require vapor collection systems.	Reduce venting through equipment replacement or vapor control (control venting emissions). Expand/increase LDAR (control fugitive emissions).	No; Standards and requirements need years of lead time to be implemented; infeasible to pull forward standard within 60 days. Purchasing would not happen immediately or within one year of trigger; infeasible to achieve reductions within one 1-2 years.	No; only feasible controls are required to be implemented under U.S. EPA's Emissions Guidelines (finalized December 2023). No; current LDAR requirements are the most stringent in the country.
Consumer Products	Consumer Products	Amended 3/25/21. Lowered VOC standards for hair-care products, personal fragrance, manual aerosol air fresheners, and aerosol crawling bug insecticide.	Adopt and implement more stringent emission standards; pull forward compliance deadlines	No; Standards and requirements need years of lead time to be implemented; infeasible to pull forward standard within 60 days. Purchasing and manufacturing would not happen immediately or within one year of trigger; infeasible to achieve reductions within one 1-2 years.	No; cannot require manufacturers to develop new formulations and products only for contingency and to warehouse just for contingency purposes. Also, since California has the most stringent requirements, cannot bring in lower-emitting products already manufactured for other markets.
Consumer Products	Portable Fuel Container (PFC) Regulation	Amended 4/1/2017. Updated certification test fuel, established 4 year certification term, and streamlined test procedures with U.S. EPA.	Adopt and implement more stringent emission standards	No; Standards requirements need years of lead time to be implemented; infeasible to enforce more stringent standards within 60 days. Purchasing would not happen immediately or within one year of trigger; infeasible to achieve reductions within 1-2 years.	No; standards currently in place are the most stringent.

CARB Contingency Measure Analysis

Emission Source	Regulatory Programs	Latest Amendment Requirements	Contingency Options	Trigger Feasibility	Technological Feasibility
Cargo Tanks (hauling gasoline)	Cargo Tank Vapor Recovery Program	Amended 10/01/23, Administrative in nature; corrected grammatical errors, removed imprecise language regarding alternative test procedures.	Setting more stringent standards	No; technology in this field has no new innovations and standards are more stringent than federal guidelines.	No; current standards and requirements are the most stringent in the nation and current technologies are most advanced.
Petroleum Marketing – Vehicle Refueling	Enhanced Vapor Recovery	Adopted July 26, 2012; performance standards for gasoline dispensing hose permeation April 2015; New performance standards and specifications for ECO Nozzles, including a more stringent nozzle spillage standard over EVR nozzles. December 2020; more stringent performance standard of 0.05 lbs/kgal for nozzle spillage for both EVR and ECO nozzles	Adopt and implement more stringent emission and performance standards	Standards requirements need years of lead time to be implemented; infeasible to enforce more stringent standards within 30 or 60 days. Purchasing would not happen immediately or within one year of trigger; infeasible to achieve reductions within one year.	California has the most comprehensive vapor recovery program applicable to GDFs in the country; no additional opportunities for increased stringency