

BOARD MEETING DATE: August 6, 2021

AGENDA NO. 28

PROPOSAL: Determine That Proposed Rule 1147.1 – NO_x Reductions from Aggregate Dryers, Is Exempt from CEQA and Adopt Rule 1147.1

SYNOPSIS: The adopted Resolution of the Final 2016 AQMP directed staff to achieve additional NO_x reductions and to transition facilities in the NO_x RECLAIM program to a command-and-control regulatory structure as soon as practicable. Proposed Rule 1147.1 (PR 1147.1) will establish NO_x and CO emission limits for aggregate dryers at non-RECLAIM, RECLAIM, and former RECLAIM facilities. PR 1147.1 also includes provisions for emissions monitoring, reporting, and recordkeeping.

COMMITTEE: Stationary Source, June 18, 2021, Reviewed

RECOMMENDED ACTIONS:

Adopt the attached Resolution:

1. Determining that Proposed Rule 1147.1 – NO_x Reductions from Aggregate Dryers, is exempt from the requirements of the California Environmental Quality Act; and
2. Adopting Proposed Rule 1147.1 – NO_x Reductions from Aggregate Dryers.

Wayne Natri
Executive Officer

PMF:SN:MK:GQ:SW:YZ

Background

Control Measure CMB-05 in the 2016 AQMP seeks to transition facilities from the NO_x RECLAIM program into a command-and-control regulatory program. Before facilities can be transitioned from RECLAIM, a command-and-control rule that specifies NO_x emission limits must be established. Currently, aggregate dryers with a unit heat rating $\geq 325,000$ British thermal units per hour (BTU/hr) at non-RECLAIM facilities are regulated under Rule 1147 – NO_x Reductions from Miscellaneous Sources.

Staff proposes creating a separate rule for gaseous-fueled aggregate dryers due to the unique characteristics of these units, such as low operating temperatures, moist environments, and equipment size. Proposed Rule 1147.1 – NO_x Reductions from Aggregate Dryers (PR 1147.1) establishes NO_x limits that are representative of Best Available Retrofit Control Technology (BARCT), for gaseous fuel-fired aggregate dryers at non-RECLAIM, RECLAIM, and former RECLAIM facilities. PR 1147.1 will affect 42 aggregate dryers located at 37 facilities (24 non-RECLAIM and 13 RECLAIM).

Public Process

The development of PR 1147.1 was conducted through a public process. All working group meetings as well as the public workshop were held remotely via Zoom. Six working group meetings were held throughout the rulemaking process, which included a variety of stakeholders such as affected facilities, industry associations, equipment vendors, public agencies, and environmental and community groups. A public workshop was held on May 26, 2021. Staff also held numerous meetings with individual stakeholders and industry associations and conducted virtual site visits at six facilities.

Proposed Rule and Objectives

PR 1147.1 applies to non-RECLAIM, RECLAIM, and former RECLAIM facilities that operate gaseous fuel-fired aggregate dryers with a rated heat input of greater than 2 Million BTU/hr with NO_x emissions greater than or equal to one pound per day. The proposed rule establishes a NO_x concentration limit of 30 parts per million (ppm) and a CO concentration limit of 1,000 ppm for aggregate dryers and specifies implementation timeframes. Interim limits are proposed for aggregate dryers located for former RECLAIM facilities that must be met after the facility exits RECLAIM and until the unit meets the proposed NO_x and CO emission limits. Aggregate dryers above the current Rule 1147 limit are required to meet the proposed limits when the burner reaches 12 years of age or by January 1, 2022, whichever is later. Aggregate dryers at or below the current Rule 1147 limit are required to meet the proposed limits when the burner reaches 32 years of age or by January 1, 2023, whichever is later. PR 1147.1 also includes provisions for monitoring, reporting, and recordkeeping requirements.

Emission Reductions

The baseline emissions inventory of the impacted equipment universe is 0.4 ton per day. Estimated emission reductions of PR 1147.1 over full implementation are estimated to be 0.04 tons per day. PR 1147.1 will be submitted for inclusion into the SIP.

Key Issues

Through the rulemaking process, staff worked with stakeholders to address proposed NO_x and CO limits and monitoring requirements. Staff is not aware of any remaining key issues.

California Environmental Quality Act (CEQA)

Pursuant to the California Environmental Quality Act (CEQA) Guidelines Sections 15002(k) and 15061, the proposed project is exempt from CEQA pursuant to CEQA Guidelines Section 15061(b)(3). A Notice of Exemption has been prepared pursuant to CEQA Guidelines Section 15062 and is included as Attachment H to this Board Letter. If the proposed project is approved, the Notice of Exemption will be electronically filed with the State Clearinghouse of the Governor's Office of Planning and Research to be posted on their CEQAnet Web Portal, which may be accessed via the following weblink: <https://ceqanet.opr.ca.gov/search/recent>. In addition, the Notice of Exemption will be electronically posted on South Coast AQMD's webpage which can be accessed via the following weblink: <http://www.aqmd.gov/nav/about/public-notices/ceqa-notices/notices-of-exemption/noe---year-2021>. The electronic filing and posting of the Notice of Exemption is being implemented in accordance with Governor Newsom's Executive Orders N-54-20 and N-80-20 issued on April 22, 2020 and September 23, 2020, respectively, for the State of Emergency in California as a result of the threat of COVID-19.

Socioeconomic Impact Assessment

Proposed Rule 1147.1 potentially affects 37 facilities with new NOx and CO emission limits for burners used in aggregate dryers. Only two facilities with three dryers are expected to incur costs for the replacement of burners in 2022 in order to meet the 30 ppm limit. The remaining 35 facilities currently meet the Rule 1147 limit of 40 ppm and will meet the 30 ppm NOx limit after the useful life of the equipment. The total one-time cost of compliance from PR 1147.1 is estimated at \$1.35 million or \$125,000 per year when annualized over 15 years. The overall cost-effectiveness of PR 1147.1 is estimated at \$46,000 per ton of NOx emissions reduced. The regional job impacts are expected to be minimal.

Resource Impacts

Existing staff resources are adequate to implement the proposed rule.

Attachments

- A. Summary of Proposal
- B. Key Issues and Responses
- C. Rule Development Process
- D. Key Contacts List
- E. Resolution
- F. Proposed Rule 1147.1
- G. Final Staff Report with Socioeconomic Impact Assessment
- H. Notice of Exemption from CEQA
- I. Board Meeting Presentation

**ATTACHMENT A
SUMMARY OF PROPOSAL**

Proposed Rule 1147.1 – NO_x Reductions from Aggregate Dryers

Applicability:

- Gaseous fuel-fired aggregate dryers with daily NO_x emissions greater than one pound rated greater than 2,000,000 btu/hr

Emission Limits:

- Establishes interim NO_x emission limits of:
 - 40 ppm for non-RECLAIM facilities
 - 102 ppm for former RECLAIM facilities
- Establishes NO_x emission limit of 30 ppm and CO emission limit of 1,000 ppm for gaseous fuel fired aggregate dryers

Monitoring, Recordkeeping and Reporting:

- Periodic source testing based on equipment size:
 - < 10 MMBtu/hr – Every 5 Calendar Years
 - < 40 and ≥ 10 MMBtu/hr – Every 3 Calendar Years
 - ≥ 40 MMBtu/hr – Every Calendar Year
- Aggregate dryers rated ≥ 40 MMBtu/hr that have not operated for at least 6 consecutive months may conduct a source test no later than 90 days after date of resumed operation
- Aggregate dryers at a non-RECLAIM or former RECLAIM facility with an existing continuous emissions system or equivalent shall retain the system and comply with the requirements of Rules 218.2 and 218.3

Compliance Schedule

- Aggregate dryers with permit limits ≤ 40 ppm NO_x at 3% O₂ established by July 1, 2022 shall submit a permit application by July 1 of the following calendar year after the burner reaches 32 years of age (Units are already meeting current Rule 1147 limits that were established in 2008)
- All other aggregate dryers shall submit a permit application by July 1, 2022, or July 1 of the following calendar year after the burner reaches 12 years of age, whichever is later
- Aggregate dryers must demonstrate compliance with the proposed NO_x and CO limits within 18 months after permit to construct is issued

Exemptions

- The provisions of this rule shall not apply to aggregate dryers with daily NO_x emissions of less than one pound per day pursuant to methods specified in Rule 1147 – NO_x Reductions from Miscellaneous Sources
- The provisions of this rule shall not apply to tunnel dryers subject to Rule 1147 – NO_x Reductions from Miscellaneous Sources.

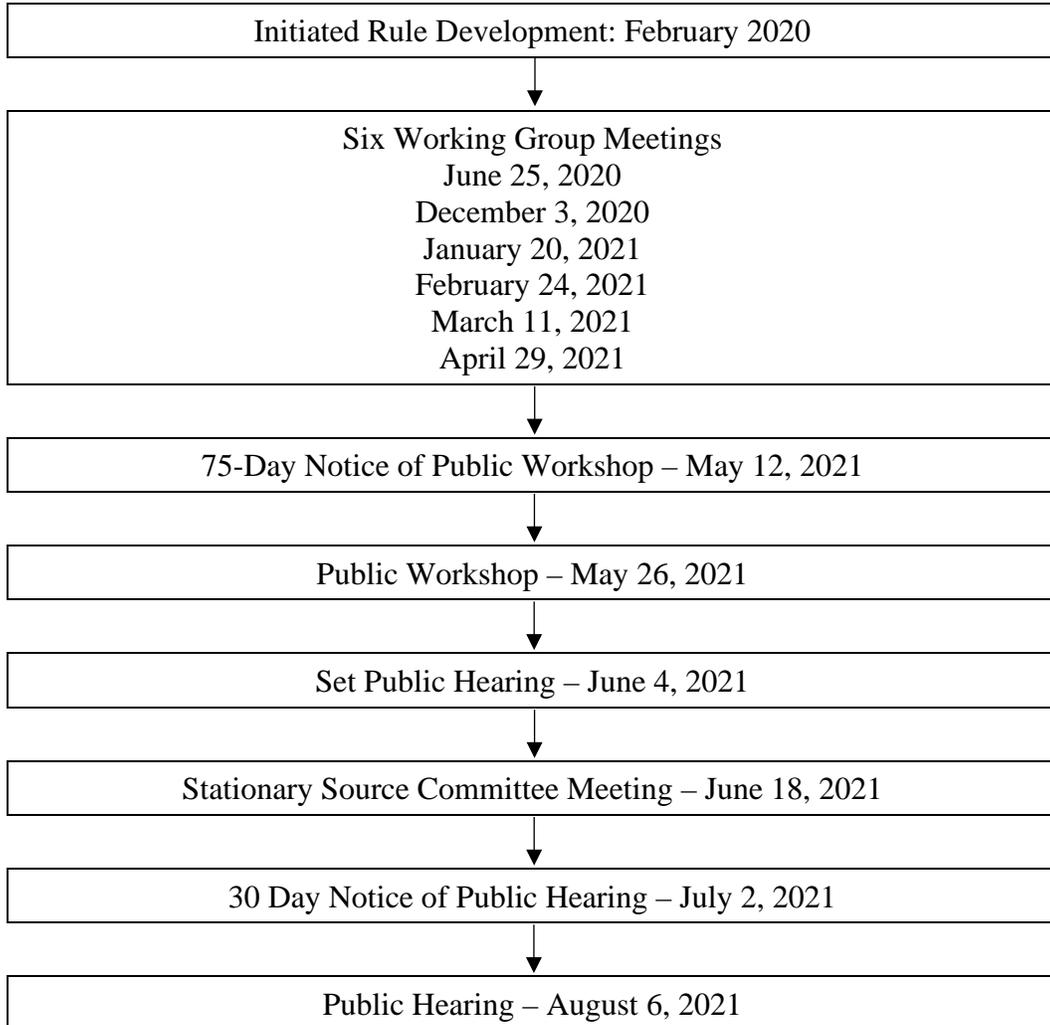
ATTACHMENT B
Key Issues and Responses

Proposed Rule 1147.1 – NOx Reductions from Aggregate Dryers

Staff is not aware of any outstanding key issues

**ATTACHMENT C
RULE DEVELOPMENT PROCESS**

Proposed Rule 1147.1 – NO_x Reductions from Aggregate Dryers



Eighteen (18) months spent in rule development.

One (1) Public Workshop.

One (1) Stationary Source Committee Meeting.

Six (6) Working Group Meeting.

ATTACHMENT D
KEY CONTACTS LIST

Proposed Rule 1147.1 – NO_x Reductions from Aggregate Dryers (*listed alphabetically*)

- 3M Company
- Advanced Engine Technologies Corporation
- Astec Inc
- All American Asphalt
- California Asphalt Pavement Association (CalAPA)
- California Construction and Industrial Materials Association (CalCIMA)
- CEMTEK KVB-Enertec
- City of Los Angeles
- Fives Group
- Fontana Paper Mill
- General Combustion Corporation
- Hauck (Honeywell Thermal Solutions)
- Lapeyre Industrial Sands (PW Gillibrand)
- Nationwide Boiler Incorporated
- R.J. Noble Company
- Sully-Miller
- Tri-Mer Corporation
- United States Environmental Protection Agency
- Vulcan Materials Company

ATTACHMENT E

RESOLUTION NO. 21-____

A Resolution of the Governing Board of the South Coast Air Quality Management District (South Coast AQMD) determining that Proposed Rule 1147.1 – NOx Reductions from Aggregate Dryers, is exempt from the requirements of the California Environmental Quality Act (CEQA).

A Resolution of the South Coast AQMD Governing Board adopting Proposed Rule 1147.1 – NOx Reductions from Aggregate Dryers.

WHEREAS, the South Coast AQMD Governing Board finds and determines that Proposed Rule 1147.1 is considered a “project” as defined by CEQA; and

WHEREAS, the South Coast AQMD has had its regulatory program certified pursuant to Public Resources Code Section 21080.5 and CEQA Guidelines Section 15251(l) and has conducted a CEQA review and analysis of the proposed project pursuant to such program (South Coast AQMD Rule 110); and

WHEREAS, the South Coast AQMD Governing Board finds and determines after conducting a review of the proposed project in accordance with CEQA Guidelines Section 15002(k) – General Concepts, the three-step process for deciding which document to prepare for a project subject to CEQA, and CEQA Guidelines Section 15061 – Review for Exemption, procedures for determining if a project is exempt from CEQA, that the proposed project is exempt from CEQA; and

WHEREAS, the South Coast AQMD Governing Board finds and determines that the only physical modifications that may occur in connection with the proposed project are associated with retrofitting dryers with low-NOx burners or replacing equipment at the end of its useful life, which may be achieved without involving construction or via minimal construction activities, depending on the affected facility, it can be seen with certainty that the proposed project would not cause any significant adverse effects on the environment, and is therefore exempt from CEQA pursuant to CEQA Guidelines Section 15061(b)(3) – Common Sense Exemption; and

WHEREAS, the South Coast AQMD staff has prepared a Notice of Exemption for the proposed project that is completed in compliance with CEQA Guidelines Section 15062 – Notice of Exemption; and

WHEREAS, the South Coast AQMD staff conducted a public workshop on May 26, 2021 regarding Proposed Rule 1147.1; and

WHEREAS, Proposed Rule 1147.1 and supporting documentation, including but not limited to, the Notice of Exemption, the Socioeconomic Impact Assessment that is contained in the Final Staff Report, and the Final Staff Report were presented to the South Coast AQMD Governing Board and the South Coast AQMD Governing Board has reviewed and considered this information, as well as has taken and considered staff testimony and public comment prior to approving the project; and

WHEREAS, the South Coast AQMD Governing Board finds and determines, taking into consideration the factors in Section (d)(4)(D) of the Governing Board Procedures (codified as Section 30.5(4)(D)(i) of the Administrative Code), that no modifications to Proposed Rule 1147.1 have been made since the notice of public hearing was published that are so substantial as to significantly affect the meaning of the proposed rule within the meaning of Health and Safety Code Section 40726 because: (a) the changes do not impact emission reductions, (b) the changes do not affect the number or type of sources regulated by the rule, (c) the changes are consistent with the information contained in the notice of public hearing, and (d) the consideration of the range of CEQA alternatives is not applicable because the proposed project is exempt from CEQA; and

WHEREAS, Proposed Rule 1147.1 will be submitted for inclusion into the State Implementation Plan; and

WHEREAS, California Health and Safety Code Section 40727 requires that prior to adopting, amending or repealing a rule or regulation, the South Coast AQMD Governing Board shall make findings of necessity, authority, clarity, consistency, non-duplication, and reference based on relevant information presented at the public hearing and in the Final Staff Report; and

WHEREAS, the South Coast AQMD Governing Board has determined that a need exists to adopt Proposed Rule 1147.1 – NO_x Reductions from Aggregate Dryers to continue with the transition of facilities in the RECLAIM program to a command-and-control regulatory structure by establishing Best Available Retrofit Control Technology (BARCT) to meet the commitments of Control Measure CMB-05 of the Final 2016 Air Quality Management Plan; and

WHEREAS, the South Coast AQMD Governing Board obtains its authority to adopt, amend, or repeal rules and regulations from Sections 39002, 39650 et. seq., 40000, 40001, 40440, 40441, 40702, 40725 through 40728, 41508, and 41700 of the Health and Safety Code; and

WHEREAS, the South Coast AQMD Governing Board finds that there is an ozone problem that Proposed Rule 1147.1 will alleviate and that the proposed rule will promote the attainment or maintenance of state or federal ambient air quality standards; and

WHEREAS, the South Coast AQMD Governing Board has determined that Proposed Rule 1147.1 is written and displayed so that its meaning can be easily understood by persons directly affected by it; and

WHEREAS, the South Coast AQMD Governing Board has determined that Proposed Rule 1147.1 is in harmony with, and not in conflict with or contradictory to, existing statutes, court decisions, or state or federal regulations; and

WHEREAS, the South Coast AQMD Governing Board has determined that Proposed Rule 1147.1 does not impose the same requirements as any existing state or federal regulations, and the proposed rule is necessary and proper to execute the powers and duties granted to, and imposed upon, the South Coast AQMD; and

WHEREAS, the South Coast AQMD Governing Board, in adopting Proposed Rule 1147.1, references the following statutes which the South Coast AQMD hereby implements, interprets or makes specific: Assembly Bill 617 and Health and Safety Code Sections 39002, 40001, 40702, 40440(a), and 40725 through 40728.5; and

WHEREAS, Health and Safety Code Section 40727.2 requires the South Coast AQMD to prepare a written analysis of existing federal air pollution control requirements applicable to the same source type being regulated whenever it adopts, or amends, a rule and the South Coast AQMD's comparative analysis of Proposed Rule 1147.1 is included in the Final Staff Report; and

WHEREAS, the public hearing has been properly noticed in accordance with the provisions of Health and Safety Code Section 40725 and 40440.5; and

WHEREAS, the South Coast AQMD Governing Board has held a public hearing in accordance with all provisions of law; and

WHEREAS, the South Coast AQMD specifies the Planning and Rules Manager of Proposed Rule 1147.1 as the custodian of the documents or other materials which constitute the record of proceedings upon which the adoption of this proposed rule is based, which are located at the South Coast Air Quality Management District, 21865 Copley Drive, Diamond Bar, California; and

WHEREAS, the South Coast AQMD Governing Board has determined that the Socioeconomic Impact Assessment of Proposed Rule 1147.1, as contained in the Final Staff Report, is consistent with the March 17, 1989 Governing Board Socioeconomic Resolution for rule adoption; and

WHEREAS, the South Coast AQMD Governing Board has determined that the Socioeconomic Impact Assessment for Proposed Rule 1147.1, as contained in the Final Staff Report, is consistent with the provisions of Health and Safety Code Sections 40440.8, 40728.5, and 40920.6; and

WHEREAS, the South Coast AQMD Governing Board has determined that Proposed Rule 1147.1 will result in increased costs to the affected industries, yet are considered to be reasonable, with a total annualized cost as specified in the Final Staff Report; and

WHEREAS, the South Coast AQMD Governing Board has actively considered the Socioeconomic Impact Assessment and has made a good faith effort to minimize such impacts; and

NOW, THEREFORE BE IT RESOLVED, that the South Coast AQMD Governing Board does hereby determine, pursuant to the authority granted by law, that Proposed Rule 1147.1 is exempt from CEQA pursuant to CEQA Guidelines Section 15061(b)(3) – Common Sense Exemption. This information was presented to the South Coast AQMD Governing Board, whose members exercised their independent judgment and reviewed, considered and approved the information therein prior to acting on Proposed Rule 1147.1; and

BE IT FURTHER RESOLVED, that the South Coast AQMD Governing Board does hereby adopt, pursuant to the authority granted by law, Proposed Rule 1147.1 as set forth in the attached, and incorporated herein by reference; and

BE IT FURTHER RESOLVED, that the South Coast AQMD Governing Board requests that Proposed Rule 1147.1 be submitted into the State Implementation Plan; and

BE IT FURTHER RESOLVED, that the Executive Officer is hereby directed to forward a copy of this Resolution and Proposed Rule 1147.1 and supporting documentation to the California Air Resources Board for approval and subsequently submitted to the U.S. Environmental Protection Agency for inclusion into the State Implementation Plan.

DATE: _____

CLERK OF THE BOARDS

PROPOSED RULE 1147.1 NO_x REDUCTIONS FROM AGGREGATE DRYERS**(a) Purpose**

The purpose of this rule is to reduce emissions of oxides of nitrogen (NO_x) while limiting carbon monoxide (CO) from gaseous fuel-fired aggregate dryers.

(b) Applicability

This rule applies to owners or operators of gaseous fuel-fired aggregate dryers with NO_x emissions greater than or equal to one pound per day with a rated heat input greater than 2,000,000 BTU per hour.

(c) Definitions

- (1) **AGGREGATE MATERIAL** means particulate materials used in construction and industrial manufacturing, including recycled concrete, recycled asphalt, and quarried materials such as sand, gravel, and crushed stone.
- (2) **AGGREGATE DRYER** means any combustion equipment fired with gaseous fuel used to reduce or minimize the moisture content of aggregate material, including dryers, rotary dryers, fluidized bed dryers and rotary kilns.
- (3) **BTU** means British thermal unit or units.
- (4) **COMBUSTION SYSTEM MODIFICATION** means any modification of burner(s) or heating unit that contains:
 - (A) Burner(s), or burner(s) fuel system;
 - (B) Combustion air supply; or
 - (C) Combustion control system that changes the rated heat input capacity of the burner(s) or heating unit.
- (5) **COMBUSTION SYSTEM REPAIR** means repairing or refurbishing, without resulting in a combustion system modification or combustion system replacement, the following components of an aggregate dryer:
 - (A) Burner(s) or heating unit that contains a burner(s), or burner(s) fuel system; or
 - (B) Combustion air supply, or combustion control system.
- (6) **COMBUSTION SYSTEM REPLACEMENT** means the substituting of a burner(s) or a heating unit that includes a burner(s).
- (7) **FORMER RECLAIM FACILITY** means a facility, or any of its successors, that was in the Regional Clean Air Incentives Market program as of January 5, 2018,

as established in Regulation XX, that has received a final determination notification, and is no longer in the RECLAIM program.

- (8) HEAT INPUT means the higher heating value of the fuel to the unit measured as BTU per hour. The higher heating value is the total heat liberated per mass of fuel combusted, expressed as BTUs per pound of cubic feet, when fuel and dry air at standard conditions undergo complete combustion and all resulting products are brought to their standard states at standard conditions.
 - (9) NON-RECLAIM FACILITY means a facility, or any of its successors, that was not in the Regional Clean Air Incentives Market program as of January 5, 2018, as established in Regulation XX.
 - (10) OXIDES OF NITROGEN (NO_x) EMISSIONS means the sum of nitric oxides and nitrogen dioxides emitted, collectively expressed as nitrogen dioxide emissions.
 - (11) PROTOCOL means a South Coast AQMD approved test protocol for determining compliance with emission limits for applicable equipment.
 - (12) RATED HEAT INPUT CAPACITY means the maximum gross heat input of the unit specified on a permanent rating plate attached by the manufacturer to the unit. If the unit has been altered or modified, the new gross heat input as specified in subparagraph (h)(2)(B) shall be considered as the rated heat input capacity.
 - (13) RECLAIM FACILITY means a facility, or any of its successors, that was in the Regional Clean Air Incentives Market program as of January 5, 2018, as established in Regulation XX.
- (d) Emission Requirements
- (1) Until an owner or operator of an aggregate dryer at a non-RECLAIM facility is required to meet the applicable NO_x and CO emission limits specified in subparagraph (d)(3)(B) or (d)(4)(B), the owner or operator shall not operate the aggregate dryer such that the NO_x emissions exceed a limit of 40 ppm, corrected to 3% oxygen, dry.
 - (2) Until an owner or operator of an aggregate dryer at a former RECLAIM facility is required to meet NO_x and CO emission limits in subparagraph (d)(3)(B) or (d)(4)(B), the owner or operator shall not operate the aggregate dryer such that the NO_x emissions exceed a limit of 102 ppm, corrected to 3% oxygen, dry.

- (3) An owner or operator of an aggregate dryer at a non-RECLAIM, RECLAIM, or former RECLAIM facility without a South Coast AQMD permit that limits NO_x emissions to 40 ppm or less at 3% oxygen, dry, established by July 1, 2022 shall:
- (A) For a burner that is 12 years of age or older, as determined pursuant to subdivision (e), beginning January 1, 2022 or every January 1 thereafter, submit a permit application by the date specified in Table 1 to meet the NO_x and CO limits specified in subparagraph (d)(3)(B); and
- (B) No later than the compliance date specified in Table 1, not operate the aggregate dryer such that the NO_x concentration limit of 30 ppm at 3% oxygen, dry, and the CO concentration limit of 1000 ppm at 3% oxygen, dry, are exceeded.

Table 1 – Compliance Schedule for Aggregate Dryers at ~~Greater than 40 ppm~~ Without a Permit Limit of 40 ppm or Less by July 1, 2022

Equipment Category	Permit Application Submittal Date	Compliance Date
Aggregate Dryer with burners installed prior to January 1, 2010	July 1, 2022	No later than 18 months after Permit to Construct is issued
Aggregate Dryer with burners installed on or after January 1, 2010	July 1 of the following calendar year after the burner reaches 12 years of age	No later than 18 months after Permit to Construct is issued

- (4) An owner or operator of an aggregate dryer at a non-RECLAIM, RECLAIM, or former RECLAIM facility with a South Coast AQMD permit that limits NO_x emissions to 40 ppm or less at 3% oxygen, dry, established by July 1, 2022 shall:
- (A) For a burner that is 32 years of age or older, as determined pursuant to subdivision (e), beginning January 1, 2023, or every January 1 thereafter, submit a permit application by the date specified in Table 2 to meet the NO_x and CO limits specified in subparagraph (d)(4)(B); and
- (B) No later than the compliance date in Table 2, not operate the aggregate dryer such that the NO_x concentration limit of 30 ppm at 3% oxygen, dry, and the CO concentration limit of 1000 ppm at 3% oxygen, dry, are exceeded.

**Table 2 –Compliance Schedule for Aggregate Dryers at With a Permit Limit of 40 ppm
or Less by July 1, 2022**

Equipment Category	Permit Application Submittal Date	Compliance Date
Aggregate Dryer with permit limit at or below 40 ppm by July 1, 2022	July 1 of the following calendar year after the burner reaches 32 years of age	No later than 18 months after Permit to Construct is issued

- (5) An owner or operator that elects to permanently shutdown an aggregate dryer no later than 36 months after the permit application submittal date pursuant to subparagraph (d)(3)(A) or (d)(4)(A) shall not be required to submit a permit application pursuant to paragraph (d)(3) or (d)(4) provided:
- (A) On or before the permit application for the aggregate dryer is required to be submitted pursuant to paragraph (d)(3) or (d)(4), notify the Executive Officer in writing that the aggregate dryer will be shutdown no later than 36 months after the permit application submittal date pursuant to paragraph (d)(3) or (d)(4); and
 - (B) No later than 36 months after the permit application submittal date pursuant to paragraph (d)(3) or (d)(4), the owner or operator shall:
 - (i) Surrender the South Coast AQMD permit to operate for the aggregate dryer; and
 - (ii) Disconnect and blind the fuel line for the aggregate dryer.
- (6) An owner or operator that submitted a notification pursuant to subparagraph (d)(5)(A) that elects not to permanently shutdown the aggregate dryer shall:
- (A) Submit a permit application to the Executive Officer no later than 12 months after the date a permit application is due pursuant to paragraph (d)(3) or (d)(4); and
 - (B) No later than 12 months after the Permit to Construct is issued, meet the NOx and CO emission limits specified in subparagraph (d)(3)(B) or (d)(4)(B).
- (7) An owner or operator of an aggregate dryer that meets the requirements specified in paragraph (i)(1), that fails to demonstrate NOx emissions of less

than one pound per day pursuant to Rule 1147 – NO_x Reductions from Miscellaneous Sources, shall comply with the emission limits specified in subparagraph (d)(3)(B) in accordance with the schedule specified in paragraph (d)(3) or the following, whichever is later:

- (A) For a burner installed prior to January 1, 2010, as determined pursuant to subparagraphs (e)(1)(A) through (e)(1)(C), submit a permit application to meet the NO_x and CO limits specified in subparagraph (d)(3)(B) no later than 180 days from the date the aggregate dryer failed to demonstrate NO_x emissions of less than one pound per day; and
 - (B) No later than 18 months after Permit to Construct is issued, not operate the aggregate dryer such that the emission limits specified in subparagraph (d)(3)(B) are exceeded.
- (8) An owner or operator of an aggregate dryer with a South Coast AQMD permit that limits NO_x emissions to 40 ppm or less at 3% oxygen, dry, established by July 1, 2022, that exceeds a permitted NO_x concentration of 40 ppm or less before the burner reaches 32 years, shall meet the NO_x and CO emission limits specified in subparagraph (d)(3)(B) in accordance with the schedule specified in paragraph (d)(3) or the following, whichever is later:
- (A) For a burner installed prior to January 1, 2010, as determined pursuant to subparagraphs (e)(1)(A) through (e)(1)(C), submit a permit application to meet the NO_x and CO limits specified in subparagraph (d)(3)(B) no later than 180 days from the date an aggregate dryer failed to demonstrate emissions in accordance to a South Coast AQMD permit; and
 - (B) No later than 18 months after Permit to Construct is issued, not operate the aggregate dryer such that the emission limits specified in subparagraph (d)(3)(B) are exceeded.
- (9) An owner or operator of an aggregate dryer complying with paragraph (d)(3) or (d)(4) that fails to submit permit application by the date specified in paragraph (d)(3) or (d)(4), shall meet the NO_x and CO emission limits specified in subparagraph (d)(3)(B) or (d)(4)(B) no later than 30 months after the permit application submittal date pursuant to paragraph (d)(3) or (d)(4).
- (e) Burner Age Determination

- (1) An owner or operator shall determine the burner age referenced in paragraphs (d)(3) and (d)(4) based on the 12 month period prior to January 1 of each year using the original installation date as determined by the:
 - (A) Invoice from the manufacturer for purchase and installation of the burner;
 - (B) Original manufacturer's identification or rating plate permanently fixed to the equipment;
 - (C) Information submitted to the South Coast AQMD with prior permit applications for the specific burner.
 - (D) Information regarding the burner included in the South Coast AQMD permit; or
 - (E) Original burner serial number provided by the burner manufacturer indicating date of manufacture.
 - (2) In absence of the information specified in paragraph (e)(1), the burner age will be deemed by the South Coast AQMD to be 32 years old as of January 1, 2022.
- (f) Monitoring
- (1) An owner or operator of an aggregate dryer subject to paragraph (d)(3) or (d)(4) shall:
 - (A) Submit a source test protocol to the Executive Officer for approval no later than 90 days prior to the scheduled source test;
 - (B) Conduct a source test to demonstrate compliance with emission limits specified in subparagraphs (d)(3)(B) or (d)(4)(B) using an Executive Officer approved source test protocol on or before 90 days of receipt of written approval; and
 - (C) Conduct a source test to demonstrate compliance with the NO_x and CO emission limits specified in subparagraph (d)(3)(B) or (d)(4)(B) no later than the compliance date specified in paragraph (d)(3) or (d)(4).
 - (2) An owner or operator of an aggregate dryer with a previously approved protocol used to comply with paragraph (f)(1), can use the previously approved protocol if the burner or aggregate dryer has not been altered in a manner that requires a permit modification and if the permit emission limits have not changed since the previous test.
 - (3) An owner or operator of an aggregate dryer shall demonstrate compliance with the NO_x and CO emission limits specified in subparagraph (d)(3)(B) or

- (d)(4)(B) and determine stack-gas oxygen and carbon dioxide concentrations using a South Coast AQMD approved contractor under the Laboratory Approval Program according to the following procedures:
- (A) South Coast AQMD Source Test Method 100.1 – Instrumental Analyzer Procedures for Continuous Gaseous Emission Sampling (March 1989);
 - (B) South Coast AQMD Source Test Method 10.1 – Carbon Monoxide and Carbon Dioxide by Gas Chromatograph/Non-Dispersive Infrared Detector (GC/NDIR) – Oxygen by Gas Chromatograph-Thermal Conductivity (GC/TCD) (March 1989); or
 - (C) Any alternative test method submitted in writing to, and pre-approved by, the Executive Officers of the South Coast AQMD, the California Air Resources Board and the United States Environmental Protection Agency.
- (4) An owner or operator of an aggregate dryer shall conduct source tests pursuant to paragraph (f)(1) to demonstrate compliance with the applicable NO_x and CO emission limit requirements in subparagraphs (d)(3)(B) or (d)(4)(B):
- (A) For an aggregate dryer with a rated heat input capacity lower than 10 million Btu per hour, conduct source testing every 5 calendar years, but no earlier than 54 calendar months after the previous source test;
 - (B) For an aggregate dryer with a rated heat input capacity greater than or equal to 10 million Btu per hour and less than 40 million BTU per hour, conduct source testing every 3 calendar years, but no earlier than 30 calendar months after the previous source test; or
 - (C) For an aggregate dryer with a rated heat input capacity greater than or equal to 40 million Btu per hour:
 - (i) Conduct source testing every calendar year, but no earlier than 6 calendar months after the previous source test; or
 - (ii) If the aggregate dryer has not operated for at least 6 consecutive calendar months, conduct a source test no later than 90 days after the date of resumed operation and maintain monthly fuel usage using a non-resettable fuel meter to demonstrate that the aggregate dryer has not been operated for at least 6 consecutive calendar months.

- (5) Source test reports, including a description of the equipment tested, shall be submitted to the Executive Officer within 60 days of completion of the test.
 - (6) Beginning January 1, 2023 or when the burner becomes 15 years of age, determined pursuant to subdivision (e), whichever is later, an owner or operator of an aggregate dryer at a non-RECLAIM, RECLAIM or former RECLAIM facility opting to comply with paragraph (d)(4) shall demonstrate compliance with the NO_x emission limits of 40 ppm or lower specified in a South Coast AQMD Permit in accordance with paragraph (f)(1), on the schedule specified in paragraph (f)(4) until the aggregate dryer meets the NO_x and CO emission limits in subparagraph (d)(4)(B).
 - (7) If a source test pursuant to paragraph (f)(1) was conducted within 12 months prior to the compliance determination required in paragraph (f)(6), an owner or operator of an aggregate dryer subject to paragraph (f)(6) may use that source test to comply with paragraph (f)(1).
 - (8) Provided the emissions test set forth in this paragraph is conducted within the same schedule as the compliance determination required in paragraph (f)(4), an owner or operator of an aggregate dryer may use the following emissions test to comply with paragraph (f)(4):
 - (A) Periodic monitoring or testing of a unit as required in a Title V permit pursuant to Regulation XXX, or
 - (B) Relative accuracy testing for continuous emissions monitoring verification pursuant to Rule 218.2 and Rule 218.3.
- (g) Recordkeeping and Reporting
- (1) The owner or operator of an existing continuous in-stack emissions monitor or equivalent verification system located at a non-RECLAIM or former RECLAIM facility prior to [Date of Adoption] shall retain the system and comply with the requirements specified in Rules 218.2 and 218.3.
 - (2) The owner or operator of any aggregate dryer located at a non-RECLAIM or former RECLAIM facility subject to paragraph (g)(1) shall use a rolling averaging time of 60 minutes corrected to 3% oxygen, dry, to demonstrate compliance with the NO_x emission limits specified in paragraphs (d)(1), (d)(2), (d)(3), or (d)(4).
 - (3) Records of source tests shall be maintained for five years and shall be made available to South Coast AQMD personnel upon request. Emissions determined

to exceed any limits established by this rule through the use of any of the test methods specified in subparagraphs (f)(4)(A) through (f)(4)(C) shall constitute a violation of this rule .

- (4) RECLAIM facilities must continue to comply with reporting requirements pursuant to Regulation XX until such time that the facility becomes a Former RECLAIM facility.
- (h) Labeling Requirements
- (1) An owner or operator of an aggregate dryer shall display the model number and rated heat input capacity of the unit burner on a permanent rating plate.
 - (2) Labeling of Modified Aggregate Dryers
The owner or operator of a modified aggregate dryer shall:
 - (A) Display the new rated heat input capacity on a new permanent supplemental rating plate installed in an accessible location on the unit or burner; and
 - (B) Calculate gross heat input based on maximum fuel input corrected for fuel content, temperature, pressure, and fuel consumption recorded by an in-line fuel meter by the manufacturer or installer.
 - (3) The owner or operator of an aggregate dryer shall maintain on site a copy of all documents identifying the unit's rated heat input capacity for as long as the unit is retained on-site. The rated heat input capacity shall be identified by a manufacturer's or distributor's manual or invoice and a permanent rating plate attached to the unit.
 - (4) Any owner or operator of a burner or unit modified or replaced shall retain on-site and make available upon request by the Executive Officer, the following documentation:
 - (A) Heat input capacity calculated with the method specified in subparagraph (h)(2)(B);
 - (B) Name of the company and person modifying or replacing the burner or unit;
 - (C) Description of all modifications made to the burner or unit; and
 - (D) Date the burner or aggregate dryer was modified or replaced.
- (i) Exemptions

- (1) The provisions of this rule shall not apply to aggregate dryers with daily NO_x emissions of less than one pound per day pursuant to methods specified in Rule 1147 – NO_x Reductions from Miscellaneous Sources.
- (2) The provisions of this rule shall not apply to tunnel dryers subject to Rule 1147 – NO_x Reductions from Miscellaneous Sources.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Final Staff Report

Proposed Rule 1147.1 - NOx Reductions from Aggregate Dryers

August 2021

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EXECUTIVE SUMMARY

Proposed Rule 1147.1 – NO_x Reductions from Aggregate Dryers, seeks emission reductions of oxides of nitrogen (NO_x) from dryers at aggregate facilities and is part of a suite of “landing” rules for facilities currently regulated under the Regional Clean Air Incentives Market (RECLAIM) program or under another existing source specific rule. The goal is to conduct an updated Best Available Retrofit Control Technology (BARCT) analysis to ensure affected equipment is feasibly controlled to achieve cost effective maximum emission reductions.

The South Coast Air Quality Management District (South Coast AQMD) adopted Regulation XX – RECLAIM in October 1993. The purpose of RECLAIM is to reduce NO_x and SO_x emissions through a market-based approach. It also was designed to provide equivalent emission reductions, in the aggregate, for the facilities in the program compared to what would occur under a command-and-control approach.

Control Measure CMB-05 of the Final 2016 Air Quality Management Plan (AQMP) directed staff to transition the RECLAIM program to a command-and-control regulatory structure requiring BARCT as soon as practicable and to achieve a five tons per day NO_x emission reduction as soon as feasible but no later than 2025.

Aggregate facilities conduct operations which support the construction industry by producing materials such as hot mix asphalt and other construction aggregates such as sand, gravel and recycled concrete. These operations have the potential to emit NO_x and particulate matter, to which the latter pollutant is regulated elsewhere, requiring controls such as baghouses. NO_x emissions are primarily generated from the burners needed to heat critical equipment in the processes such as rotary dryers.

Proposed Rule 1147.1 is a new rule that will primarily update NO_x emission limits for aggregate dryers currently regulated under Rule 1147, as well as establish an implementation schedule, and requirements for monitoring and recordkeeping. The revised NO_x emission limits represent BARCT and apply to RECLAIM and non-RECLAIM facilities. The proposed rule will replace the applicability of equipment previously subject to Rule 1147. Specifically, Proposed Rule 1147.1 will apply to gaseous fuel-fired aggregate dryers previously subject to the “asphalt manufacturing” category of Rule 1147. Proposed Rule 1147.1 will maintain the compliance schedule structure like that of Rule 1147, with updated compliance dates and new limits for NO_x and CO emissions for RECLAIM, non-RECLAIM, and former RECLAIM facilities.

Units applicable to Proposed Rule 1147.1 will be subject to proposed emission limits of 30 ppm NO_x and 1,000 ppm CO. Owners or operators of units with rated heat input of less than 2,000,000 BTU/hr or emit less than one pound per day of NO_x will continue to be subject to Rule 1147. Units that comply with the existing Rule 1147 limit of 40 ppm NO_x shall submit permit applications to meet proposed emission limits by July 1 of the year after the unit burner becomes 32 years old. Owners or operators of a units that are not in compliance with the existing Rule 1147 NO_x limit must submit applications to meet proposed emission limits by July 1, 2022, or July 1 of the year after unit burner becomes 12 years old, whichever is later. The compliance deadlines for Proposed Rule 1147.1 were established by taking into consideration equipment size range, application type, the number of units per facility, and whether facilities had multiple pieces of equipment subject to multiple source-specific command-and-control rules. The total emissions inventory for the PR 1147.1 universe is 0.38 tons per day (tpd). Emission reductions from the three facilities expected to submit permit applications by July 1, 2022 is estimated to be 0.01 tpd by July 1, 2025 and

expected total reductions from the Proposed Rule 1147.1 universe to be 0.04 tpd by full implementation estimate of July 1, 2056.

CHAPTER 1: BACKGROUND

Introduction

Regulatory History

Affected Industries

Public Process

Introduction

The Regional Clean Air Incentives Market (RECLAIM) program was adopted in October 1993 under Regulation XX. RECLAIM is a market-based emissions trading program designed to reduce NO_x and SO_x emissions and includes facilities with NO_x or SO_x emissions greater than 4 tons per year. The 2016 Final Air Quality Management Plan (2016 AQMP) included Control Measure CMB-05: Further NO_x Reductions from RECLAIM Assessment (CMB-05) to ensure the NO_x RECLAIM program was achieving equivalency with command-and-control rules that are implementing Best Available Retrofit Control Technology (BARCT) and to generate further NO_x emission reductions at RECLAIM facilities. The adoption resolution for the 2016 AQMP directed staff to achieve five tons per day of NO_x emission reductions as soon as feasible but no later than 2025, and to transition the RECLAIM program to a command-and-control regulatory structure requiring BARCT as soon as practicable.

As facilities transition out of NO_x RECLAIM, a command-and-control rule that includes NO_x emission standards that reflect BARCT is needed for all equipment categories. Proposed Rule (PR) 1147.1 – NO_x Reductions from Aggregate Dryers is a “landing” rule for RECLAIM facilities with aggregate dryers and will establish NO_x and CO emission limits for natural gas fired aggregate dryers at RECLAIM, non-RECLAIM, and former RECLAIM facilities. Non-RECLAIM facilities were previously subject to the Rule 1147 – NO_x Reductions from Miscellaneous Sources category for asphalt manufacturing operations.

Background

For Non-RECLAIM facilities, aggregate dryers are currently regulated under Rule 1147 - NO_x Reductions from Miscellaneous Sources. Includes a wide range of miscellaneous combustion sources, that are generally smaller in size. Aggregate dryers are unique due to their large size and lower operating temperatures, with a combustion environment which has high moisture and particulate levels. The average equipment size of aggregate dryers in the South Coast AQMD is 100 MMbtu/hr and operate at temperatures below 800°F. These factors create more unique challenges for control technologies such as selective catalytic reduction (SCR) and sophisticated in-stack monitoring techniques such as Continuous Emissions Monitory Systems (CEMS). As a result, staff decided to create Proposed Rule 1147.1 for aggregate dryers at non-RECLAIM, RECLAIM, and former RECLAIM facilities.

Regulatory History

PR 1147.1 will regulate aggregate dryers at RECLAIM and non-RECLAIM facilities. Prior to the adoption of RECLAIM, aggregate dryers were unregulated. Asphalt and aggregate facilities with annual NO_x emissions greater than 4 tons per year are regulated under RECLAIM. Non-RECLAIM facilities with aggregate dryers are regulated under Rule 1147. The following provides the regulatory history for aggregate dryers under RECLAIM and Rule 1147.

Regulation XX – RECLAIM

The South Coast AQMD Governing Board adopted the RECLAIM program in October 1993. Regulation XX – Regional Clean Air Incentives Market (RECLAIM) (Regulation XX) includes a series of rules that specify the applicability and procedures for determining NO_x and SO_x facility emissions allocations, program requirements, as well as monitoring, reporting, and recordkeeping requirements for RECLAIM facilities. RECLAIM replaced a series of existing and future command-and-control rules and was designed to achieve BARCT in aggregate. At the start of RECLAIM, facilities received an allocation of RECLAIM Trading Credits (RTCs). At the end of each compliance year, facilities are required to hold RTCs that are equal or greater than were equal to their actual annual emissions.

Under RECLAIM, facilities can install pollution controls to reduce NO_x emissions or buy or trade RTCs. Any unused RTCs from over control, reduction in throughput, or equipment shutdowns, can be sold or traded.

For aggregate dryers, allocations were based on the facility's reported emission rate since there were no proposed BARCT limits at the time. Over the life of RECLAIM, allocations have been "shaved" or reduced twice, however, only the first shave affected facilities with aggregate dryers. The second shave only affected facilities with the largest holdings of RTCs in 2015. In response to concerns regarding actual emission reductions and implementation of BARCT under RECLAIM, Control Measure CMB-05 of the 2016 AQMP committed to an assessment of the RECLAIM program to achieve further NO_x emission reductions of five tons per day, including actions to transition the program and ensure future equivalency to command-and-control regulations. During the adoption of the 2016 AQMP, the adoption resolution directed staff to modify Control Measure CMB-05 to achieve the five tons per day NO_x emission reduction as soon as feasible but no later than 2025, and to transition the RECLAIM program to a command-and-control regulatory structure requiring BARCT-level controls as soon as practicable. PR 1147.1 is needed to transition RECLAIM facilities with aggregate dryers to a command-and-control regulatory structure. PR 1147.1 will apply to facilities while in RECLAIM and after the facility transitions out of RECLAIM and becomes a former RECLAIM facility.

Rule 1147 – NO_x Reductions from Miscellaneous Sources

Rule 1147 was adopted in December 2008 and establishes NO_x limits for a wide variety of miscellaneous combustion sources at non-RECLAIM facilities. Rule 1147 applies to ovens, dryers, dehydrators, heaters, kilns, calciners, furnaces, crematories, incinerators, heated pots, cookers, roasters, fryers, closed and open heated tanks and evaporators, distillation units, afterburners, degassing units, vapor incinerators, catalytic or thermal oxidizers, soil and water remediation units and other combustion equipment with NO_x emissions that require a South Coast AQMD permit and are not specifically required to comply with a NO_x emission limit by other South Coast AQMD Regulation XI rules.

- December 2008 - Rule 1147 was adopted.
- September 2011 - Rule 1147 was amended in order to respond to compliance challenges by delaying compliance dates as well as providing alternative compliance pathways and reducing testing requirements for impacted equipment. The rule amendment also required staff to conduct a technology assessment for small combustion sources impacted by the rule.
- February 2017 - staff conducted a technology assessment focused on low-use equipment emitting less than one-pound NO_x per day. The completed Technology Assessment was reviewed by an independent third-party consultant as well as the Rule 1147 Task Force.
- July 2017 - Rule 1147 was amended to reflect findings and recommendations from the Technology Assessment conducted in February 2017. This amendment provided additional compliance flexibility by including an exemption for equipment with heat input ratings of less than 325,000 BTU/hr. The amendment also removed the in-use requirement for low-use equipment, modified emission limits for various equipment categories in line with findings from the February 2017 Technology Assessment and provided additional compliance options for impacted equipment.

Under the asphalt manufacturing category of Rule 1147, applicable equipment including aggregate dryers are subject to the NO_x limit of 40 ppm. All in-use aggregate dryers subject to Rule 1147

emitting one pound or more of NO_x per day are required to demonstrate compliance with the Rule 1147 limit of 40 ppm according to the schedule outlined below in Table 1-1 – Rule 1147 Compliance Schedule.

Table 1-1 – Rule 1147 Compliance Schedule (≥1 lb/Day of NO_x)

Equipment Category(ies)	Submit Permit Application	Unit Shall Be in Compliance
Specific UNIT		
Remediation UNIT manufactured and installed prior to March 1, 2012	Seven months prior to a combustion system modification, combustion system replacement or unit replacement or a relocation.	Upon combustion system modification, combustion system replacement or unit replacement or relocation beginning March 1, 2012
Evaporator, heated process tank, or parts washer with a District permit issued and operating prior to January 1, 2014	Seven months prior to combustion system modification, combustion system replacement or unit replacement	Upon combustion system modification, combustion system replacement or unit replacement
Tar Pot		All new permit applications beginning January 1, 2013
UNIT with Emissions ≥1 Pound/Day		
Afterburner, degassing unit, catalytic oxidizer, thermal oxidizer, vapor incinerator, fryer, or spray booth make-up air heater manufactured prior to 1998	December 1, 2013	July 1, 2014
Other UNIT manufactured prior to 1986	December 1, 2011	July 1, 2012
Other UNIT manufactured prior to 1992	December 1, 2011	July 1, 2012
Other UNIT manufactured prior to 1998	December 1, 2012	July 1, 2013
Any UNIT manufactured after 1997	December 1 of the year prior to the compliance date	July 1 of the year the unit is 15 years old

All new applicable aggregate dryers subject to Rule 1147 are required to demonstrate compliance with the rule limit existing at the time of permitting. Units emitting less than one pound per day of NO_x are required to demonstrate compliance with Rule 1147 limit of 40 ppm when the unit becomes 35 years old unless opting to demonstrate NO_x emissions of less than one pound per day through biennial emissions testing. Rule 1147 does not have periodic monitoring requirements. RECLAIM Rule 2012 requires periodic monitoring and bi-annual tune ups with frequency determined by source categorization of Major, Large or Process sources:

- Major sources are required to install CEMS with daily, monthly, quarterly, and annual reporting with minimum of semi-annual RATA
- Large sources are required to conduct source testing every 3 years with requirement for bi-annual tune up
- Process sources are required to conduct source testing every 5 years with requirement for bi-annual tune up

Rule 1147 itself does not have a CO requirement in the rule itself. Instead, CO requirements of the asphalt manufacturing category of Rule 1147 are based on a limit of 2000 ppm corrected to 3% oxygen from South Coast AQMD Rule 407 – *Liquid and Gaseous Air Contaminants*.

AB 617

On July 26, 2017, Governor Brown signed AB 617 (Cynthia Garcia): Nonvehicular air pollution: criteria air pollutants and toxic air contaminants. AB 617 was companion legislation to AB 398 which extended California's cap and trade program for reducing greenhouse gas emissions from

stationary sources. RECLAIM facilities that are part of the cap-and-trade program are now also subject to the requirements of AB 617. AB 617 requires an expedited schedule for implementing BARCT for cap-and-trade facilities. Under AB 617, the State's air districts were to develop a schedule by January 1, 2019 for the implementation of BARCT no later than December 31, 2023. The schedule must give highest priority to those permitted units that have not modified emissions-related permit conditions for the greatest period of time and does not apply to an emissions unit that has implemented BARCT due to a permit revision or a new permit issuance since 2007.

Affected Industries

PR 1147.1 will affect RECLAIM and non-RECLAIM facilities that own or operate permitted gaseous fuel-fired aggregate dryers such as rotary dryers and fluidized bed dryers. Based on permitting data, affected facilities generally do not operate more than two pieces of applicable equipment in one location. Based on South Coast AQMD permitting data, staff identified 37 facilities that are subject to PR 1147.1. Of the 37 facilities, 13 facilities are in RECLAIM and 24 are non-RECLAIM facilities.

Public Process

Development of PR 1147.1 was conducted through a public process. South Coast AQMD staff has held six Working Group Meetings. Staff recognized the challenges businesses and other stakeholders have experienced with the global COVID-19 pandemic and have conducted Working Group Meetings remotely via Zoom consistent with Governor Newsom's Executive Order N-29-20 dated March 17, 2020. Remote Working Group Meetings were held on June 25, 2020, December 3, 2020, January 20, 2021, February 24, 2021, March 11, 2021, and April 29, 2021. The Working Group is composed of representatives from the equipment manufacturers, trade organizations, permit stakeholders, businesses, environmental groups, public agencies, consultants, and other interested parties. The purpose of the Working Group Meetings was to discuss proposed concepts and to work through the details of staff's proposal. A Public Workshop was held on May 26, 2021. Staff has also had numerous individual meetings with stakeholders who will be impacted by this rulemaking and conducted virtual site visits to six potentially impacted facilities.

CHAPTER 2: BARCT ASSESSMENT

**BARCT Assessment
Monitoring, Reporting, and Recordkeeping**

BARCT Assessment

Health & Safety Code §40406 defines BARCT as follows:

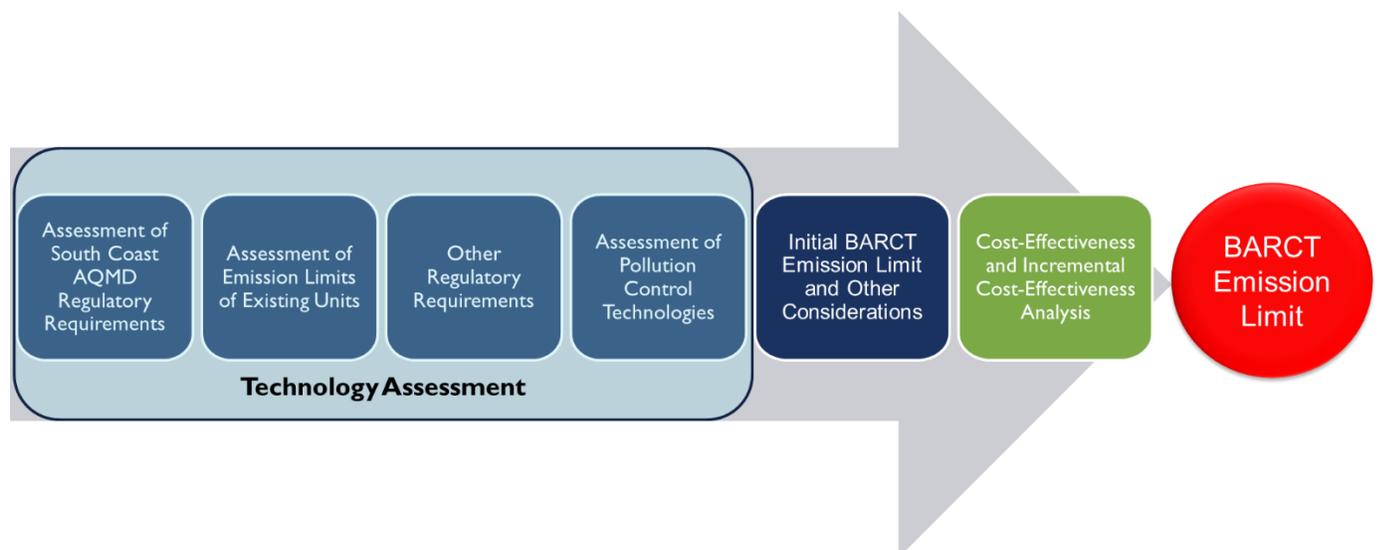
Best Available Retrofit Control Technology means an emission limitation that is based on the maximum degree of reduction achievable, taking into account environmental, energy, and economic impacts by each class or category of source.

The California Health and Safety Code Section 40920.6 establishes requirements prior to adopting rules or regulations regarding retrofit control technologies. Some of these requirements include:

- Identifying one or more potential control options which achieves the emission reduction objective for the regulation.
- Reviewing the information developed to assess the cost-effectiveness of the potential control option, where cost-effectiveness is defined as the cost, in dollars, of the potential control option divided by emission reduction potential, in tons (i.e., the amount of dollars per ton of NO_x reduced).
- Calculating the incremental cost-effectiveness for the potential control options is defined as the difference in the costs divided by the difference in the emission reduction potential between each progressively more stringent potential control option as compared to the next less expensive control option.

The BARCT technology assessment for aggregate dryers included ~~a technology assessment that included~~ assessment of existing regulatory requirements, existing NO_x limits that have been achieved, and review of commercially available NO_x emission reduction technologies for aggregate dryers. ~~After~~ staff conducts the technology assessment that identifies potential control options. Before the proposed BARCT limit is established staff will evaluate the cost-effectiveness and incremental cost-effectiveness. A summary of the BARCT assessment is provided below in Figure 2-1.

Figure 2-1 – Summary of BARCT Assessment



Assessment of South Coast AQMD Regulatory Requirements

As part of the BARCT assessment, staff reviewed NO_x limits in Rule 1147 which regulates NO_x emissions from ovens, dryers, dehydrators, heaters, kilns, calciners, furnaces, crematories,

incinerators, heated pots, cookers, roasters, fryers, closed and open heated tanks and evaporators, distillation units, afterburners, degassing units, vapor incinerators, catalytic or thermal oxidizers, soil and water remediation units and other combustion equipment with nitrogen oxide emissions that require a South Coast AQMD permit and are not specifically required to comply with a nitrogen oxide emission limit by other South Coast AQMD Regulation XI rules. Current rule emission limits were adopted on July 7, 2017. All NO_x concentration limits specified in Rule 1147 are referenced at 3 percent volume stack gas oxygen on a dry basis.

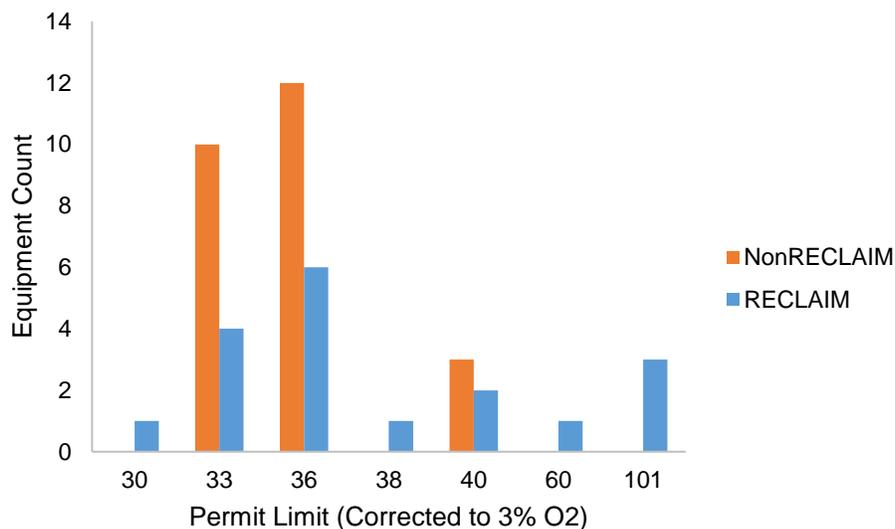
Under the asphalt manufacturing category of Rule 1147, applicable equipment including aggregate dryers are subject to the NO_x limit of 40 ppm. All in-use aggregate dryers subject to Rule 1147 emitting one pound or more of NO_x per day are required to demonstrate compliance with the Rule 1147 limit of 40 ppm.

Assessment of NO_x Emission Limits for Existing Units

Permit Limits

As part of the BARCT analysis, permit limits for aggregate drying operations from within the South Coast AQMD were reviewed. The objective of this part of the technology assessment is to ascertain current permitted emission limits that are lower than the NO_x limit established for the asphalt manufacturing category of Rule 1147. The analysis also identified other control technologies implemented by permitted equipment to achieve designated permit limits. Additional considerations were made regarding equipment configurations such as rotary dryers, hot asphalt mixers/dryers, and fluidized bed dryers. Permit limits of existing permitted aggregate dryer range between 30 ppm to 101.4 ppm (equivalent to RECLAIM default emission factor of 130 lb/mm scf). Summary of the assessment for permit limits of 43 permitted aggregate dryers is shown in Figure 2-2.

Figure 2-2 – Summary of Assessment on Aggregate Dryer Permit Limits



Source Test

Facility-submitted source test results were analyzed to assess NO_x concentration levels being achieved. Within South Coast AQMD, there are a total of 25 non-RECLAIM units and 18 RECLAIM units subject to PR 1147.1. Burner size observed during source test assessment ranged between 25 MMBtu/hr to 125 MMBtu/hr. Staff reviewed 40 facility submitted source test reports

representing 27 permitted units at 24 facilities. Some source test reports were for the same unit. Of the 40 source test reports, staff removed one source test from the analysis due to noncompliant results and removed six source tests due to lack of CO testing. The remaining 33 source test results surveyed are shown in Table 2 and acquired from 25 permitted units that made up 60% of the total units located in South Coast AQMD. ~~Ten of these with 10~~ units are from the non-RECLAIM universe and 15 units from the RECLAIM universe. Two units highlighted in Table 2 were identified to be subject to RECLAIM default reporting factor of 130 lb/mmscf (equivalent to 102 ppm NO_x). Source test results were obtained from the South Coast AQMD database which consists of source tests submitted by facilities to demonstrate compliance with various monitoring and testing requirements.

Of the 33 remaining source test results that were further evaluated, 17 units displayed both NO_x emissions of below 30 ppm corrected to 3% O₂ and CO emissions below 1,000 ppm corrected to 3% O₂. Emissions data displayed in Table 2-1 show that it is technically feasible for equipment subject to PR 1147.1 to achieve an emission limit of both 30 ppm NO_x corrected to 3% O₂ and 1,000 ppm CO corrected to 3% O₂ simultaneously with burner only control strategies. Some source test results suggest that a limit of below 30 ppm is feasible, staff is recommending a 30 ppm NO_x limit in proposed rule 1147.1 to provide a built-in compliance margin to account for variations due to aggregate quality and facility location.

Table 2-1 –Results of Source Test Evaluation

	Test Date	Equipment Heat Input (MMBtu/hr)	Permit NOx Limit (@3% O2)	NOx Result (@ 3% O2)	CO Result (@ 3% O2)
Non-RECLAIM	9/20/2018	50	36	24.0	151.0
	9/19/2018	113	36	26.9	251.0
	6/29/2010	66	40	35.0	321.0
	1/21/2013	100	33	28.3	41.6
	9/19/2018	100	33	26.9	251.0
	4/6/2017	100	36	26.5	328.0
	6/25/2010	110	40	33.3	116.0
	2/27/2013	125	36	26.8	11.9
	7/31/2007	125	33	28.7	204.0
	9/7/2016	135	33	29.0	659.0
	5/24/2018	100	33	28.3	1111.0
RECLAIM	3/15/2018	35	38	7.6	204.8
	6/20/2017	20	60	37.4	467.0
	6/20/2017	25	30	26.3	285.0
	6/16/2006	95	36	18.5	199.5
	5/30/2018	85	33	23.6	1091.0
	5/23/2018	100	36	24.4	580.0
	6/6/2018	153	36	27.0	1068.0
	2/24/2014	100	33	29.6	119.3
	8/16/2017	94	36	34.2	232.7
	12/15/2005	125	33	30.9	255.0
	6/7/2018	45	102*	82.5	186.0
	9/29/2020	100	40	27.1	75.4
	1/12/2015	25	30	29.4	213.0
	6/16/2015	100	36	17.1	889.0
	6/22/2017	150	36	27.1	328.0
	5/12/2015	85	33	21.7	1294.0
	3/10/2020	28	40	5.8	1231.43
	3/10/2020	35	38	30.2	2.7
	9/28/2020	94	36	31.7	32.8
	6/11/2020	150	36	27.2	392
5/28/2020	95	36	30.1	1609.0	
11/14/2017	121	102*	74.0	990.0	

*Reporting equivalent to RECLAIM Default of 130 lb/mmcsf and not subject to a concentration limit

Other Regulatory Requirements

Analysis of NOx Concentration Limits for Proposed Rule 1147.1 Equipment at Other Air Districts

Staff reviewed other air districts' requirements for Proposed Rule 1147.1 applicable equipment to identify rules and regulations with lower emission limits or limits representing improvements in pollution control technologies. A comparison of the existing requirements in Rule 1147 with the analogous rules adopted by two other air districts in California, one in San Joaquin Valley (SJVAPCD) and the other in Ventura, was made.

SJVAPCD Rule 4309

SJVAPCD Rule 4309 (Dryers, Dehydrators, and Ovens) regulates equipment located at asphalt/concrete plants that are greater than or equal to 5 MMBTU/hr with full compliance by December 1, 2009. Rule 4309 limits equipment located at asphalt/concrete plants to a NO_x limit of 4.3 ppm and a CO limit of 42 ppm both corrected to 19% oxygen which are equivalent to 40 ppm NO_x and 400 ppm CO corrected to 3% oxygen. Monitoring requirements of Rule 4309 include monthly emissions monitoring or installation of CEMS with source testing required every 24 months.

SJVAPCD has more stringent MRR requirements when compared to existing South Coast AQMD Rule 1147. Rule 4309 requires source testing at the frequency of every 24 months and periodic emissions monitoring every month as compared to the Rule 1147 requirement of one source test at the time of compliance determination with no additional requirements for periodic emissions monitoring. Emission limits from SJVAPCD are equivalent to the existing limits of 40 ppm NO_x for the asphalt manufacturing category in Rule 1147, but are more stringent for CO.

Ventura County Air Pollution Control District (VCAPCD) Rule 74.34

VCAPCD Rule 74.34 –NO_x Reductions from Miscellaneous Sources establishes a NO_x emission limit of 40 ppm and CO limit of 400 ppm both corrected to 3% oxygen for any natural gas fired combustion unit where the unit total heat input is greater than or equal to 5 MMBtu/hr. Monitoring requirements of Rule 74.34 includes a NO_x and CO source test every 48 months with annual screening of NO_x and CO within 30 days of the anniversary date of the previous source test.

VCAPCD Rule 74.34 has more stringent MRR requirements when compared to South Coast AQMD Rule 1147. Rule 74.34 requires source testing at the frequency of every 48 months and annual screening of NO_x and CO within 30 days of the anniversary date of the previous source test when compared to the Rule 1147 requirement of one source test at the time of compliance determination with no requirements for periodic emissions monitoring. Emission limits from VCAPCD are equivalent to the existing limits of 40 ppm NO_x for the asphalt manufacturing category in Rule 1147, but are more stringent in CO.

Assessment of Pollution Control Technologies*Ultra-Low/Low NO_x Burners Systems*

For gaseous fuels, thermal NO_x is generally the largest contributor of NO_x emissions. High flame temperatures trigger the disassociation of nitrogen molecules from combustion air and a chain reaction with oxygen follows to form oxides of nitrogen. Factors that minimize the formation of thermal NO_x include reduced flame temperature, shortened residence time, and an increased fuel to air ratio. To reduce NO_x emissions, combustion parameters can be optimized, control techniques can be applied downstream of the combustion zone, or a combination of the two approaches can be utilized. Common types of combustion modification include: lowered flame temperature; reduced residence time at high combustion temperature; and reduced oxygen concentration in the high temperature zone.

There are a variety of configurations and types of burners for ultra-low NO_x burner (ULNB) systems. Often, fuel and air are pre-mixed prior to combustion. This results in a lower and more uniform flame temperature. Some premix burners also use staged combustion with a fuel rich zone to start combustion and stabilize the flame and a fuel lean zone to complete combustion and reduce the peak flame temperature. These burners can also be designed to spread flames over a larger area to reduce hot spots and lower NO_x emissions. Radiant premix burners with ceramic, sintered metal

or metal fiber heads spread the flame and produce more radiant heat. When a burner produces more radiant heat, it results in less heat escaping through the exhaust gases.

Most premix burners require the aid of a blower to mix the fuel with air before combustion takes place (primary air). A commonly used application in combination with these burners is flue gas recirculation (FGR). FGR recycles a portion of the exhaust stream back into the burner. Increasing the amount of primary air and/or use of FGR can reduce flame temperature, but it also reduces the temperature of combustion gases through dilution and can reduce efficiency. To maintain efficiency a manufacturer may have to add surface area to the heat exchanger. Increasing the primary air may also destabilize the flame. Ultra-low NO_x burners require sophisticated controls to maintain emissions levels and efficiency, to stabilize the flame, and to maintain a turndown ratio that is enough for the demands of the operation.

Selective Catalytic Reduction (SCR) Systems

SCR is a post-combustion control technology that is a commercially available and commonly employed to control NO_x emissions from wide range of NO_x sources. It is considered to be BARCT, if cost-effective, for controlling NO_x emissions from existing combustion sources such as aggregate dryers. A typical SCR system design consists of an ammonia storage tank, ammonia vaporization and injection equipment, a booster fan for the flue gas exhaust, an SCR reactor with catalyst, an exhaust stack plus ancillary electronic instrumentation and operations control equipment. The technology uses a precious metal catalyst that selectively reduces NO_x in the presence of ammonia. Ammonia is injected in the flue gas stream where it reacts with NO_x and oxygen in the presence of the catalyst to produce nitrogen and water vapor.

For conventional SCRs, the minimum temperature for NO_x reduction is 500 degrees F and the maximum operating temperature for the catalyst is 800 degrees F. Depending on the application, the type of fuel combusted, and the presence of sulfur compounds in the exhaust gas, the optimum flue gas temperature of an SCR system is case-by-case and will range between 550 degrees F and 750 degrees F to limit the occurrence of several undesirable side reactions at certain conditions. Depending on the type of combustion equipment utilizing SCR technology, the typical amount of ammonia slip can vary between less than 5 ppm when the catalyst is fresh and 20 ppm at the end of the catalyst life. However, newly permitted SCR systems have an ammonia slip limit of 5 ppm. In addition to the conventional SCR catalysts, there are high temperature SCR catalysts that can withstand temperatures up to 1200 degrees F and low temperature SCR catalysts that can operate below 500 degrees F.

For applications where exhaust temperatures are below the minimum reaction temperature, additional heat in the form of duct burners would need to be installed for proper emission reduction. Doing so would increase mass emissions at the inlet of the SCR and lower total emissions reduction potential of the SCR system.

Vendor Discussions

The following five vendors and manufacturers (in alphabetical order) were contacted requesting information regarding ultra-low/low NO_x burners and SCR systems. All five provided technical input and three out of five provided cost estimates that has been included in the discussion below and the cost-effectiveness analysis in this staff report.

- Astec Industries
- Gencor Industries
- Honeywell Thermal Solutions (Hauck)

- Nationwide Boiler Incorporated
- Tri-Mer Corporation

Ultra-Low/Low NOx Burners Systems

The current NOx limit for asphalt manufacturing operations in Rule 1147, which includes aggregate dryers, to be incorporated into Proposed Rule 1147.1 is 40 ppm corrected to 3% O₂. Based on the information obtained through vendor discussions, lower NOx emissions with ultra-low/Low NOx burners are feasible for burner replacements and new installations. Based on discussions with one burner manufacturer, achieving 25 ppm NOx and 400 ppm CO limit with an ultra-low NOx burner without SCR is feasible in new applications. From further discussions with the burner manufacturer, 25 ppm NOx is difficult to achieve in existing facilities due to limited excess air required for lower NOx burners and that 30 ppm is achievable for most retrofit applications. All three burner manufacturers provided assurance for retrofit applications to meet 30 ppm NOx and 1,000 ppm CO for retrofit applications, and observed source test data also suggests existing equipment and burner technology can feasibly achieve 30 ppm NOx and 1,000 ppm CO.

Selective Catalytic Reduction (SCR) Systems

Existing Rule 1147 NOx limits can be feasibly achieved with burner only control technologies. The NOx limit for new SCR applications within the South Coast AQMD is 5 ppm with a 5 ppm ammonia slip. SCR systems are scalable and generally utilized for units greater than 10 MMBtu/hr. From discussions with SCR vendors, system installations for PR 1147.1 is feasible with some limitations. One limitation for SCR applications in PR 1147.1 applicable equipment is the low exhaust temperature for aggregate drying operations. Due to SCR systems requiring minimum exhaust temperatures of about 500 Degrees F, aggregate dryers would require installations of additional heat input devices such as duct burners to meet a minimum exhaust temperature for proper emission reduction reaction to occur. Installation of duct burners would increase NOx emissions at the inlet of the SCR and decrease total reduction potential of the system. Vendor quotes also indicated that inclusion of duct burners would also increase the overall cost of the control system..

Initial BARCT Recommendations and Additional Considerations

Based on the review of the types of pollution control technologies available to reduce NOx and CO emissions applicable to aggregate dryers, burner control technologies are still the main technologies that can achieve the NOx concentration limits specified in these rules.¹

Natural gas fired units make up for most of the equipment subject to Proposed Rule 1147.1. Currently, San Joaquin Valley APCD Rule 4309 and Ventura County APCD Rule 74.34 limit aggregate drying operations to a NOx limit of 40 ppm and CO limit of 400 ppm corrected to 3% O₂. Stakeholders expressed concerns of a 400 ppm CO limit with the 30 ppm NOx limit due to potential variations on aggregate quality. Information obtained from vendor discussions confirms findings from the source test analysis that 30 ppm NOx and 1,000 ppm CO are feasible with burner technology. Summary of initial staff recommendations based on feasibility is shown in Table 2-2.

¹ In the event that an owner or operator installs a new burner to meet the proposed emission limit, a permit modification would be required. If the owner or operator chooses to increase the unit's rating in the process, the equipment would be subject to the emission limit set by Best Available Control Technology (BACT).

Table 2-2 -Initial BARCT Recommendations for Proposed Rules 1147.1

Equipment Size	Rule 1147 Limit*	Other Regulatory*	Technology Assessment*	Initial Staff Recommendations*
>2,000,000 Btu/hr	40 ppm No CO Limit	36 to 40 ppm NOx 400 ppm CO	30 ppm NOx 1,000 ppm CO	30 ppm NOx 1,000 ppm CO

* Emissions limits are corrected to 3% O₂

Cost-Effectiveness and Incremental Cost-Effectiveness Analysis

Cost-Effectiveness Methodologies

The South Coast AQMD routinely conducts cost-effective analyses regarding proposed rules and regulations that result in the reduction of criteria pollutants (NO_x, SO_x, VOC, PM, and CO). The analysis is used as a measure of relative effectiveness of a proposal. It is generally used to compare and rank rules, control measures, or alternative means of emissions control relating to the cost of purchasing, installing, and operating control equipment to achieve the projected emission reductions. The major inputs in a cost-effectiveness analysis include capital and installation costs, operating and maintenance costs, emission reductions, discount rate, and equipment life. There are two potential methods to calculate cost-effectiveness for emission reductions; the discounted cash flow method and levelized cash flow method. The cost-effectiveness calculations were completed using the discounted cash flow method based on the discussions and comparisons of the two methods below.

Discounted Cash Flow (DCF)

The DCF method converts all costs, including initial capital investments and costs expected in the present and all future years of equipment life, to a present value. Conceptually, it is as if calculating the amount of funds that would be needed at the beginning of the initial year to finance the initial capital investments and to set aside to pay off the annual costs as they occur in the future. The fund that is set aside is assumed to be invested and generates a rate of return at the discount rate chosen. The final cost-effectiveness measure is derived by dividing the present value of total costs by the total emissions reduced over the equipment life. Below is the equation used for calculating cost-effectiveness with DCF as was presented in the 2016 AQMP Socioeconomic Report Appendix 2-B (p. 2-B-3):

$$\text{Cost - effectiveness} = \frac{\text{Initial Capital Investments} + (\text{Annual O\&M Costs} \times \text{PVF})}{\text{Annual Emission Reductions} \times \text{Years of Equipment Life}}$$

Where:

$$\text{PVF} = \frac{(1 + r)^N - 1}{r * (1 + r)^N}$$

Where r = real interest rate (discount rate); and N = years of equipment life.

The present-value factor (PVF) converts a constant stream of payments made for N years into its single present-value equivalent.

Levelized Cash Flow (LCF)

The LCF method annualizes the present value of total costs as if all costs, including the initial capital investments, would be paid off in the future with an equal annual installment over the

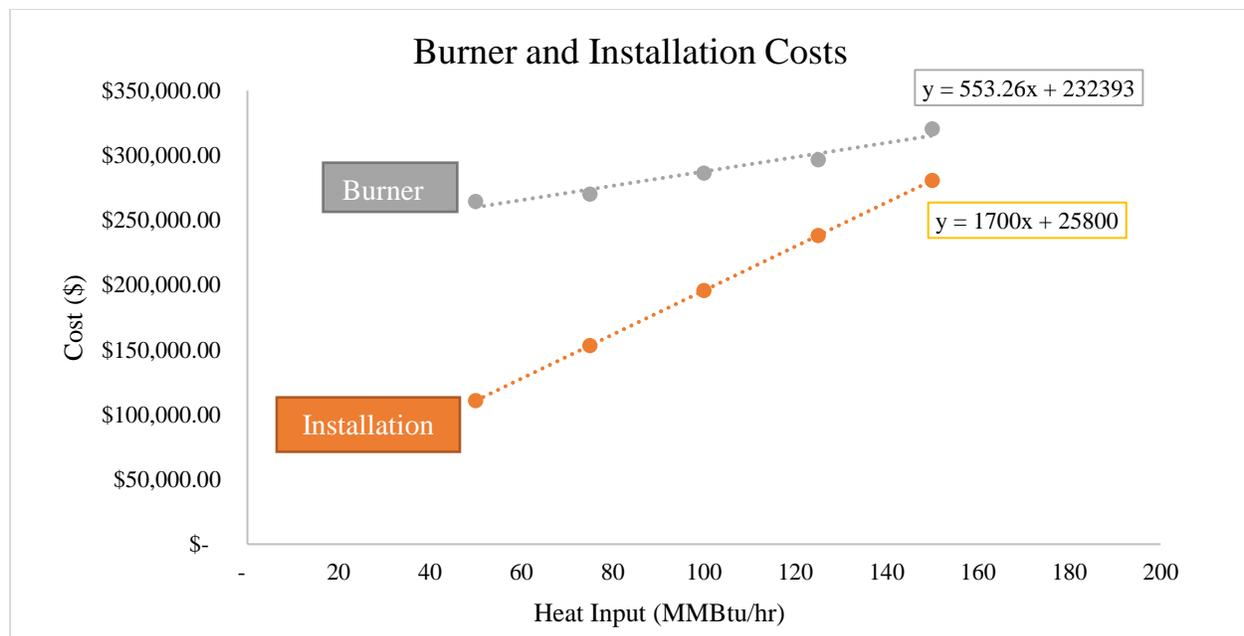
equipment life. What is less clear, however, is how to deal with non-constant emission reductions when using the LCF method. The LCF method is designed to compare the annualized cost with the annual emission reduction that can be potentially achieved by a project; thus implicitly, emission reductions are constant when the LCF method is applied.

$$LCF = \left(\frac{\text{Annualized Present Value of Total Costs}}{\text{Average Annual Emission Reductions}} \right)$$

Summary of Cost-Effectiveness and Incremental Cost-Effectiveness Analysis

To assess the cost-effectiveness for the proposed BARCT limits, cost information about the control equipment was obtained from discussions with manufacturers, vendors, and stakeholders. Additional references were made to the installation cost information obtained during the 2018 rulemaking for the Rule 1146 series. Staff presented the extrapolated installation cost curve was presented to stakeholders during the third public working group that took place on January 20, 2021. Cost extrapolations were further compared to stakeholder provided vendor quotations which showed staff's estimates were generally more conservative than that of stakeholder quotations. Figure 2-2 shows the linear correlations between equipment and installation cost for natural gas fired units based on size (MMBtu/hr) for 30 ppm burner replacements.

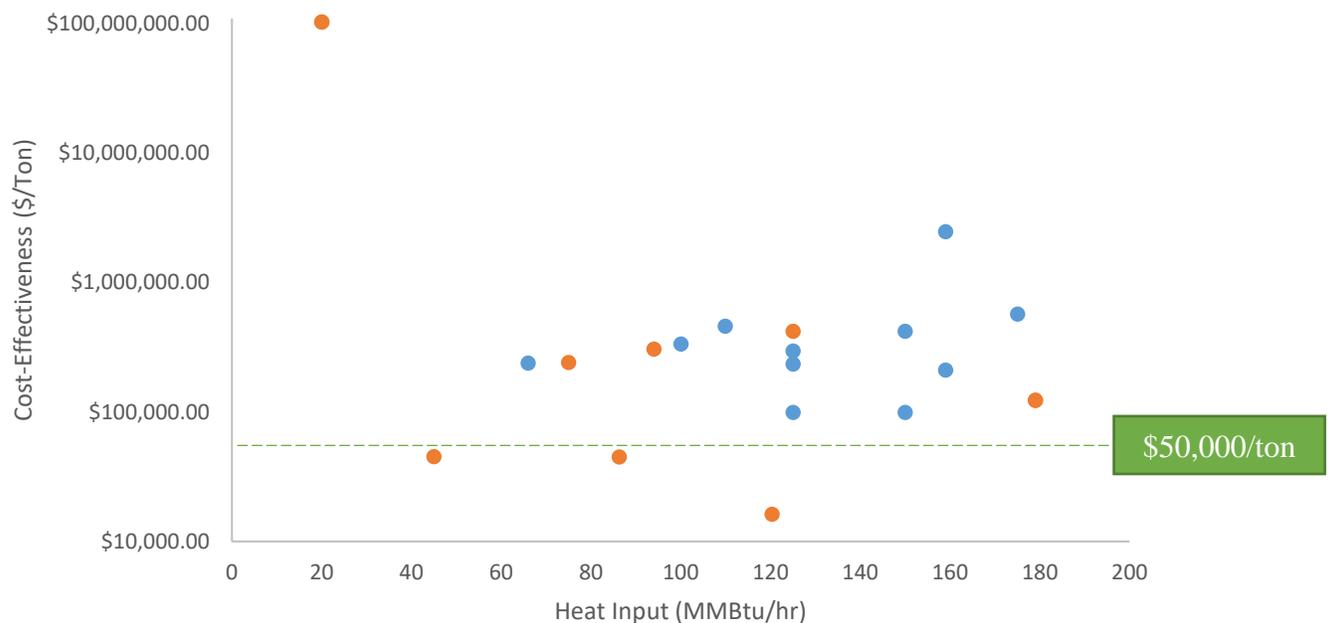
Figure 2-2 – Capital Costs for Equipment and Installation



Cost estimates for the equipment and installation were obtained from one vendor and three stakeholders. Burner costs depended on the equipment size and NOx emission limits. The budget prices obtained for burner retrofits, that indicate there would be no major changes to existing units such as major structural or foundation changes. Additionally, the useful life for the control equipment was assumed to be 15 years for equipment burners. Staff utilized a bottom-up approach which evaluated each equipment subject to Proposed Rule 1147.1 and conducted cost-effectiveness analysis on a per equipment basis. Baseline emissions for each equipment were calculated using latest usage information from facility Annual Emissions Reporting (AER), if available. For equipment without AER information, staff used operating capacity assumption of 80% based off the average industrial production and capacity utilization released by the United

States Federal Reserve printed on February 7, 2011². In addition to the average cost for the equipment and installation, the permitting fees are included as part of the capital cost in the cost-effectiveness analysis. The most current fee rates in *Rule 301 – Permitting and Associated Fees* were used to estimate the permitting cost. Figure 2-3 shows cost-effectiveness for RECALIM equipment subject to PR 1147.1 and Table 2-4 further analyzes RECLAIM equipment that are above cost-effectiveness threshold of \$50,000/ton. The vertical axis for the graph displayed in Figure 2-3 is scaled logarithmically to display outliers with cost-effectiveness of >\$100,000,000/ton. In general, all units with cost-effectiveness greater than \$50,000/ton are permitted below 40 ppm. One unit in RECLAIM was identified with a permit limit of 60 ppm with cost effectiveness of \$103,171,505. Upon further evaluation, the identified RECLAIM unit is part of a backup process line with annual emissions of ~2 pounds per year according to 2020 RECLAIM reported emissions. Based on the reported annual emissions total, PR 1147.1 will include a low-use provision.

Figure 2-3 –Cost Effectiveness Estimate for Aggregate Dryers



²Federal Reserve Statistical Release G.17, Industrial Production and Capacity Utilization
http://www.federalreserve.gov/releases/g17/cap_notes.htm as printed on February 7, 2011.

Table 2-4 – Further Assessment of Applicable Equipment with Cost-Effectiveness >\$50,000/Ton

RECLAIM/Non-RECLAIM	Equipment Size (MMBtu/hr)	Current Limit (PPM)	Cost-Effectiveness (DCF; \$/ton)
Non-RECLAIM	159	36	\$ 2,317,100
Non-RECLAIM	66	40	\$ 238,500
Non-RECLAIM	100	36	\$ 334,900
Non-RECLAIM	100	33	\$ 826,500
Non-RECLAIM	110	40	\$ 460,100
Non-RECLAIM	125	36	\$ 99,100
Non-RECLAIM	125	33	\$ 234,700
Non-RECLAIM	125	33	\$ 295,700
Non-RECLAIM	150	40	\$ 99,300
Non-RECLAIM	150	36	\$ 419,000
Non-RECLAIM	159	36	\$ 210,700
Non-RECLAIM	175	33	\$ 571,900
RECLAIM	20	60	\$ 103,171,600
RECLAIM	100	40	\$ 57,200
RECLAIM	179	36	\$ 123,300
RECLAIM	150	36	\$ 119,200
RECLAIM	94	36	\$ 305,100
RECLAIM	125	33	\$ 421,300
RECLAIM	75	33	\$ 240,600

After factoring in considerations for units with existing permit limits of greater than 30 ppm NO_x and less than or equal to 40 ppm NO_x, category average cost-effectiveness is calculated to be \$46,000/ton of NO_x reduced.

Incremental cost-effectiveness evaluates and compares two or more control options available for emission reductions. For equipment subject to proposed rule 1147.1, the two identified pollution control technologies are ultra-low NO_x burners and selective catalytic reduction (SCR) systems. Due to low exhaust temperature present in aggregate dryers (between 200°F and 300°F), SCR systems would require the additions of external heat sources, such as duct burners, to bring exhaust temperatures up to temperatures where reduction reactions can efficiently occur (~500°F). External combustion sources for SCR applications increase system cost and lower overall emission reduction potential when compared to SCR applications that do not require external heat input. The average cost-effectiveness for SCR systems including duct burners for aggregate dryers were calculated to be >\$150,000/ton for all identified aggregate dryers with South Coast AQMD permits. As such post-combustion controls were found to be not cost-effective and incremental cost-effectiveness between combustion control and post-combustion control was not calculated.

Proposed BARCT Emission Limit

Staff evaluated applicable permitted equipment in the RECLAIM and non-RECLAIM universe to assess and develop the proposed NO_x BARCT limit for Proposed Rule 1147.1. The proposal outlined in Table 2-5 was developed by considering data collected from vendor discussions as well

as analysis of source test results and cost-effectiveness. Separate compliance schedules will be developed for aggregate dryers with South Coast AQMD permits that limit emissions less than or equal to 40 ppm and aggregate dryers without South Coast AQMD permits that limit emissions less than or equal to 40 ppm. Aggregate dryers with heat input ratings below 2,000,000 BTU/hr or daily NOx emissions below one pound per day will continue to be regulated under Rule 1147 – NOx Reductions from Miscellaneous Sources.

Table 2-5 – Summary of Proposed Rule 1147.1

Equipment Category	Equipment Size	Existing Rule 1147 Limit*		Proposed Rule 1147.1 Limit*	
		NOx	CO	NOx	CO
Aggregate Dryers	>2,000,000 Btu/hr	40 ppm	-	30 ppm	1,000 ppm

As facilities transition from Rule 1147 and RECLAIM into PR 1147.1, interim limits are put in place for aggregate dryers located at non-RECLAIM and former RECLAIM facilities until they are required to meet proposed NOx and CO emission limits. Non-RECLAIM facilities will be subject to an interim limit of 40 ppm NOx based on existing Rule 1147 limits while RECLAIM facilities will be subject to an interim limit of 102 ppm NOx based on existing RECLAIM default emission factor of 130 pounds NOx per million standard cubic feet natural gas (lbs/mmscf). Aggregate dryers above the current Rule 1147 limit are required to meet proposed limits when the burner reaches 12 years of age or January 1, 2022, whichever is later. Aggregate dryers at or below the current Rule 1147 limit are required to meet proposed limits when the burner reaches 32 years of age or January 1, 2023, whichever is later. All aggregate dryers must meet proposed limits upon burner replacement.

CHAPTER 3: SUMMARY OF PROPOSALS

Introduction
Proposed Rule 1147.1

Introduction

The primary objective of PR 1147.1 is to establish NO_x limits that represent BARCT requirements for applicable equipment and to remove the exclusion of RECLAIM facilities. Equipment applicable to the proposed rule were previously covered under South Coast AQMD Rule 1147 under the “Asphalt Manufacturing” category. Proposed Rule 1147.1 also proposes to include periodic monitoring requirements that are currently not included in Rule 1147. Key provisions included in PR 1147.1 are discussed below.

Proposed Rule 1147.1**Rule 1147.1 Purpose [Subdivision(a)]**

The purpose of this rule is to reduce emissions of nitrogen oxide (NO_x) and maintain carbon monoxide (CO) from gaseous fuel-fired aggregate dryers.

Rule 1147.1 Applicability [Subdivision(b)]

Proposed Rule 1147.1 applies to owner or operator of a facility that operates natural gas fired aggregate dryers with nitrogen oxide and carbon monoxide emissions with NO_x emissions greater than one pound per day and rated heat input greater than 2,000,000 BTU per hour. This equipment category was previously controlled under the “Asphalt Manufacturing Operations” category under Rule 1147 and are reclassified as “Aggregate Dryers” under PR 1147.1. Definitions for this new equipment category as well as associated terms will be further discussed in subdivision(c). Aggregate dryers with rated heat input below 2,000,000 BTU per hour or daily NO_x emissions of below one pound per day will continue to be subject to Rule 1147.

Rule 1147.1 Definitions [Subdivision(c)]

The following are key definitions for Proposed Rule 1147.1 to distinguish the applicable types of equipment and facilities regulated under this rule. For all definitions, refer to PR 1147.1.

AGGREGATE MATERIAL in paragraph (c)(1), which means:

“particulate materials used in construction and industrial manufacturing, including recycled concrete, recycled asphalt, and quarried materials such as sand, gravel, and crushed stone.”

AGGREGATE DRYERS in paragraph (c)(2), which means:

“any combustion equipment fired with gaseous fuel used to reduce or minimize the moisture content of aggregate material, including dryers, rotary dryers, fluidized bed dryers and rotary kilns.”

FORMER RECLAIM FACILITY in paragraph (c)(7), which means:

“a facility, or any of its successors, that was in the Regional Clean Air Incentives Market program as of January 5, 2018, as established in Regulation XX, that has received a final determination notification, and is no longer in the RECLAIM program.”

NON-RECLAIM FACILITY in paragraph (c)(9), which means:

“a facility, or any of its successors, that was not in the Regional Clean Air Incentives Market program as of January 5, 2018, as established in Regulation XX.”

RECLAIM FACILITY in paragraph (c)(13), which means:

“a facility, or any of its successors, that was in the Regional Clean Air Incentives Market program as of January 5, 2018, as established in Regulation XX.”

Rule 1147.1 Requirements [Subdivision(d)]**Paragraph (d)(1) – Interim Limit for Non-RECLAIM Facilities**

As non-RECLAIM facilities that were regulated under Rule 1147 transition to PR 1147.1, an interim limit of 40 ppm, in line with existing requirements of Rule 1147, will be placed on non-RECLAIM facilities until the facility meets the new limits outlined in the proposed rule. Facilities with existing South Coast AQMD permits to operate with permit limits below the interim limit specified in (d)(1) will continue to adhere to the limit specified in the permit to operate.

Paragraph (d)(2) – Interim Limit for Former RECLAIM Facilities

As RECLAIM facilities transition out of RECLAIM, which implements BARCT in aggregate, to command-and-control, which implements BARCT for each individual unit, there is a need for an interim NOx limit. U.S. EPA has commented that as RECLAIM facilities transition to the command-and-control regulatory program, an interim NOx limit is needed until the facility achieves the proposed NOx BARCT limit to ensure that after the RECLAIM cap is removed, there is an enforceable regulatory requirement that is representative of federal Reasonable Available Control Technology levels.

To ensure RECLAIM sources with compliance dates after a facility becomes a former RECLAIM facility continues to meet RACT in the interim, Proposed Rule 1147 will incorporate an interim limit of 102 ppm NOx (equivalent to 130 lb/mmscf RECLAIM default emission factor) for former RECLAIM facilities until the facility meets BARCT, as outlined in paragraph (d)(2).

Paragraphs (d)(3) and (d)(4) – Compliance Schedule for Aggregate Dryers

PR 1147.1 will establish a NOx concentration limit of 30 ppm at 3% oxygen, dry, and CO concentration limit of 1,000 ppm at 3% oxygen, dry. To allow adequate amount of time for non-RECLAIM, RECLAIM, and former RECLAIM facilities to come into compliance with the limits of PR 1147.1, staff proposes a two-step approach as specified in paragraphs (d)(3) and (d)(4) for facilities to come into compliance.

Paragraph (d)(3) will apply to owners or operators of an aggregate dryer at a non-RECLAIM, RECLAIM, or former RECLAIM facility without an existing permit that was established by July 2, 2022 limiting NOx emissions to 40 ppm or less. An owner or operator of an aggregate dryer subject to paragraph (d)(3) shall submit permit application to meet the emission limits of PR 1147.1 when the burner of the aggregate dryer becomes 12 years old and follow the compliance schedule specified in PR 1147.1 Table 1 (Table 3-1 of staff report). Age determination of the aggregate dryer burner will be determined pursuant to paragraph (e)(1). This provision is based on Rule 1147 that requires units to meet NOx limits when the burner reaches 15 years old. PR 1147.1 requires operators to submit a permit application when the unit reaches 12 years old and to meet the NOx limit 18 months after the permit to construct is issued. Assuming a permit is issued with 18 months, an operator under PR 1147.1 would be required to meet the proposed NOx limit when the burner is about 15 years old, consistent with Rule 1147.

Table 3-1 – Compliance Schedule for Aggregate Dryers at Greater than 40 ppm

Equipment Category	Permit Application Submittal Date	Compliance Date
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Aggregate Dryer with burners installed prior to January 1, 2010	July 1, 2022	No later than 18 months after Permit to Construct is issued
Aggregate Dryer with burners installed on or after January 1, 2010	July 1 of the following calendar year after the burner reaches 12 years of age	No later than 18 months after Permit to Construct is issued

Paragraph (d)(4) will apply to owners or operators of an aggregate dryer at a non-RECLAIM, RECLAIM, or former RECLAIM facility with an existing permit that was established by July 1, 2023 limiting NOx emissions to 40 ppm or less. An owner or operator of an aggregate dryer subject to paragraph (d)(4) shall submit permit application to meet the emission limits of PR 1147.1 when the burner of the aggregate dryer becomes 32 years old and follow the compliance schedule specified in PR 1147.1 Table 2 (Table 3-2 of staff report). Age determination of the aggregate dryer burner will be determined pursuant to paragraph (e)(1). Aggregate dryers that are already 32 years or older at the time of rule adoption shall comply with the compliance schedule of PR 1147.1 Table 2 during the subsequent year of rule adoption. The proposed timeframe under PR 1147.1 is similar to Rule 1147 which allows 35 years for low use units.

Table 3-2 –Compliance Schedule for Aggregate Dryers at 40 ppm or less

Equipment Category	Submit Permit Application	Compliance Date
Aggregate Dryer with permit limit at or below 40 ppm by July 1, 2022	July 1 of the following calendar year after the burner reaches 32 years of age	Within 18 months after Permit to Construct is issued

Paragraphs (d)(5) and (d)(6) – Shutdown Provision

Paragraph (d)(5) provides a compliance pathway for owners and operators of aggregate dryers that are shutting down an aggregate dryer. The provision is designed to not require an operator to meet the proposed NOx limit, if the unit will be shut down within the timeframe required to meet the proposed NOx limit. Owners and operators must notify the Executive Officer of the intent to shut down the aggregate dryer prior to 36 months after the date a permit application is required specified in paragraph (d)(3) or (d)(4). The notification must be in writing and submitted on or before the date a permit application is required specified in paragraph (d)(3) or (d)(4). On or before 36 months after the date a permit application is due pursuant to paragraph (d)(3) or (d)(4), the owner or operator shall surrender equipment permit to operate as well as disconnect and bind the fuel line for the aggregate dryer.

Paragraph (d)(6) establishes requirements if owners or operators determines a unit originally designated to be shut down, will continue to operate. Under paragraph (d)(6) the owner or operator must submit permit application to the Executive Officer no later than 12 months after the date a

permit application is due pursuant to paragraph (d)(3) or (d)(4). Owners or operators that choose to continue operating the aggregate dryer identified in paragraph (d)(5) must meet the NO_x and CO emission limits of paragraph (d)(3)(B) or (d)(4)(B) in accordance to source testing provisions of paragraph (f)(1) within 12 months after the Permit to Construct is issued. Owners and operators electing to follow paragraph (d)(6) that fail to timely submit permit application outlined in subparagraph (d)(6)(A) will be considered to be in violation of PR 1147.1 and must continue to follow the compliance schedule outlined in (d)(6)(B).

Paragraph (d)(7) – On-Ramp Provision for Aggregate Dryers Exceeding 1 LB/Day NO_x

Pursuant to paragraph (i)(1), aggregate dryers with NO_x emissions of less than one pound per day are exempt from PR 1147.1 and will continue to be regulated under Rule 1147. For owners or operators of aggregate dryers with NO_x emissions below one pound per day that exceeds the threshold, paragraph (d)(7) provides an on-ramp into PR 1147.1 requirements. An owner or operator of an aggregate dryer that exceed one pound per day will be subject to comply with the NO_x and CO limits specified in paragraph (d)(3)(B) in accordance to the schedule specified in (d)(3)(A). For an owner or operator of an aggregate dryer installed prior to January 1, 2010 that exceed one pound per day will be subject to comply emission limits specified in paragraph (d)(3)(B) no later than 180 days from the date the aggregate dryer failed to demonstrate NO_x emissions of less than one pound per day and must demonstrate compliance with PR 1147.1 limits no later than 18 months after Permit to Construct is issued.

Paragraph (d)(8) – Aggregate Dryers Exceeding 40 ppm NO_x

Aggregate dryers with existing permit limiting NO_x emissions to 40 ppm or below are provided an extended compliance schedule specified in paragraph (d)(4). To ensure facilities remain in compliance with their permit limits, facilities must conduct source testing pursuant to paragraph (f)(4) when the aggregate dryer becomes 15 years old pursuant to paragraph (f)(6). Paragraph (d)(8) provides owners or operators of aggregate dryers complying with paragraph (d)(4) that fail to demonstrate compliance to their permit limits a time frame to come into compliance with emission limits of PR 1147.1. An owner or operator of an aggregate dryer with existing permit limiting NO_x emissions to 40 ppm or below complying with paragraph (d)(4) that exceeds their permitted NO_x concentration before the burner reaches 12 years, shall meet the NO_x and CO emission limits specified in subparagraph (d)(3)(B) in accordance with the schedule specified in paragraph (d)(3). For an owner or operator of an aggregate dryer installed prior to January 1, 2010 with existing permit limiting NO_x emissions to 40 ppm or below complying with paragraph (d)(4) that exceeds their permitted NO_x concentration shall submit a permit application to meet emission limits specified in paragraph (d)(3)(B) no later than 180 days from the date aggregate dryer failed to demonstrate compliance with its permit limit and must demonstrate compliance with PR 1147.1 limits no later than 18 months after Permit to Construct is issued.

Rule 1147.1 Burner Age Determination [Subdivision(e)]

Subdivision (e) provides guidance to determine burner age of aggregate dryers. Unlike the existing provision in Rule 1147(c)(2), PR 1147.1 subdivision (e) does not function as a hierarchy. Owners and operators of aggregate dryers subject to PR 1147.1 may choose any of the available options listed in subdivision (e) to determine burner age such as the invoice related to installation from equipment manufacturer, original manufacturer's identification plate, information submitted to the South Coast AQMD with permit applications, information present on the South Coast AQMD permit, and original the burner serial number containing information on date of manufacture. Aggregate dryers without the information outlined in paragraph (e)(1) will be deemed by the South Coast AQMD to be 32 years old as of January 1, 2023.

Rule 1147.1 Monitoring [Subdivision(f)]

Background of Current MRR Requirements in RECLAIM and Non-RECLAIM

Under RECLAIM, mass emissions reported by each facility are used to track and demonstrate compliance. To ensure the integrity of reported emissions, RECLAIM includes substantial monitoring and reporting requirements, as specified in *Rule 2012 - Requirements for Monitoring, Reporting and Recordkeeping for Oxides of Nitrogen Emissions*. RECLAIM MRR requirements are developed to accurately determine mass emissions of NO_x for each facility, which is necessary for emission reconciliation and compliance demonstration in the cap-and-trade regulatory structure. RECLAIM MRR requirements are segregated by device classifications. The 4 device classifications are major sources, large sources, process units, and Rule 219 exempt equipment.

In a command-and-control regulatory structure, a device-level emission standard (expressed in concentration such as ppm in Rule 1147) is used for regulatory and compliance demonstration. Unlike RECLAIM equipment, Rule 1147 does not have periodic source testing requirements such as periodic source testing or emissions monitoring, and generally only an initial source test is required.

Major sources are units with a total heat input rating of greater than or equal to 40 MMBtu/hr with total annual fuel usage of greater than 90 billion Btu. Units that are classified as major sources are required to install a continuous emissions monitoring system (CEMS) or South Coast AQMD approved equivalent. To ensure the integrity of reported emissions, RECLAIM includes substantial monitoring and reporting requirements for major sources such as annual (or semi-annual) RATA, daily emissions electronic reporting, quarterly aggregate electronic reporting, quarterly certifications of emissions reports (QCER), and annual permit emissions program (APEP) report.

Large sources are units with a total heat input rating of greater than or equal to 10 MMBtu/hr and less than 40 MMBtu/hr with annual emissions of between 4 and 10 tons. Under the RECLAIM program, units classified as large sources are required to electronically report monthly emissions and quarterly aggregate emissions as well as QCER and APEP requirements. Large sources are also required to conduct source testing every three years and conduct semi-annual tuning.

Process units are units with a total heat input rating of between 2 MMBtu/hr and 10 MMBtu/hr. Process units share similar reporting requirements as Rule 219 exempt equipment which are rated to less than or equal to 2 MMBtu/hr. Both process units and Rule 219 exempt equipment are required to submit quarterly electronic emissions reports as well as QCER and APEP requirements. Process units assigned concentration limits are required to conduct source testing every five years and all process units are required to conduct semi-annual tuning. Rule 219 exempt equipment are not subject to periodic testing or tuning requirements unless required by permit.

Non-RECLAIM aggregate dryers with total heat input rating of greater than or equal to 325,000 Btu/hr are subject to the Rule 1147 emission limit of 40 ppm corrected to 3% oxygen, dry. Compliance is determined either at the time required outlined previously in Table 1-1 or at the time of permitting.

Comparison of MRR Requirements in RECLAIM and Non-RECLAIM

Comparison of MRR requirements between RECLAIM and Rule 1147 are outlined in Table 3-1.

Table 3-1 – Comparison of MRR Requirements Between RECLAIM and Rule 1147

Requirements	RECLAIM	Rule 1147
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Source Testing	Major Source: Semi-annual RATA which includes reference source test Super Compliant Major Source: Semi-annual source testing (Every 12 months after 2 years of consecutive passes)	Units Emitting ≥ 1 Pound NOx/Day: According to schedule found in Rule 1147 Table 2 or at the time of permitting
	Large Source: Source testing every 3 years	Units Emitting < 1 Pound NOx/Day: At the time when unit is 35 years old*
	Process Source: Source testing every 5 years	
Periodic Monitoring	Major Source: Requires installation of CEMS or equivalent	Units Emitting ≥ 1 Pound NOx/Day: Tune up interval according to manufacturer specification
	Super Compliant Major Source: Semi-annual tuning with emissions monitoring	
	Large Source: Semi-annual tuning with emissions monitoring	Units Emitting < 1 Pound NOx/Day: Tune up interval according to manufacturer specification and maintaining daily usage records to demonstrate low use
	Process Source: Semi-annual tuning with emissions monitoring	
CEMS Provision	Required for all units meeting definition of major source (≥ 40 MMBtu/hr and ≥ 90 billion BTU/year; OR ≥ 500 MMBtu/hr)	Rule 1147 does not contain provisions for CEMS
Reporting	Major Source: - Daily electronic reporting - Monthly electronic reporting - Quarterly aggregate reporting - Quarterly certifications of emissions report (QCER) - Annual permit emissions program (APEP) report	Rule 1147 does not contain periodic reporting requirements
	Super Compliant Major Source: - Monthly electronic reporting - Quarterly aggregate reporting - QCER - APEP report	
	Large Source: - Monthly electronic reporting - Quarterly aggregate reporting - QCER - APEP report	
	Process Source: - Quarterly aggregate reporting - QCER - APEP report	

*Units subject to Rule 1147 emitting less than 1 pound/day of NOx may continue to operate without complying with rule limits if the facility conducts biennial testing to continuously demonstrate emissions of < 1 pound/day.

In general, source testing and reporting requirements under RECLAIM are more stringent than Rule 1147. Proposed Rule 1147.1 aligns MRR requires for RECLAIM and non-RECLAIM facilities with aggregate dryers. Title V requires additional periodic monitoring. South Coast AQMD has developed guidelines, outlined in South Coast AQMD Periodic Monitoring Guidelines³, for periodic monitoring, testing and recordkeeping requirements that may be

³ Periodic Monitoring Guideline. <http://www.aqmd.gov/home/permits/title-v/title-v-requirements#pm>.

incorporated in Title V permits. Currently, the monitoring requirements in the RECLAIM program are comprehensive and address the Title V periodic monitoring requirements. On March 5, 2021, the South Coast AQMD Governing Board voted to amend *Rule 218 - Continuous Emission Monitoring* and adopt *Rule 218.2 - Continuous Emission Monitoring System: General Provisions*, and *Rule 218.3 - Continuous Emission Monitoring System: Performance Specifications* which address the additional MRR requirements as required by the Title V program. Considerations of the different monitoring requirements between RECLAIM and non-RECLAIM are considered when developing MRR requirements for Proposed Rule 1147.1.

Paragraphs (f)(1) and (f)(2) –Source Test Provision

Aggregate dryers subject to paragraph (d)(3) or (d)(4) must conduct a source test to demonstrate compliance as specified in paragraph (f)(3) as well as obtaining approved source test protocol prior to conducting the source test. Source test protocols for subsequent testing would not need to be re-evaluated assuming burner or aggregate dryer was not altered in a way where a new permit is required in between tests.

Paragraph (f)(3) –Source Test Methods

Paragraph (f)(3) outlines acceptable methods of compliance determination for PR 1147.1 emission limits.

Paragraph (f)(4) –Periodic Source Testing Requirements

Paragraph (f)(4) outlines the following periodic source test schedule for aggregate dryers subject to PR 1147.1 based on rated heat input and stakeholder feedback:

- Below 10 MMBtu/hr – Every 5 calendar years and source test may not take place earlier than 54 calendar months after previous source test
- Between 10 MMBtu/hr and 40 MMBtu/hr – Every 3 calendar years and source test may not take place earlier than 30 months after the previous source test
- At or above 40 MMBtu/hr – Every calendar year and source test may not take place earlier than 6 months after the previous source test

Owners and operators of equipment at or above 40 MMBtu/hr that are able to demonstrate that the aggregate dryer has not operated for at least six consecutive calendar months, may conduct source testing within 90 days after resumed operation instead of following the annual source testing schedule.

Discussions with a CEMS vendor highlighted the unknown longevity of operating a conventional CEMS system in aggregate dryer operations. The high levels of moisture and other particulates could cause obstruction or damage to the in-stack sensor as well as increase maintenance cost for the facilities. As a result, PR 1147.1 will not require facilities to install new continuous emissions monitoring systems (CEMS) onto aggregate dryers; however, facilities with existing CEMS or alternative CEMS (ACEMS) must maintain the system for the list of the aggregate dryer. Aggregate dryers with installed ACEMS are required to conduct periodic relative accuracy test audits (RATA) as required in Rule 218.2 and 218.3. RATA may substitute for one instance of compliance demonstration required in paragraph (f)(3) as specified in paragraph (f)(7).

Paragraph (f)(6) – Periodic Demonstration for Units Complying with Paragraph (d)(4)

To ensure facilities following the extended compliance schedule specified in paragraph (d)(4) remain in compliance with their permit limits, facilities must conduct periodic source testing pursuant to paragraph (f)(4) when the aggregate dryer becomes 15 years old. Facilities that fail to

continuously demonstrate compliance with a permit limit will be subject to PR 1147.1 emission limits pursuant to the schedule specified in paragraph (d)(8).

Paragraph (f)(7) – Accepted Alternatives to Periodic Source Test

Facilities subject to additional testing requirements such as periodic monitoring under a Title V permit pursuant to Regulation XXX and relative accuracy testing for continuous emissions monitoring systems subject to Rule 218.2 and 218.3 specified in paragraph (f)(7) may use the tests to satisfy one instance of the requirements of paragraph (f)(4) if the test is conducted within the same schedule as the required determination specified in paragraph (f)(4).

Rule 1147.1 Recordkeeping and Reporting [Subdivision(g)]

Subdivision (g) outlines reporting and recordkeeping requirements including compliance demonstration averaging time for aggregate dryers with existing CEMS or ACEMS.

Rule 1147.1 Labeling Requirements [Subdivision(h)]

Subdivision (h) outlines labeling requirements for owners and operators of aggregate dryings subject to PR 1147.1.

Rule 1147.1 Exemptions [Subdivision(i)]

Paragraphs (i)(1) – Aggregate Dryers Emitting Less Than One Pound Per Day

Aggregate dryers emitting less than one pound per day of NO_x pursuant to methods specified in Rule 1147 will not be subject to PR 1147.1 and continue to be regulated under Rule 1147.

Paragraphs (i)(2) – Tunnel Dryers

Some tunnel dryers used for industrial manufacturing identified in South Coast AQMD potentially meet the definition of aggregate dryer, but with a significantly different process. Tunnel dryers are evaluated under Rule 1147 and exempt from PR 1147.1.

CHAPTER 4: IMPACT ASSESSMENT

Introduction

Emission Reductions

Socioeconomic Assessment

California Environmental Quality Act Analysis

Draft Findings Under California Health and Safety Code Section 40727

Comparative Analysis

Introduction

Among the 37 RECLAIM and non-RECLAIM facilities identified to be applicable to Proposed Rule 1147.1, 34 facilities are already in compliance with the existing Rule 1147 concentration limit of 40 ppm and would not need to comply with the BARCT limit of 30 ppm NO_x and 1,000 ppm CO until the unit becomes 32 years old. One facility with a unit concentration limit of 60 ppm was identified as a low use back up with total annual emissions of around 2 pounds NO_x, which would qualify for the low use provisions of PR 1147.1. A total of three RECLAIM facilities are expected to need to submit permit applications by January 1, 2022.

Emissions Reduction

The total NO_x inventory for the RECLAIM and non-RECLAIM units affected by the PR 1147.1 is estimated to be 0.4 tons per day. This estimate is taken from South Coast AQMD annual emission report (AER) inventory database for compliance year 2018 for permitted units. The South Coast AQMD's AER program was developed to track emissions of air contaminants from permitted facilities. Facilities with annual emissions exceeding 4 or more tons of nitrogen oxides (NO_x), sulfur oxides (SO_x), volatile organic compounds (VOCs), specific organics (SPOG), particulate matter (PM), or emissions of 100 tons per year or more of carbon monoxide (CO) are required by the South Coast AQMD to submit an annual emissions report. Facilities could also be required to submit AER if the facility receives a notification from South Coast AQMD or is subject to the AB2588 Program for reporting quadrennial updates to its toxics inventory. For each piece of RECLAIM equipment, the annual activity is estimated using the facility's reported emissions for the compliance year of 2020 and fuel usage is calculated using an emission factor represented by the permit limit specific for each unit. For units with missing AER data, emissions were calculated assuming 80% utilization capacity based off the average industrial production and capacity utilization released by the United States Federal Reserve printed on February 7, 2011.⁴

Emission reductions were calculated using the difference between the total aggregate emissions calculated using the concentration limit or emissions factor found on equipment permits (RECLAIM default of 130 lb/MMSCF for those without specified limits or factors) and total aggregate emissions using the PR 1147.1 proposed NO_x concentration limit. The total emissions inventory for the PR 1147.1 universe is 0.4 tons per day (tpd). Emission reductions from the three facilities expected to submit permit applications by July 1, 2022 is estimated to be 0.01 tpd by July 1, 2025 and expected total reductions of 0.04 tpd by full implementation estimate of July 1, 2056.

Socioeconomic Assessment

~~A socioeconomic impact assessment will be conducted and released for public review and comment at least 30 days prior to the South Coast AQMD Governing Board Hearing, which is anticipated to be on August 6, 2021.~~

California Health & Safety Code §40440.8 requires a socioeconomic impact assessment for proposed and amended rules resulting in significant impacts to air quality or emission limitations. This assessment shall include affected industries, range of probable costs, cost effectiveness of control alternatives, and emission reduction potential.

Proposed Rule 1147.1 – NO_x Reductions from Aggregate Dryers (PR 1147.1) would reduce emissions from dryers at aggregate facilities by setting lower NO_x emission limits accomplished through replacement of burners. PR 1147.1 is part of a suite of “landing rules” redirecting the control of facilities currently subject to the Regional Clean Air Incentives program (RECLAIM)

⁴Federal Reserve Statistical Release G.17, Industrial Production and Capacity Utilization http://www.federalreserve.gov/releases/g17/cap_notes.htm as printed on February 7, 2011.

to a “command and control” regulatory framework. Within PR1147.1, an updated Best Available Retrofit Control Technology (BARCT) analysis was conducted to evaluate technologies for emission reductions that are feasible and cost-effective.

Aggregate facilities supply the construction industry by providing materials such as hot-mix asphalt and construction aggregates like sand, gravel, and recycled concrete. Aggregate dryer operations at these facilities have the potential to emit nitrogen oxide (NO_x), carbon monoxide (CO), and particulate matter (PM). PR 1147.1 addresses NO_x and CO emissions by setting lower emission limits for the burners used in aggregate dryers. The new requirements for emission limits affect facilities upon replacement or retrofit of burners for aggregate dryers, and compliance deadlines were based equipment age, burner size, , the number of units per facility.

Affected Facilities and Industries

A total of 43 aggregate dryers at 37 facilities will be potentially affected by the emission limits proposed in PR 1147.1. Thirteen affected facilities are located in Los Angeles County, 10 in Riverside County, nine in San Bernardino County, and five in Orange County. Out of 43 dryers, only three have burners with permit limits requiring permit application submittals for retrofits in 2022; two dryers are at one facility in Los Angeles County, and the other is in San Bernardino County.

Over 62 percent (23 of 37) of the facilities affected by PR 1147.1 fall in the industry North American Industrial Classification System (NAICS) sector of manufacturing (31-33), while six of the facilities fall under construction (NAICS 23). The remaining eight affected facilities fall under industries of wholesale trade (NAICS 42, three facilities), government services (NAICS 92, three facilities), and mining (NAICS 21, two facilities).

Compliance Costs

Aggregate dryers subject to Proposed Rule 1147.1 will be required to meet emission limits of 30 ppm NO_x and 1,000 ppm CO. Owners or operators of units with rated heat input of less than 2,000,000 BTU/hr or emit less than one pound per day of NO_x will continue to be subject to Rule 1147. Units that comply with the existing Rule 1147 limit of 40 ppm NO_x shall submit permit applications to meet the proposed emission limits by July 1 of the year after the unit burner becomes 32 years old.

Owners or operators of a units that are not in compliance with the existing Rule 1147 NO_x limit must submit applications to meet proposed emission limits by July 1, 2022, or July 1 of the year after unit burner becomes 12 years old, whichever is later. Only two facilities with three dryers are expected to be impacted by the July 1, 2022 emission limits requirement and will incur costs for replacement or retrofit burners to meet the 30 ppm NO_x limits.

Thirty-five out of the 37 affected facilities with 40 dryers that are currently compliant with Rule 1147 (current limit of 40 ppm or below) will be required to meet the proposed limits after 32 years based on permit issue date (paragraph (d)(4)). Based on the South Coast AQMD permitting database, the expected replacement dates within this grouping of burners occurs between 2031 and 2052. There are no additional costs assumed for the replacement of these burners at 32 years, as it is consistent with the natural turnover of the equipment based on the expected useful life.

The remaining two affected facilities with three dryers are expected to install Ultra Low NO_x Burners (ULNB) to meet the 30 ppm NO_x limits in 2022. The average cost of each ULNB is estimated at \$280,000, with average installation costs of about \$170,000, and one-time permitting costs of \$2,946 per burner. The total one-time cost of PR 1147.1 for the three Rule 1147 non-

compliant dryers is estimated at \$1.35 million, with an expected useful life of 15 years. The average annualized cost of these burner replacements (purchase, installation, and permitting) at 4 percent real interest rate is estimated at \$125,000. No additional costs are assumed for operation and maintenance of these burners to be retrofitted.

Regional Macroeconomic Impacts

The total annual compliance cost is estimated to be \$125,000 for PR 1147.1. When the total annual compliance cost is less than one million current U.S. dollars, South Coast AQMD does not estimate regional macroeconomic impacts as the Regional Economic Models Inc. (REMI)'s Policy Insight Plus Model is not able to reliably evaluate impacts that are so small relative to the baseline regional economy.

California Environmental Quality Act Analysis

~~Pursuant to the California Environmental Quality Act (CEQA) and South Coast AQMD's certified regulatory program (Public Resources Code Section 21080.5, CEQA Guidelines Section 15251(l) and South Coast AQMD Rule 110), the South Coast AQMD, as lead agency, is reviewing the proposed project to determine if it will result in any potential adverse environmental impacts. Appropriate CEQA documentation will be prepared based on the analysis.~~ Pursuant to the California Environmental Quality Act (CEQA) Guidelines Sections 15002(k) and 15061, the proposed project is exempt from CEQA pursuant to CEQA Guidelines Section 15061(b)(3). A Notice of Exemption has been prepared pursuant to CEQA Guidelines Section 15062. If the proposed project is approved, the Notice of Exemption will be electronically filed with the State Clearinghouse of the Governor's Office of Planning and Research to be posted on their CEQAnet Web Portal, which may be accessed via the following weblink: <https://ceqanet.opr.ca.gov/search/recent>. In addition, the Notice of Exemption will be electronically posted on South Coast AQMD's webpage which can be accessed via the following weblink: <http://www.aqmd.gov/nav/about/public-notice/ceqa-notice/notice-of-exemption/noe--year-2021>. The electronic filing and posting of the Notice of Exemption is being implemented in accordance with Governor Newsom's Executive Orders N-54-20 and N-80-20 issued on April 22, 2020 and September 23, 2020, respectively, for the State of Emergency in California as a result of the threat of COVID-19.

Draft Findings Under California Health and Safety Code Section 40727 Requirements to Make Findings

California Health and Safety Code Section 40727 requires that prior to adopting, amending or repealing a rule or regulation, the South Coast AQMD Governing Board shall make findings of necessity, authority, clarity, consistency, non-duplication, and reference based on relevant information presented at the public hearing and in the staff report.

Necessity

PR 1147.1 is needed to establish BARCT requirements for facilities that will be transitioning from RECLAIM to a command-and-control regulatory structure.

Authority

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

Clarity

PR 1147.1 is written or displayed so that their meaning can be easily understood by the persons directly affected by them.

Consistency

PR 1147.1 are in harmony with and not in conflict with or contradictory to, existing statutes, court decisions or state or federal regulations.

Non-Duplication

PR 1147.1 will not impose the same requirements as any existing state or federal regulations. The proposed rule is necessary and proper to execute the powers and duties granted to, and imposed upon, the South Coast AQMD.

Reference

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

Comparative Analysis

Under H&SC Section 40727.2, the South Coast AQMD is required to perform a comparative written analysis when adopting, amending, or repealing a rule or regulation. The comparative analysis is relative to existing federal requirements, existing or proposed South Coast AQMD rules and air pollution control requirements and guidelines which are applicable to aggregate dryers. See Table 12 below.

Table 12 – Comparative Analysis of Proposed Rule 1147.1

Rule Element	PR 1147.1	RECLAIM	Equivalent Federal Regulation
Applicability	Aggregate dryers with maximum rated heat input capacities greater than or equal to 2 MMBtu/hr	Facilities regulated under the NOx RECLAIM program (South Coast AQMD Reg. XX)	New or modified minor source hot asphalt plants in tribal territory
Requirements* *All parts per million (ppm) emission limits are referenced at 3 percent volume stack gas oxygen on a dry basis averaged over a period of 15 consecutive minutes.	NOx limits: 30 ppm CO Limit: 1,000 ppm	Asphalt Heater/Concrete NOx Limit: 30 ppm	NOx limits: 36 ppm CO Limit: 400 ppm
Reporting	Every 6 months for units with existing continuous emissions monitoring system (CEMS) or equivalent prior to date of rule adoption (Rules 218.2 and 218.3).	<ul style="list-style-type: none"> • Daily electronic reporting for major sources • Monthly to quarterly reporting for large sources and process units • Quarterly Certification of Emissions Report and Annual Permit Emissions Program for all units 	Permit specific
Monitoring	<ul style="list-style-type: none"> • A continuous in-stack NOx monitors for existing systems • Source testing once every 5 calendar years for units < 10 MMBtu/hr • Source testing once every 3 calendar years for units ≥10 MMBtu/hr and <40 MMBtu/hr • Source testing once every calendar year for units ≥40 MMBtu/hr 	<ul style="list-style-type: none"> • A continuous in-stack NOx monitors for major sources • Source testing at least once every year for super compliant major sources • Source testing once every 3 years for large sources • Source testing once every 5 years for process units 	Permit specific
Recordkeeping	<ul style="list-style-type: none"> • Source test records = 5 years 	<ul style="list-style-type: none"> • < 15-min. data = min. 48 hours; • ≥ 15-min. data = 3 years (5 years if Title V) • Maintenance & emission records, source test reports, RATA reports, audit reports and fuel meter 	Permit specific

Rule Element	PR 1147.1	RECLAIM	Equivalent Federal Regulation
		calibration records for Annual Permit Emissions Program = 3 years (5 years if Title V)	

ATTACHMENT H



South Coast Air Quality Management District

21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 • www.aqmd.gov

SUBJECT: NOTICE OF EXEMPTION FROM THE CALIFORNIA ENVIRONMENTAL QUALITY ACT

PROJECT TITLE: PROPOSED RULE 1147.1 – NOX REDUCTIONS FROM AGGREGATE DRYERS

Pursuant to the California Environmental Quality Act (CEQA) Guidelines, the South Coast Air Quality Management District (South Coast AQMD), as Lead Agency, has prepared a Notice of Exemption pursuant to CEQA Guidelines Section 15062 – Notice of Exemption for the project identified above.

If the proposed project is approved, the Notice of Exemption will be electronically filed with the State Clearinghouse of the Governor's Office of Planning and Research to be posted on their CEQAnet Web Portal which, upon posting, may be accessed via the following weblink: <https://ceqanet.opr.ca.gov/search/recent>. In addition, the Notice of Exemption will be electronically posted on the South Coast AQMD's webpage which can be accessed via the following weblink: <http://www.aqmd.gov/nav/about/public-notices/ceqa-notices/notices-of-exemption/noe---year-2021>. The electronic filing and posting of the Notice of Exemption is being implemented in accordance with Governor Newsom's Executive Orders N-54-20 and N-80-20 issued on April 22, 2020 and September 23, 2020, respectively, for the State of Emergency in California as a result of the threat of COVID-19.

**NOTICE OF EXEMPTION FROM THE
CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)**

To: Governor's Office of Planning and Research - State Clearinghouse
1400 Tenth St, Suite 222
Sacramento, CA 95814-5502

From: South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Project Title: Proposed Rule 1147.1 – NOx Reductions from Aggregate Dryers

Project Location: The proposed project is located within the South Coast Air Quality Management District's (South Coast AQMD) jurisdiction, which includes the four-county South Coast Air Basin (all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino counties), and the Riverside County portion of the Salton Sea Air Basin and the non-Palo Verde, Riverside County portion of the Mojave Desert Air Basin.

Description of Nature, Purpose, and Beneficiaries of Project: South Coast AQMD has developed Proposed Rule (PR) 1147.1 to reduce nitrogen oxide (NOx) emission limits, while limiting carbon monoxide (CO) emissions, from gaseous fuel-fired aggregate dryers currently regulated by South Coast AQMD Rule 1147 - NOx Reductions from Miscellaneous Sources, in the "asphalt manufacturing" category. PR 1147.1 contains: 1) proposed emission limits of 30 parts per million (ppm) NOx and 1,000 ppm CO, which represent Best Available Retrofit Control Technology (BARCT); 2) compliance deadlines with an implementation schedule that takes into consideration equipment age, the existing permitted NOx limit, the number of units per facility, and whether facilities have multiple pieces of equipment subject to multiple source-specific command-and-control rules; and 3) monitoring, reporting, and recordkeeping requirements. Dryers with a rated heat input less than 2,000,000 British thermal units per hour or that emit less than one pound per day of NOx will continue to be subject to Rule 1147. PR 1147.1 is expected to achieve initial NOx emission reductions of 0.01 ton per day (tpd) by July 1, 2025 and 0.04 tpd by July 1, 2056.

Public Agency Approving Project: South Coast Air Quality Management District	Agency Carrying Out Project: South Coast Air Quality Management District
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Exempt Status: CEQA Guidelines Section 15061(b)(3) – Common Sense Exemption

Reasons why project is exempt: South Coast AQMD, as Lead Agency, has reviewed the proposed project pursuant to: 1) CEQA Guidelines Section 15002(k) – General Concepts, the three-step process for deciding which document to prepare for a project subject to CEQA; and 2) CEQA Guidelines Section 15061 – Review for Exemption, procedures for determining if a project is exempt from CEQA. Since the only physical modifications that may occur as a result of the proposed project are associated with retrofitting dryers with low-NOx burners or equipment replacement at the end of its useful life, which may be achieved without involving construction or via minimal construction activities, depending on the affected facility, it can be seen with certainty that implementing the proposed project would not cause a significant adverse effect on the environment. Therefore, the proposed project is exempt from CEQA pursuant to CEQA Guidelines Section 15061(b)(3) – Common Sense Exemption.

Date When Project Will Be Considered for Approval (subject to change):

South Coast AQMD Governing Board Hearing: August 6, 2021

CEQA Contact Person: Steve Tsumura	Phone Number: (909) 396-2549	Email: stsumura@aqmd.gov	Fax: (909) 396-3982
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Rule Contact Person: Shawn Wang	Phone Number: (909) 396-3319	Email: swang@aqmd.gov	Fax: (909) 396-3982
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Date Received for Filing: _____ **Signature:** _____ *(Signed Upon Board Approval)*
Barbara Radlein
Program Supervisor, CEQA
Planning, Rule Development, and Area Sources

PROPOSED RULE 1147.1

NO_x REDUCTIONS FROM AGGREGATE DRYERS

BOARD MEETING

AUGUST 6, 2021

Background

- ❑ Proposed Rule 1147.1 (PR 1147.1) is a landing rule for transitioning aggregate dryers located at RECLAIM facilities to a command and control regulatory structure
- ❑ For non-RECLAIM facilities, aggregate dryers are currently regulated under Rule 1147 – NO_x Reductions from Miscellaneous Combustion
- ❑ Aggregate dryers impacted by PR 1147.1 are separated from Rule 1147 to address unique operating conditions of aggregate dryers such as low temperature and high moisture environment
- ❑ PR 1147.1 establishes NO_x and CO limits, monitoring, reporting, and recordkeeping requirements for aggregate dryers at non-RECLAIM, RECLAIM, and former RECLAIM facilities

Impacted Equipment and Rule Applicability



- ❑ Aggregate dryers are combustion equipment fired on gaseous fuels used to reduce or minimize the moisture content from various aggregate materials
 - Examples include recycled concrete, recycled asphalt, and quarried materials
- ❑ Approximately 43 dryers located at 37 facilities
 - 24 non-RECLAIM facilities
 - 13 RECLAIM facilities
- ❑ Staff conducted virtual site visits to six facilities
- ❑ PR 1147.1 will apply to aggregate dryers with:
 - NO_x emissions greater than or equal to one pound per day; and
 - Rated heat input greater than 2,000,000 BTU per hour

Proposed Emission Limits

- ❑ PR 1147.1 proposes emission limits of:
 - 30 ppm NO_x; and
 - 1,000 ppm CO
- ❑ Aggregate dryers above 40 ppm are required to meet proposed limits when burner reaches 12 years old or January 1, 2022, whichever is later
- ❑ Aggregate dryers at or below the current Rule 1147 limit of 40 ppm limit are required to meet proposed limits when burner reaches 32 old or January 1, 2023, whichever is later
 - Additional time provided for aggregate dryers recently retrofitted to comply with Rule 1147 limits to avoid stranded assets
- ❑ All aggregate dryers must meet proposed limits upon burner replacement



Monitoring and Reporting

Source Testing

- Frequency based on equipment size with more frequent source testing for larger aggregate dryers
 - <10 mmBTU/hr – Every 5 calendar years
 - ≥ 10 mmBTU/hr and <40 mmBTU/hr – Every 3 calendar years
 - ≥ 40 mmBTU/hr – Every calendar year
- Aggregate dryers at or below the current Rule 1147 limit must conduct source testing when burner becomes 15 years of age

Emission Reductions and Cost-Effectiveness

Emission Reduction and Cost-Effectiveness

- 0.04 tons NO_x per day (tpd) by full implementation
- Average category cost-effectiveness is \$46,000/ton of NO_x reduced

Staff Recommendation

- Adopt Resolution:
 - Determining that Proposed Rule 1147.1 is exempt from the requirements of the California Environmental Quality Act (CEQA)
 - Adopting Rule 1147.1

