

SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT

FINAL DRAFT STAFF REPORT

April 21, 2011

Proposed Amendments to Rule 4307 (Boilers, Steam Generators, and Process Heaters – 2.0 MMBtu/hr to 5.0 MMBtu/hr)

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I. SUMMARY

A. Reasons for Rule Development and Implementation

California grows and processes about 80 percent of the world's almonds and virtually 100 percent of the almonds consumed in the US. Due to *Salmonella* outbreaks traced to California almonds in 2001 and 2004, the Food and Drug Administration (FDA) has imposed pasteurization requirements to reduce the potential for pathogen (bacteria that can make humans ill) contamination. The units that are the focus of this rule project are used to remove pathogens from the surface of raw almonds without "cooking" or otherwise affecting the nuts.

In October 2008, Paramount Farms, Incorporated, the largest almond processor in the US, installed an almond pasteurization unit at its Lost Hills processing facility. The unit's burners, however, do not meet the District Rule 4307 oxides of nitrogen (NOx) limit. Paramount Farms asked for and received two one-year variances from the District's Hearing Board. After the second variance hearing, the Rule Development Section was asked to research tree nut pasteurizer units and, if warranted, to consider a rule amendment incorporating tree nut pasteurizers into Rule 4307. District staff has reviewed the available information, visited the facility in question and has determined that a rule amendment is appropriate.

Based on the additional research, District staff has estimated for a facility to install this low-NOx technology and comply with the existing rule requirements, the unit would achieve an emissions reduction of 0.003 tons of NOx per day, but at a cost effectiveness of greater than \$250,000 per ton of NOx reduced. This specific situation and associated compliance cost was not considered during the last rule amendment.

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The proposed rule amendments will allow this existing facility to continue meeting the strict FDA pasteurization requirements and comply with Rule 4307 requirements. New pasteurization units would be evaluated on a case-by-case basis within the context of the District's permitting process.

B. Description of the Project

The purpose of this rule project is to amend Rule 4307 to specifically incorporate tree nut pasteurizers as a separate type of unit. In addressing these pasteurizers, the District is protecting public health by balancing the emissions from this unit and the potential health risks associated with un-pasteurized tree nuts.

C. Rule Development Process

The proposed rule and final draft staff report will be published and mailed to affected sources and interested parties prior to a public hearing to consider the adoption of proposed amendments to Rule 4307 by the District Governing Board.

II. CLIMATE CHANGE

The California Global Warming Solutions Act of 2006 (AB 32) created a comprehensive, multi-year program to reduce greenhouse gas (GHG) emissions in California, with the overall goal of restoring emissions to 1990 levels by the year 2020. In the coming years, ARB and the Legislature will be developing policies and programs to implement AB 32. The District believes that the evidence and the rationale that climate change is occurring is compelling and convincing. In addition to the long-term consequences of climate change, the District is concerned with the potential ramifications of more moderate but imminent changes in weather patterns. The Valley depends heavily on agriculture for its economy and has developed agricultural practices based on the last several decades of weather patterns. Unanticipated and large fluctuations in these patterns could have a devastating effect on the Valley's economy.

While there are many win-win strategies that can reduce both GHG and criteria/toxic pollutant emissions, when faced with situations that involve tradeoffs between the two, District staff believes that the more immediate public health concerns that may arise from an increase in criteria or toxic pollutant emissions should take precedence.

III. BACKGROUND

In 2001, a major *Salmonella* outbreak was linked to almonds and ultimately traced back to the handler and the grower. In the spring of 2004, a second major *Salmonella* outbreak occurred in Oregon that was linked to raw almonds purchased at a particular retailer. As a result of the two *Salmonella* outbreaks, the FDA now requires that all

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almonds be pasteurized before being sold to consumers in North America.¹ A number of other commonly consumed foods, such as milk, juice, eggs and canned foods are pasteurized in order to ensure safety by removing pathogens.

The almond pasteurization plan became mandatory for the California almond industry on September 1, 2007. The FDA, along with a technical review panel comprised of almond scientific experts, is responsible for evaluating and approving the treatment processes that demonstrate effectiveness in achieving a reduction of possible contamination in almonds while not impacting their quality and sensory (e.g., taste and texture) attributes.²

Like almond handlers, pistachio handlers will most likely be required to pasteurize their product as a direct consequence of a major *Salmonella* outbreak traced to pistachios in 2009. It is expected that the pistachio pasteurization provision will be promulgated within 12 to 30 months. This means that an additional three to seven tree nut pasteurizers could be built in the Valley. Emissions from new units would be evaluated on a case-by-case basis and within the context of the District's New Source Review rule.

IV. CURRENT RULE 4307 AND PROPOSED AMENDMENTS

A. Current Rule 4307

Rule 4307 was adopted in December 2005, and it was last amended on October 2008. The rule applies to any gaseous fuel or liquid fuel fired boiler, steam generator, or process heater with a total rated heat input of at least 2.0 million Btu per hour (MMBtu/hr) up to and including 5.0 MMBtu/hr. The current rule limits emission of NO_x, carbon monoxide (CO), and particulate matter (PM). NO_x limits are 30 or 40 parts per million by weight (ppm) for gaseous and liquid fuel-fired units, respectively. For new or replacement units, NO_x is nine or twelve parts per million, depending on the type of unit. CO is limited to 400 ppm. PM is controlled through fuel selection. Operators may choose PUC-quality natural gas, commercial propane, butane, liquefied petroleum gas, or a combination of such gases, or other low-sulfur fuel. If the operator chooses a high sulfur fuel, SO_x is required to be controlled by either 95% or to no more than nine parts per million by volume (ppmv).

For detailed requirements, please refer to current Rule 4307, which is available on the District's website at www.valleyair.org.

¹ Almond Board of California website
http://www.almondboard.com/FoodProfessionals/Documents/Pasteurization_Sheet%205.22.09.pdf

² Almond Board of California website
http://www.almondboard.com/FoodProfessionals/Documents/Pasteurization_Sheet%205.22.09.pdf

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B. Proposed Amendments to Rule 4307

1. Section 3.0 – Definitions

A definition would be added for tree nut pasteurizer. The definition of EPA would be modified the standard format for acronyms that puts the spelled-out name in front of the acronym.

2. Section 5.0 – Requirements

The San Joaquin Valley is home to some of the largest tree nut (almond and pistachio) processing operations in the entire nation. To protect consumers, the United States Food and Drug Administration (FDA) imposed pathogen reduction requirements for tree nut processing operations to reduce the potential for contamination from pathogens such as *Salmonella*. A variety of pathogen reduction measures are employed by tree nut processing operations, with the majority of facilities utilizing chemicals, blanching, or roasting processes not subject to Rule 4307, and several facilities are utilizing steam pasteurization to satisfy FDA requirements. These pasteurizer units are costly, complex systems that sometimes include small burners. The Paramount Farms almond pasteurizer unit is a two-part unit. The first part uses steam to add moisture to the surface of the shelled almonds. The second part of the unit quickly heats the almond surface to kill pathogens.

District staff is proposing that tree nut pasteurizers be fired on natural gas as a NO_x control. This strategy is similar to the requirements imposed on vegetable dehydrators in District Rule 4309, a rule that has been approved by EPA into the California State Implementation Plan (SIP). During natural gas curtailments, units would either not be used or meet the requirements of Section 4.6. Section 4.6 outlines limitations for a unit that fires on alternative fuels during natural gas curtailments. As detailed in Section VII of this report, imposing a 30 ppm NO_x emission limit for the single existing unit affected by the rule is extremely expensive because any change to the process triggers a re-validation of the sterilization process. Since the pasteurizer is already operating, the requirement can take effect on the date of rule adoption; therefore no commencement date is needed for this provision.

Section 5.4.4 would be modified to clarify that a longer start-up or shutdown duration may be approved, if the operator receives approval from the APCO, ARB, and EPA.

3. Section 6.0 – Administrative Requirements

The records section would be modified. The operator of a tree nut pasteurizer would be required to keep records showing that the unit is being operated and maintained as recommended by the pasteurizer's manufacturer as well as being able to demonstrate that the fuel utilized by the unit meets the specifications of PUC quality natural gas.

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V. IMPACT OF PROPOSED AMENDMENTS ON OTHER DISTRICT COMMITMENTS

A. Impact of Proposed Amendments on District Attainment Strategies

This rule project is not a control measure in any attainment plan and is not expected to reduce or increase emissions from the single existing tree nut pasteurizer. For these reasons, District staff has concluded that attainment of any ambient air quality standard will not be affected by this rule project. The proposed amendments will not affect either the District's 2007 Ozone Plan or the District's 2008 PM_{2.5} Plan (particulate matter with aerodynamic diameter of 2.5 micrometers or less) because no emission limits have been changed, nor are the amendments expected to affect emissions from this source category.

The federal Clean Air Act (Act) requires that attainment plans meet reasonable further progress (RFP) by achieving incremental emission reductions to ensure attainment of the National Ambient Air Quality Standards (NAAQS) by the attainment date. The Act does not identify specific emission reduction benchmarks that must be met for particulate matter attainment plans. EPA has interpreted the Act's RFP requirement using the concept of achieving (generally) linear progress toward the standard. The District's 2008 PM_{2.5} Plan contains an RFP demonstration. However, the proposed amendments do not have emission reductions associated with them, so it is not expected that the RFP will be affected by the changes in the rule.

B. Consideration for the Condensable Fraction of PM_{2.5}

Certain high-temperature processes emit gaseous pollutants that rapidly condense into particle form in the ambient air. After January 1, 2011, areas that are nonattainment for the National Ambient Air Quality Standard (NAAQS) for particulate matter that is 2.5 microns or less in diameter (PM_{2.5}) are to consider the condensable fraction of directly emitted PM_{2.5} for purposes of establishing the emissions limits for:

- Reasonable Further Progress (RFP), in which an area shows continuous reductions of directly emitted PM_{2.5} and precursors, with sufficient emissions reductions to demonstrate attainment by the applicable deadline, and
- Reasonably Available Control Technology (RACT) and Reasonably Available Control Measures (RACM), in which a nonattainment area shows that it is adopting technologies and measures that are reasonably available, considering technical and economic feasibility; sufficient to demonstrate expeditious attainment; and meet RFP. (reference: 40 CFR 51.1002(c))

The District established emissions limits for its attainment, RFP, and RACT/RACM demonstrations in the *2008 PM_{2.5} Plan* for the PM_{2.5} NAAQS as set by EPA in 1997. The District continues to evaluate condensable particulates and other directly emitted PM_{2.5} to improve its PM_{2.5} emissions inventory for future attainment plan efforts.

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This amendment to Rule 4307 was neither included in, nor does it impede, the emissions limits set in the *2008 PM2.5 Plan*. The District is not currently aware of significant condensable PM2.5 emissions or related condensable PM2.5 emissions control technologies for the sources affected by this amendment. Therefore, the District has satisfied any applicable requirement to consider condensable particulates from this source at this time.

VI. BASELINE EMISSION INVENTORY AND EMISSION REDUCTIONS

There is one almond pasteurization unit currently operating that would be affected by the amendments. The unit is fired on natural gas and rated at 4.4 MMBtu/hr. There is no baseline inventory for this source category. District staff assumed typical uncontrolled burners were installed in the pasteurizer. The unit was assumed to operate between 5,000 and 8,500 hours per year and the average percent of maximum heat input between 70 percent and 90 percent of maximum heat input. District staff used 0.092 pounds of NOx per MMBtu as the uncontrolled emission factor. Using these assumptions, the estimated uncontrolled emissions from this unit are about 1.0 to 1.5 tons NOx per year.

The unit is already firing on natural gas, so there is no change to the unit and by extension, no emission reductions associated with the proposed amendments. Additionally, there is no increase in emissions to implement this rule; therefore, there is no emission impact for this project

VII. COSTS AND COST EFFECTIVENESS ANALYSIS

The California Health and Safety Code Section 40920.6(a) requires the District to conduct both an absolute cost effectiveness analysis and an incremental cost effectiveness analysis of available emission control options before adopting each Best Available Retrofit Control Technology (BARCT) rule. The purpose of conducting a cost effectiveness analysis is to evaluate the economic reasonableness of the pollution control measure or rule. The analysis also serves as a guideline in developing the control requirements of a rule.

Absolute cost effectiveness of a control option is the added annual compliance cost in dollars per year divided by the emission reduction achieved in tons VOC reduced per year. Incremental cost effectiveness is intended to measure the change in costs, in dollars per year, and emissions reductions, in tons of pollutant reduced per year, between two progressively more effective control options or technologies. Incremental cost effectiveness compares the differences in costs and the differences in emissions reductions of the two candidate control options. Incremental cost effectiveness does not reveal the emission reduction potential of the control options, merely the additional cost of adding the next most effective control to a given control measure. Unlike the

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absolute cost effective analysis that identifies the control option with the greatest emission reduction; incremental cost effectiveness does not present a meaningful correlation between emissions reductions and cost effectiveness. Therefore, the relative values produced in the incremental cost effectiveness analysis and the absolute cost effectiveness values are not comparable and cannot be evaluated using similar standards.

The pasteurizer at Paramount Farms is already in compliance with the proposed provisions of Rule 4307 and therefore, no additional costs to the operator are associated with the proposed requirements. Absolute cost effectiveness cannot be calculated because there are no associated emission reductions, meaning that the \$0 cost would be divided by zero, which is mathematically undefined.

The incremental cost effectiveness is the difference in cost between successively more effective controls. The next-most stringent option after natural gas firing is to require the current unit to replace the current burners with 30 ppm low-NO_x burners. Paramount Farms submitted cost data for retrofitting their current unit. A theoretical replacement unit (which has not been built, nor tested to determine if it would pasteurize to the required level of pathogen reduction) would cost \$260,000. Because any change to a validated sterilization process triggers re-validation under FDA regulations, costs of materials and testing for the re-validation of the sterilization process are included as one-time retrofit costs. Paramount Farms indicated that the testing and materials for re-validation would be an additional \$1.2 million to \$5.0 million. Added to the replacement cost, the total one-time retrofit costs of \$1.46 to \$5.26 million. Annualized over 10 years at 10% rate of return, the annualized incremental cost is \$238,000 to \$856,000.

In order to determine incremental cost effectiveness, an estimate of emission reductions from the proposed requirement to the next-most effective control is needed. District staff estimated a range of additional NO_x reductions for this unit using the same assumptions as for the baseline inventory. District staff used 0.092 pounds of NO_x per MMBtu as the uncontrolled emission factor and 0.036 pounds NO_x per MMBtu for the controlled emission factor. Using the same range for hours used and percent of maximum heat input as for the baseline emissions estimation above, the estimated emission reductions are 0.43 tons per year to 0.94 tons per year. The incremental cost effectiveness is \$252,000 to \$908,000 per additional ton of NO_x reduced. The calculation is shown in Table 1.

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Table 1 – Incremental Cost Effectiveness Analysis Results				
	One-time Retrofit Cost (\$)	Annualized Cost (\$/yr)	Incremental Cost Effectiveness at min reductions (\$/add'l ton NOx)	Incremental Cost Effectiveness at max reductions (\$/add'l ton NOx)
Total (retrofit + re-valid min)	\$1,460,000	\$237,542	\$550,886	\$252,039
Total retrofit + re-valid max)	\$5,260,000	\$855,802	\$1,984,699	\$908,032

Because the incremental cost is greater than \$250,000 per additional ton of NOx reduced, District staff has determined that requiring the affected unit be retrofitted with a 30 ppm burner is not reasonable for the existing unit.

VIII. SOCIOECONOMIC IMPACT ANALYSIS

Pursuant to state law, District staff is required to perform a socioeconomic impact analysis prior to adoption, amendment, or repeal of a rule that has significant impacts on air quality or that will strengthen emission limitations. The proposed amendments to Rule 4307 would cost \$0 to comply; therefore there is no socioeconomic impact from the proposed amendments.

IX. ENVIRONMENTAL IMPACTS

Pursuant to the California Environmental Quality Act (CEQA), District staff reviewed the possible environmental impacts of the proposed amendments and determined that air quality and perhaps greenhouse gas emissions are the only potentially affected environmental resources. The proposed amendments do not impose regulatory requirements resulting in an increase in fuel combustion, thus implementation of the proposed project would neither increase greenhouse gas emissions nor affect criteria pollutant emissions.

District staff concludes that there is no substantial evidence in the whole record before the District that the proposed amendments to Rule 4307 would cause any adverse effects on the environment. The District finds that the project is exempt per the general rule that CEQA applies only to projects which have the potential for causing a significant effect on the environment (CEQA Guidelines Section 15061(b)(3)). For these reasons, staff is proposing to file a Notice of Exemption upon Board adoption of the proposed amendments to Rule 4307.

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X. RULE CONSISTENCY ANALYSIS

Prior to adopting, amending, or repealing a rule or regulation, California Health and Safety Code Section 40727.2 requires a written analysis that identifies and compares requirements of the proposed rule with corresponding, existing and proposed District rules and corresponding United States Environmental Protection Agency (EPA) rules, regulations, and guidelines. Based on the analysis, District staff concludes that the proposed amendments to Rule 4307 are consistent with other District rules and are not in conflict with these rules. Further, the proposed rule amendments are consistent with EPA rules, regulations, and guidelines that apply to the same source category. The analysis is presented in Appendix A of the Final Draft Staff Report.

XI. REFERENCES

1. U.S. Environmental Protection Agency “Clean Air Fine Particulate Implementation Rule” Federal Register Volume 72 pages 20586 – 20667; April 25, 2007.
2. U.S. Department of Agriculture/Agricultural Marketing Service “Almonds Grown in California: Outgoing Quality Control Requirements” Federal Register Volume 72 pages 15021 – 15036; March 30, 2007.
3. Bob Klein, Manager, Administrative Committee for Pistachios, phone conversation November 2, 2010.

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