I. SUMMARY

The purpose of this rule-amending project is to strengthen the requirements of Rule 4308 (Boilers, Steam Generators, and Process Heaters – 0.075 MMBtu/hr to less than 2.0 MMBtu/hr), fulfill a commitment from the San Joaquin Valley Air Pollution Control District’s (District’s) 2012 PM2.5 Plan, and improve the clarity of the rule. Rule 4308 is the District’s point-of-sale rule that reduces oxides of nitrogen (NOx) and carbon monoxide (CO) emissions from boilers, steam generators, and process heaters with a rated heat input capacity of 0.075 to 0.4 million British thermal units per hour (MMBtu/hr).

During plan development, the District identified an opportunity to lower the NOx emission limit for natural gas-fired instantaneous water heaters with a rated heat input of 0.075-0.4 MMBtu/hr (instantaneous units) from 55 parts per million by volume (ppmv) to 20 ppmv. The 20 ppmv compliant instantaneous units are readily available throughout California (including the San Joaquin Valley (Valley)) and are cost effective; as such, the District is proposing to lower the NOx emission limit for these units through this rule amendment project. The District is also proposing to clarify the applicability of Rule 4308 by adding specific exemption language for hot water pressure washers that are currently exempt from the rule.

This draft rule amendment project will contribute to the Valley’s progress towards attainment of federal air quality standards for particulate matter that is 2.5 microns or less in diameter (PM2.5) and ozone by reducing NOx, which is a precursor for both PM2.5 and ozone. If adopted, amendments to Rule 4308 will reduce 0.002 tons per day
(tpd) of NOx emissions from instantaneous units over time as older units are replaced with lower-emitting instantaneous units. In addition, this draft rule amendment will ensure that Rule 4308 is as stringent as similar rules in other California air districts and satisfies Reasonably Available Control Technology (RACT) requirements.

II. PROJECT BACKGROUND

A. Source Category

As a point-of-sale rule, Rule 4308 applies to any person who supplies, sells, offers for sale, installs, or solicits the installation of boilers, steam generators, and process heaters with a rated heat input of 0.075 MMBtu/hr to less than 2.0 MMBtu/hr. Affected persons include water heater manufacturers, plumbing wholesalers, supply stores, plumbers, and contractors. This point-of-sale approach allows the District to achieve NOx reductions without forcing immediate replacement of existing units to comply with rule requirements and thus placing an undo financial burden on the consumer.

The most significant draft rule amendment applies specifically to instantaneous units. Instantaneous units, also known as tankless water heaters, generate hot water only as it is needed. They do not produce the standby energy losses associated with storage, or tank-style, water heaters since they only heat water when it flows through a heat exchanger, and are thus promoted as energy efficient devices. Instantaneous units are used in settings including, but not limited to, apartment buildings, large homes, small businesses, commercial buildings, manufacturing facilities, government facilities, restaurants, hotels, hospitals, educational institutions, and religious organizations.

B. Number of Units Affected by Draft Rule Amendments

The District calculated a conservative estimate of the number of instantaneous units in the Valley affected by these draft rule amendments for the purposes of this staff report and the associated analyses. There are, currently, approximately 609 instantaneous units in the Valley that would, upon replacement, be affected by this rule amendment project. This figure is conservative because it only assumes the replacement of existing instantaneous units with newer instantaneous units. The District anticipates additional emission reductions as a result of these draft amendments due to the trend of replacing tank-style units with instantaneous units because of increased fuel and energy efficiency, but will not claim those emission reductions for this rule-amending project.

To determine the number of units in the Valley affected by the draft rule amendments, the District calculated an average population-to-unit ratio of 1 natural gas-fired unit with a rated heat input of 0.075-0.4 MMBtu/hr for every 385 people, using population data

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from the South Coast Air Quality Management District (SCAQMD)\(^2\) and their estimate for the total number of units in this size category.\(^3\) Using this ratio and a population estimate of 3.97 million people in the Valley in 2010\(^4\), there are approximately 10,300 natural gas-fired units with a rated heat input of 0.075-0.4 MMBtu/hr in the Valley.

Only a fraction of the 10,300 natural gas-fired water heaters are instantaneous units, as most of the natural gas units sold are storage water heaters. The Department of Energy’s 2009 Water Heater Market Profile estimated that of water heaters sold 3% are natural gas-fired instantaneous units, 48% are natural gas-fired storage units, and the remaining 49% are electric units.\(^5\) Therefore, natural gas-fired instantaneous units make up 5.9% of the natural gas-fired water heater market.

During the August public workshop for this rule amendment project, the District will solicit input from stakeholders in order to further refine the inventory of units. As these sources are not permitted or registered, the estimated number of units subject to these draft rule amendments has been determined using the best available data.

C. Current Rule

The purpose of Rule 4308 is to limit NOx and CO emissions from large water heaters and small boilers with a rated heat input of 0.075 MMBtu/hr to less than 2.0 MMBtu/hr. The rule currently requires that no person supply, sell, offer for sale, install, or solicit the installation of any natural gas-fired unit within the Valley that exceeds 20 ppmv of NOx emissions, except instantaneous water heaters and pool heaters with a rated heat input of 0.075-0.4 MMBtu/hr that currently have a NOx emission limit of 55 ppmv.

Rule 4308 also requires the manufacturers of units subject to this rule certify their units through either the District’s certification program, the SCAQMD certification process for SCAQMD Rule 1146.2, or other emission certification programs approved by the United States Environmental Protection Agency (EPA) and District’s Air Pollution Control Officer. Both the SCAQMD and District certification processes require that the manufacturer obtain a certification source test from an independent testing laboratory for each unit, in order to verify compliance with the applicable emission limits. The manufacturer is then required to submit the certification source test as part of a compliance report that identifies the manufacturer, brand name, model number, and

description of the unit being certified. SCAQMD has worked extensively with manufacturers subject to SCAQMD Rule 1146.2 to certify thousands of units and provides the complete list of certified units on their website for reference.

The District’s Governing Board adopted amendments to Rule 4308 on December 17, 2009 to incorporate the 20 ppmv NOx emission limits mentioned above. The District submitted the amended rule to the California Air Resources Board (ARB) for forwarding to the EPA as an amendment to the State Implementation Plan (SIP) in 2010. EPA finalized approval of Rule 4308 on January 31, 2011 and found it to be at least as stringent as established RACT requirements. 6

D. Similar Rules in Other Air Districts

The District compared Rule 4308 to the following analogous rules in other air districts:

- Bay Area Air Quality Management District (BAAQMD) Regulation 9, Rule 6 (Rule 09-06) (Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters) 7
- Sacramento Metropolitan Air Quality Management District (SMAQMD) Rule 411 (NOx from Boilers, Process Heaters and Steam Generators) 8
- SMAQMD Rule 414 (Water Heaters, Boilers and Process Heaters Rated Less Than 1,000,000 BTU Per Hour) 9
- SCAQMD Rule 1146.2 (Emissions of Oxides of Nitrogen From Large Water Heaters and Small Boilers and Process Heaters) 10
- Ventura County Air Pollution Control District (VCA PCD) Rule 74.11.1 (Large Water Heaters and Small Boilers) 11

The emission limits for units subject to Rule 4308 and these aforementioned rules in other air districts are separated based on two size categories: units with a rated heat input of 0.075-0.4 MMBtu/hr and units with a rated heat input of 0.4-2.0 MMBtu/hr. Rule 4308 currently enforces a 20 ppmv NOx emission limit for all natural gas-fired water heaters with a rated heat input of 0.4-2.0 MMBtu/hr, which is equivalent to the limits in

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these other California air districts’ rules. However, BAAQMD Rule 09-06, SCAQMD Rule 1146.2, and VCAPCD Rule 74.11.1 have a 20 ppmv NOx emission limit for instantaneous units, whereas Rule 4308 contains a NOx emission limit of 55 ppmv for these units. The lower limit was implemented in SCAQMD in 2012 and BAAQMD in 2013, and will be implemented in VCAPCD in 2014.

The District also compared the CO emission limit in Rule 4308 to the aforementioned other air districts’ rules. The District’s limit of 400 ppm is equivalent to the CO limits in these other air districts’ rules and it applies to the same size category of units specified within those rules. Therefore, aside from the NOx emission limit for instantaneous units, Rule 4308 is as stringent as or more stringent than the other air districts’ rules.

E. Control Technologies

Instantaneous units are designed and manufactured with low NOx burner systems in order to meet specific NOx emission limits, such as the existing Rule 4308 NOx emission limit of 55 ppmv. The instantaneous units that meet a 20 ppmv NOx emission limit are equipped with ultra-low NOx burners. As this rule is a point-of-sale rule, retrofit of currently installed instantaneous units would not be required.

The District researched whether pool heater technology has also advanced to achieve a 20 ppmv NOx emission limit. However, water heater manufacturers and staff at SCAQMD indicated that there are no known pool heaters with a rated heat input of 0.075-0.4 MMBtu/hr capable of meeting a 20 ppmv NOx emission limit. All pool heaters certified through SCAQMD are certified to meet a 55 ppmv NOx emission limit. Therefore, the District recommends upholding the current NOx emission limit for pool heaters in this size range to maintain the lowest feasible limit and stay consistent with other air districts’ rules.

In addition, the District is not proposing the addition of any PM2.5 or sulfur dioxide (SO2) emission limits or requirements, as in other District combustion rules, because there are no known units with a rated heat input of 0.075-2.0 MMBtu/hr that operate with PM2.5 or SO2 emission control devices (such as baghouses, electrostatic precipitators, and scrubbers). These technologies have not been demonstrated or achieved-in-practice for units smaller than 5 MMBtu/hr. Units this small are fired on natural gas, propane, liquefied petroleum gas, or low sulfur diesel fuel and already emit very low levels of PM2.5 and SO2.

III. DRAFT AMENDMENTS TO RULE 4308

A. Overview of Draft Amendments

The District is proposing the following draft amendments to Rule 4308:

- Lowering the NOx emission limit for instantaneous units from 55 ppmv to 20 ppmv
- Addition of an exemption for hot water pressure washers
- Removal of redundant and expired language
- Clarifications to existing rule language in Sections 1.0, 3.0, and 6.0

B. Draft Rule 4308

The following discussion details the draft amendments to Rule 4308. See Draft Rule 4308 for exact language.

Section 1.0 Purpose

Language would be added to this section to clarify that this rule also limits CO emissions.

Section 3.0 Definitions

To improve rule clarity, the definitions of “EPA,” “SCAQMD,” and “hot water pressure washer” would be added to rule language, and the definition of “PUC Quality Natural Gas” would be moved.

Section 4.0 Exemptions

To clarify current rule applicability, an exemption for hot water pressure washers would be added. In 2011, a pressure washer manufacturer notified the District that per the current definition of an instantaneous water heater, hot water pressure washers could be misinterpreted as being classified under this source category.

Similar to instantaneous units, the water for hot water pressure washers is only heated when it flows through the heat exchanger. These units are used in various industries, including food processing, construction, and transportation industries. The pressure washers are used to clean and degrease machinery, vehicles, work surfaces, and floors. As such, most units are portable and are fired on diesel fuel since it is more readily available and practical for portable uses than natural gas.

Most hot water pressure washers are portable; they are incapable of incorporating add-on NOx controls. For the few stationary units, the rated heat input capacity is so small that add-on controls are not feasible. Without the use of add-on controls, hot water
pressure washers are unable to meet the emission limits of Rule 4308. However, diesel fuel-fired water heaters of all sizes are required to obtain a permit for their units per District Rule 2201 (New and Modified Stationary Source Review Rule) and implement Best Available Control Technology (BACT) requirements. An exemption from Rule 4308 does not remove the requirement for diesel-fired hot water pressure washers to obtain a permit and implement the most stringent controls possible via Rule 2201.

In addition, these units are generally used for only a couple of hours a day. Pressure washers are equipped with trigger guns. The trigger gun stops the flow of water when not needed, which limits the heating and fuel burning processes. The NOx emissions from hot water pressure washers are very small. There is currently one 0.166 MMBtu/hr hot water pressure washer permitted in the Valley and based on the current NOx emission limit within that permit, the unit would emit at most 0.13 pounds of NOx per day, assuming an unrealistic worst case scenario that the unit runs for 24 hours a day.

The District also examined whether other air districts regulate hot water pressure washers through their analogous rules and found that none of the rules identified in Section II.D specifically address these units. The SCAQMD, BAAQMD, and VCAPCD rules only apply to natural gas-fired units and since hot water pressure washers are generally diesel-fired, these units would be exempt.

Pressure washers were previously addressed in SCAQMD Rule 1147 (NOx Reductions from Miscellaneous Sources); however, they were recently removed from this rule and transitioned into Rule 219 (Equipment Not Requiring a Written Permit Pursuant to Regulation II). In the staff report for the 2013 amendment of Rule 219, SCAQMD notes that due to the mobile nature of power pressure washers, emission controls for these units are challenging, if not impossible. As a result, Rule 219 exempts all diesel-fired pressure washers with a maximum heat input capacity of 0.55 MMBtu/hr or less; 96% of the permitted pressure washers in SCAQMD had rated maximum heat input capacities less than 0.55 MMBtu/hr.

**Section 5.0 Requirements**

The District proposes amending the NOx emission limit for instantaneous units from 55 ppmv to 20 ppmv. Emission limits in Table 1 of Rule 4308 would remain in effect until December 31, 2014. On and after January 1, 2015, Table 2 emission limits would be implemented. Table 2 of Rule 4308 (Table 1 below) reflects the new NOx emission limit for instantaneous units.

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### Table 1: Draft Emission Limits for Rule 4308

<table>
<thead>
<tr>
<th>Type and Size of Unit, in MMBtu/hr</th>
<th>NOx Limit (at 3% stack gas oxygen by volume on a dry basis)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PUC Quality Natural Gas</td>
</tr>
<tr>
<td></td>
<td>lb/MMBtu of heat input (ppmv)</td>
</tr>
<tr>
<td>Units greater than or equal to 0.075 but less than or equal to 0.4, except as specified below</td>
<td>0.024 (20)</td>
</tr>
<tr>
<td>Units greater than 0.4 but less than 2.0, except as specified below</td>
<td>0.024 (20)</td>
</tr>
<tr>
<td>Instantaneous water heaters greater than or equal to 0.075 but less than or equal to 0.4</td>
<td>0.024 (20)</td>
</tr>
<tr>
<td>Instantaneous water heaters greater than 0.4 but less than 2.0</td>
<td>0.024 (20)</td>
</tr>
<tr>
<td>Pool heaters greater than or equal to 0.075 but less than or equal to 0.4</td>
<td>0.068 (55)</td>
</tr>
<tr>
<td>Pool heaters greater than 0.4 but less than 2.0</td>
<td>0.024 (20)</td>
</tr>
</tbody>
</table>

This amendment would require that instantaneous units supplied, sold, or installed in the Valley after January 1, 2015 be certified to meet a 20 ppmv NOx emission limit. The District examined whether low NOx instantaneous units are available in the Valley. SCAQMD maintains a list of natural gas-fired water heater manufacturers certified to produce units that meet SCAQMD Rule 1146.2 emission limits. There are six water heater manufacturers that produce instantaneous units that meet the 20 ppmv NOx emission limit. All six instantaneous water heater manufacturers confirmed to District staff that they sell instantaneous units to Valley wholesalers or water heater suppliers. These Valley wholesalers and suppliers generally only sell units to licensed contractors or parties qualified to correctly install the units.

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Section 7.0 Compliance Schedule

To improve rule clarity and simplify rule language, Section 7.0 would be deleted from Rule 4308. The compliance dates listed in this section are outdated and the new compliance dates are listed in Section 5.0 of the rule.

IV. SUPPORTING ANALYSES

A. Global Climate Change and Greenhouse Gases

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. ARB and the State Legislature are 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, the District believes that the more immediate public health concerns that may arise from an increase in criteria or toxic pollutant emissions should take precedence. The District Governing Board adopted the Climate Change Action Plan (CCAP) in August 2008. For California Environmental Quality Act (CEQA) requirements, one of the goals of the CCAP is to establish District processes for assessing the significance of greenhouse gas impacts. The District has developed a policy and guidance for addressing greenhouse gases under CEQA.

B. Health Benefits

The District is a public health agency whose mission is to improve the health and quality of life for all Valley residents through efficient, effective and entrepreneurial air quality management strategies. The District periodically compiles attainment plans to identify individual regulations and other strategies that will achieve the emissions reductions needed for the Valley to meet federal health-based air quality standards (National Ambient Air Quality Standards, or NAAQS). Guided by its Health-risk Reduction Strategy, the District develops and implements both attainment plans and regulations to attain the NAAQS in the quickest, most health-protective, and most cost-effective manner. The control strategy as a whole, then, has important public health benefits and health costs savings.
This amendment to Rule 4308 is one component of this overall control strategy. Since this rule amendment reduces NOx, it benefits public health by contributing to improved ozone and PM2.5 air quality.

C. **Emission Reduction Analysis**

As presented in the *2012 PM2.5 Plan*, the annual NOx emissions from this source category were 0.71 tpd in 2012. The District did not specify an emission reduction commitment for this draft rule amendment in that plan in lieu of conducting a more thorough emission reduction analysis in this rule amendment project.

Draft rule amendments would only affect a portion of the total source category; as such, the baseline NOx emissions from instantaneous units is 0.003 tpd (or 1.10 tons per year (tpy)). Draft rule amendments would result in approximately 0.002 tpd (or 0.73 tpy) of NOx reductions after all units are replaced within the next 20 years, reflecting a 66.4% reduction from this baseline. The complete Emission Reduction Analysis is presented in Appendix B of this Draft Staff Report.

D. **Cost Effectiveness Analysis**

Pursuant to California Health & Safety Code (CH&SC) Section 40920.6(a), the District is required to analyze the cost effectiveness of new rules or rule amendments. The District has prepared a cost effectiveness analysis of this draft rule to analyze the economic feasibility of the draft rule amendments. The estimated cost effectiveness of implementing a 20 ppmv NOx emission limit for instantaneous units is approximately $18,062-$47,727 per ton of NOx reductions. The complete analysis is presented in Appendix C of this Draft Staff Report.

E. **Socioeconomic Analysis**

Pursuant to CH&SC Section 40728.5(a), “Whenever a district intends to propose the adoption, amendment, or repeal of a rule or regulation that will significantly affect air quality or emissions limitations, that agency shall, to the extent data are available, perform an assessment of the socioeconomic impacts of the adoption, amendment, or repeal of the rule or regulation.” No significant socioeconomic impacts are expected from these draft rule amendments. The complete Socioeconomic Analysis is presented in Appendix D of this Draft Staff Report.

F. **Rule Consistency Analysis**

Pursuant to CH&SC Section 40727.2, the District prepared a Rule Consistency Analysis that compares the elements of the amendments with the corresponding elements of other District rules and federal regulations. Draft amendments would not conflict with other District rules, or federal rules, regulations, or policies covering similar stationary
sources. This Rule Consistency Analysis is presented in Appendix E of this Draft Staff Report.

G. CEQA

Pursuant to Section 15061 of the Guidelines for Implementation of the CEQA, the District investigated the possible environmental impacts of the draft amendments to Rule 4308. Based on the lack of evidence to the contrary, the District has concluded that the draft rule amendments will not have any significant adverse effects on the environment. Staff recommends filing a Notice of Exemption under the provisions of Public Resource Code 15061(b)(3).

V. RULE DEVELOPMENT PROCESS

A. Public Workshop for Rule 4308

As part of the rule development process, the District will hold a public workshop to present, discuss, and hear comments on the draft rule and draft staff report on August 22, 2013. The draft rule and draft staff report were made available on the District’s website prior to the public workshop, and a two week comment period will follow the public workshop. Comments received during the workshop and during the commenting period following the workshop will be considered and incorporated into the draft rule or staff report, as appropriate.

Per the District’s socioeconomic policy, adopted by the Governing Board in October 2011, staff will solicit information from stakeholders at the August 22nd workshop about trade organizations that represent industries affected by the rule amendment. The District will also solicit feedback from affected sources to determine if any new Department of Transportation, Occupational Safety and Health Administration, or other requirements would result from draft amendments.

B. Public Hearing for Rule 4308

In accordance with CH&SC Section 40725, the proposed rule and final draft staff report will be publicly noticed and made available on the District’s website prior to the Governing Board public hearing to consider adoption of the proposed rule amendments. Proposed amendments are tentatively scheduled to be presented to the Governing Board during the public hearing on October 17, 2013.
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