SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT

FINAL DRAFT STAFF REPORT

November 5, 2009

Proposed Amendments to Rule 4308
(Boilers, Steam Generators, and Process Heaters –
0.075 MMBtu/hr to less than 2.0 MMBtu/hr)

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I. SUMMARY

A. Reasons for Rule Development and Implementation

The California Air Resources Board (ARB) and United States Environmental Protection Agency (EPA) classified the San Joaquin Valley Air Basin (SJVAB) as severe and serious non-attainment area for the state and federal ozone standards, respectively. In accordance with Federal Clean Air Act (CAA) requirements for non-attainment areas, the San Joaquin Valley Unified Air Pollution Control District (District) adopted the 2007 Ozone Plan to establish the strategy for attaining the federal eight-hour ozone standard. The SJVAB is also currently designated as nonattainment for the national ambient air quality standard (NAAQS) for particulate matter with aerodynamic diameter of 2.5 micrometers or less (PM2.5). As such, the District's Governing Board adopted the 2008 PM 2.5 Plan on April 30, 2008.

The ozone and particulate matter attainment strategies are comprised of regulatory and incentive-based measures to reduce emissions of oxides of nitrogen (NOx), volatile organic compounds (VOC), particulate matter and sulfur oxides (SOx). As a result, this rule development project is subject to the Code of Federal Regulations (CFR), the CAA and the California Health and Safety Code (CH&SC) requirements.

This rule amendment project is proposed to satisfy the goals of the District's 2007 Ozone Plan and 2008 PM2.5 Plan. The proposed amendments to Rule 4308 will seek to obtain as much NOx, SOx, and PM emission reductions from the source category as expeditiously practicable, technologically feasible, and economically reasonable, as determined by the District's Governing Board. Furthermore, the District intends to satisfy the requirements identified in Table 1.

Table 1

Subject	Reference	Requirement
BACM	Federal Register 8/18/94	Provisions in attainment plans should include the application of best available control measures (BACM) to existing major stationary sources.
BARCT	CH&SC 40919(a)(3) 2007 Ozone Plan	Ozone attainment plan should provide for best available retrofit technology (BARCT) for existing permitted sources.
Deadlines	Ozone Plan	Adoption of rule amendments by the 4th quarter of 2009.
Feasible Controls	CH&SC 40914(a)(2)	Ozone attainment plans should include "all feasible control measures."
RACT	CAA 182(b)(2) and 182(f)	Ozone attainment plans shall assure that reasonable available control technology (RACT) for oxides of nitrogen (NOx) and VOC is in use at sources and on source categories at or above the RACT threshold.
RACT Threshold	70 Federal Register 30592-30596 5/26/05	The applicable RACT threshold for control measures shall be the threshold in effect on June 15, 2004. The Districts threshold on June 15, 2004 was 10 tons per year (tpy) for NOx or VOC.
Reductions	Ozone Plan and PM 2.5 Plan	Emissions reduction calculations are shown in Appendix B of the staff report.
Timeline	CAA Section 172(c)(1)	Ozone attainment plans shall implement control measures as expeditiously as practicable, and provide for attainment.

B. 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 goal of restoring emissions to 1990 levels by 2020. In the coming years, ARB and the Legislature will be developing policies and programs to implement AB 32. There are many win-win strategies that can reduce both GHG and criteria/toxic pollutant emissions. In relation to criteria pollutants, greenhouse gases have been recognized by EPA to contribute to the air pollution, and therefore have an impact on the public health and welfare of citizens. However, the Districts statutory authority dictates that criteria pollutants be addressed first while also recognizing the impacts of greenhouse gases on the environment.

The San Joaquin Valley Air Pollution Control District's Governing Board adopted the Climate Change Action Plan (CCAP) in August 2008. For CEQA, 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 proposed policy and proposed guidance for addressing greenhouse gases under CEQA, which will be going to the District Governing Board for approval in November 2009.

B. Description of the Project

The District's Governing Board adopted Rule 4308 (Boilers, Steam Generators, and Process Heaters – 0.075 MMBtu/hr to 2.0 MMBtu/hr) on October, 20, 2005. District staff is seeking to amend Rule 4308 to implement an emission control measure (S-COM-3) in the District's 2008 PM 2.5 Plan. The control measure indicates that NOx emission reductions could be achieved by lowering the NOx emission limit on boilers of this size category.

As guidelines for developing the proposed changes to Rule 4308, District staff studied rules from other air districts within and outside of California. Lower NOx limits are already in place in the following rules; South Coast Air Quality Management District (SCAQMD) Rule 1146.2 (Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers and Process Heaters) (Amended May 5, 2006) and Bay Area Air Quality (BAAQMD) Regulation 9 Rule 6 (Nitrogen Oxides Emissions From Natural Gas-Fired Boilers And Water Heaters) (Amended November 7, 2007).

Rule 4308 currently is a point of sale type rule and the source category affected would include water heater manufacturers, plumbing wholesalers, business and oil supply stores, plumbers and contractors. The proposed changes would continue with a point of sale rule, but lower the NOx emissions limits to 20 ppmv. A point of sale or attrition rule applies to any person who supplies, sells, offer for sale, installs, or solicits the installation of units with a rated heat input of 0.075 MMBtu/hr to less than 2.0 MMBtu/hr.

In other words, any operators of the affected units are not directly subject to the rule, but would rely on manufacturers, suppliers, contactors to sell and install units that are in compliance with the requirements of the rule. This approach will allow the District to achieve NOx reductions without placing an undo financial burden on some of the operators and businesses here in the Valley.

C. Rule Development Process

The District's 2007 Ozone Plan and the 2008 PM 2.5 Plan identified Rule 4308 as control measure S-COM-3 which would be implemented through the rule development process. As part of the rule development process, District staff conducted three public workshops in April 2009, July 2009, and September 2009 to present and discuss proposed amendments to Rule 4308 and the draft Staff Report. The Receive and File action for this rule is scheduled for the November Governing Board Hearing with the Public Hearing to consider adoption of the proposed amendments in December 2009.

Pursuant to state law, the District is required to perform a socioeconomic impact analysis prior to adoption, amendment, or repeal of a rule that has significant air quality benefits or that will strengthen emission limitations. As part of the District socioeconomic analysis process, District staff requested volunteers from affected stakeholders and interested parties to participate as members of the Socioeconomic Focus Group. District staff convened a meeting of the Focus Group at the time of the second workshop to assist District staff in gathering information on regulatory compliance costs and business impacts resulting from compliance with the draft amendments. The results of the socioeconomic analysis were published in a report and are presented along with the proposed rule amendments to the public and interested parties during the final workshop.

At the workshops, District staff presented the objectives of the proposed rulemaking project and provided draft amendments to Rule 4308. The knowledge gathered during public workshops and the socioeconomic focus group helped District staff to accurately amend the draft rule and draft Staff Report. The comments received from the public, affected sources, interested parties, ARB, and EPA, during the public workshop process have been incorporated into the draft rule as appropriate.

The proposed rule, final draft staff report with appendices, and final draft socioeconomic analysis report will be published and available to affected sources and interested parties prior to a public hearing to consider the adoption of proposed amendments to Rule 4308 by the District Governing Board. The public hearing is scheduled to take place on December 17, 2009.

II. BACKGROUND

A. Source Description

Boilers, steam generators, process heaters, and water heaters of this size range are generally used for small business or industrial steam or heating applications, and can be used for running small furnaces and heaters, and can either heat process fluids directly or use a heat exchange fluid. The SCAQMD estimated the number of units, based on a unit per person ratio, to be one unit for every 350 people. Based on that ratio and an estimated 4.2 million people in the Valley in 2010, the SJVAB has 17,600 units with a heat input rating between 0.075 MMBtu/hr and 2.0 MMBtu/hr located in the District.

During the workshops, the District solicited input from manufactures and stakeholders to establish a more refined inventory of units, but was unable to obtain any additional information. Because these sources are not permitted or registered, the estimated number of units has been determined using the best available data and is used in further calculations.

Boilers: Many boilers are used to produce steam and others provide hot water for a variety of purposes. They have three basic designs: fire tube, water tube or cast iron sectional. Fire tube boilers use combustion gasses passing through a set of tubes to increase efficiency and the temperature of surrounding water or steam. Water tube boilers use combustion gas passing over tubes filled with water or steam to increase the surface area for quicker heating. Cast boilers pass combustion gasses over water containing sections producing a low temperature water or low pressure steam. Newer types of boilers may use a heat exchanger made of copper tubes with heat exchange fins.

Water Heaters: Water heaters include a wide variety of designs from a simple tank to larger units with sophisticated controls and boiler designs. Because currently there are not enough models that meet the proposed 20 ppmv NOx limits to be considered technologically feasible for this type of unit, instantaneous water heaters and pool heaters are not required to meet the new 20 ppmv emission limits but a 55ppmv emissions limit instead.

The majority of boilers, furnaces, and heaters are used to provide comfort heating and hot water for personal use along with steam for commercial processing needs. These units are found in manufacturing facilities, government facilities, general merchandise stores, restaurants, hotels, rooming houses and camps, cleaning service facilities, hospitals, educational institutions, religious organizations, and refineries. Humidifiers are not considered to be included in this category due to technical differences in design and operation.

Approximately 97% of the affected units are fueled by natural gas; other fuels reported were liquefied propane and distillate oil. Because fuel type is important when considering control technology, the District is focusing on natural gas units. Low NOx burners reduce NOx emissions by staging the combustion process, which partially delays combustion. This delay results in reduced peak flame temperatures and suppressed NOx formation. Different kinds of combustion include Pulse combustion, atmospheric combustion and induced draft combustion.

B. Source Category

Manufacturers have focused on combustion modification to meet the lower NOx limit as required in other California air districts. Combustion modification systems are typically designed to reduce thermal NOx formation by changing the flame characteristics to reduce peak flame temperature. Some of the design principles used in Ultra low NOx and Low NOx burners include staged air burners, staged fuel burners, pre-mix burners, internal recirculation, and radiant burners. Burner design technology incorporated radiant burners with a premix of air and fuel to provide an even distribution of heat combustion to lower NOx emissions.

The technology required to reduce NOx emissions to the proposed emission limit is currently available. Most small boiler manufacturers offer at least one model that meets or exceeds the limits proposed in draft Rule 4308. Certification results for South Coast show that manufactures have made substantial progress in reducing the NOx emissions for this source. In their certification tests, 46 percent of the smaller units meet the proposed limit of 20 ppmv, while 18 percent of the larger units meet the proposed limit of 20 ppmv. These test results, compiled during testing for the 30 ppmv certification, show the availability of the technology to accomplish the proposed emission limits of 20 ppmv.

A boiler or water heater typically has a life span of at least a decade before it needs to be replaced. The 2007 Ozone Plan suggested that staff consider the possibility of requiring a 10 year replacement cycle. Based on an implementation study conducted by the SCAQMD the average useful life of boilers, with a rated heat input between 0.4 MMBtu/hr and 2.0 MMBtu/hr is 15 years. The implementation study does not define the average useful life of boilers, with a rated heat input between 0.075 MMBtu/hr and 0.4 MMBtu/hr. The Bay Area's Regulation 8 Rule 6 considers the life of these units to be from 12 – 30 years. Comments from manufacturers, stakeholders, and further research point toward the useful life of units in this size category to be between 7yrs – 30 yrs. Boiler units that are older than 15 years old tend to require more maintenance and upkeep and may produce NOx emissions closer to 65 ppmv. Taking into account South Coast's, Bay Areas, and stakeholder's input, the District estimates an average useful life of 20 years for units in this size category, which takes into account a longer life cycle of the larger units and the shorter life cycle of the smaller units.

Currently, there are no known small gaseous-fired or liquid-fired units that operate with both PM2.5 and SO2 control devices. Control devices such as baghouse, electrostatic precipitators, and scrubbers are available, but they have not yet been demonstrated or achieved-in-practice for these units. Units firing on natural gas, propane, and liquefied petroleum gas, or low sulfur diesel tend to emit very low levels of PM2.5 and SO2. Because of this, Rule 4308 does not specify specific values for PM2.5 and SO2 reductions, however, since NOx is a PM2.5 precursor, this rule will further efforts to lower PM2.5 levels in the Valley.

III. DISCUSSION

A. Existing Rule 4308

Rule 4308 (Boilers, Steam Generators, and Process Heaters – 0.075 MMBtu/hr to 2.0 MMBtu/hr) was adopted October 20, 2005 and has not been amended since. The purpose of Rule 4308 is to limit NO_x emissions from large water heaters and small boilers. The rule applies to units that are less than 2,000,000 Btu per hour and greater than or equal to 75,000 Btu per hour. Units that are in manufactured homes and humidifiers are currently exempt.

The rule requires that no person sell, install, or offer for sale within the District any natural gas-fired water heater after January 1, 2007 that emits more than 0.093 lbs of NO_x/MMBtu if less than or equal to 0.4 MMBtu/hr, or 0.036 lbs of NO_x/MMBtu if great than 0.4 MMBtu/hr and less than 2.0 MMBtu/hr. The rule also requires subject water heaters to be certified.

B. Summary of Proposed Amendments to Rule 4308

Section 2.0 Applicability: This section only has some simple language changes for clarification.

Section 3.0 Definitions: The definitions of “California PUC Quality Natural Gas”, “Certified Retrofit Kit”, “Instantaneous Water Heaters”, “Rated Heat Input”, “Recreational vehicle” and “Therm” would be added. The definition of “humidifier” would also be clarified to reflect the exclusion of humidifiers from this rule.

Section 4.0 – Exemptions: The exemption for humidifiers would be removed. Humidifiers were not meant as an exemption, but as a unit that is excluded from the definition of “Process Heater”. Therefore, humidifiers are not subject to the requirements of this rule.

District staff is proposing the addition of an exemption for recreational vehicles. Through stakeholder input and research it has become apparent that there are very few units in recreational vehicles that fall under this size category and also run on PUC gas. Most

units that are in recreational vehicles are close to a 12 gallon size unit, which is no where close to the 80 gallon size that a typical 75,000 Btu unit is. These units are located in a mobile source and therefore make them very difficult to track to confirm compliance. Units in a recreational vehicle are typically not used on a frequent basis, so contribute very little to the NOx emissions of this source category. Air Districts such as South Coast and Bay Area include this exemption in their rules. Because of a lack of impact and the desire for consistency, District staff is proposing to include this exemption.

Section 5.0 – Requirements: The rule requirement would remain as point of sale or an attrition rule instead of changing to a forced replacement rule. District staff thoroughly looked at different options for a forced replacement. However, upon further input from stakeholders and research, it became apparent that the costs for a forced replacement schedule would be considerable to businesses. The socioeconomic analysis showed significant impacts on dry cleaners and limited service restaurants if forced replacement were to be required.

With forced replacement, there is also a problem with enforceability of the rule. Facilities with Title V permits and other permits with the District were concerned that their locations would be held to the forced replacement requirement, but those locations without any permits would be allowed to continue using older units. Also, with the number of units in this size category, it would be very difficult for District staff to be able to follow up with all of the units.

An attrition rule is not only more enforceable and more economically feasible, but it allows the District to still get the amount of NOx reductions as the forced replacement. This attrition rule assumes a useful life of 20 years per unit, instead of the forced 15 year replacement. The NOx reductions will be spread out over a longer period of time, but the same amount of reductions will eventually be achieved. For further detail on emissions reductions, refer to Appendix B.

Emission levels would be changed to 20 ppm or 0.024 lb of NOx per MMBtu/hr for both 0.075 MMBtu/hr – 0.4 MMBtu/hr and 0.4 MMBtu/hr – 2.0 MMBtu/hr categories, except for instantaneous water heaters, pool heaters and units fired on non-PUC quality gas and liquid fuels. These other categories have different standards to reflect what is possible with the available technology or what has previously not been specified in the rule.

Table 1 Emissions Limits			
Type and Size of Unit (in MMBtu/hr)	NOx Limit (at 3% stack gas oxygen by volume on a dry basis)		
	All Fuels	PUC Gas	Non PUC Gas and Liquid Fuel
	Tier 1 lb/MMBtu of heat input (ppmv)	Tier 2 lb/MMBtu of heat input (ppmv)	Tier 2 lb/MMBtu of heat input (ppmv)
Units greater than or equal to 0.075 but less than or equal to 0.4	0.093 (77)	0.024 (20)	0.093 (77)
Units greater than 0.4 but less than 2.0	0.036 (30)	0.024 (20)	0.036 (30)
Instantaneous water heaters and pool heaters greater than or equal to 0.075 but less than or equal to 0.4	0.093 (77)	0.068 (55)	0.093 (77)
Instantaneous water heaters and pool heaters greater than 0.4 but less than 2.0	0.036 (30)	0.036 (20)	0.036 (30)

Special consideration was given to the possibility of different NOx limits for high efficiency units. The U.S. Department of Energy Regulations and the California Energy Commission has an Appliance energy efficiency requirement that applies to units of this size. They require units to be at least 80% energy efficient. Representatives of Pulse Combustion technology asked District staff to consider allowing their technology to continue to be used, even though the units have an emissions concentration of close to 28 ppmv of NOx, because of the high fuel and electrical efficiency of the unit. However, District staff did not receive sufficient information to show that the lower use of fuel was significant enough to counteract the higher ppmv emissions concentration. Also it became apparent that there are other units that are more fuel and energy efficient and still meet the proposed 20 ppmv NOx limit. Because the goal of this rule is to reduce specifically NOx emissions, District staff decided not to grant special consideration to these particular units at this time. This is consistent with the SCAQMD's rule.

Section 6.0 – Administrative Requirements: Certification and compliance options will be made specific to manufacturers. Manufacturers will be required to submit information according to previous rule requirements in Sections 6.2 and 6.3. Language has been added to include the certification of retrofit kits.

Section 7.0 – Compliance Schedule: The compliance deadline will be changed to January 1, 2011 by which units must comply with the Tier 2 specifications in order to reflect the goals for the new amendments and to coincide with PM 2.5 Plan emissions reductions commitments. The emissions reductions that are claimed in the PM2.5 Plan will be achieved by the replacement of units starting with the January 1, 2011 compliance date.

IV. CURRENT EMISSIONS AND EMISSIONS REDUCTION

The South Coast Air Quality Management District (SCAQMD) calculated capacity factors and emission rates for units subject to SCAQMD Rule 1146.2 (Large Water Heaters and Small Boilers) by gathering data from boiler manufacturers and conducting a statistical survey. District Rule 4308 will regulate the same class and size of units like those subject to Rule 1146.2. Therefore, District staff will use capacity factors, emission rates and population estimates for the emissions analysis that are similar to those used in the SCAQMD final staff report on Rule 1146.2.

The current and new levels for lbs/MMBtu are calculated using the formula developed in our GEAR data for boilers. The following is an example:

$$\frac{77\text{ppm}}{1 \times 10^6} \times \underbrace{\frac{20.9}{20.9 - 3\%O_2}}_{\text{(F factor)}} \times \underbrace{8710}_{\text{(Molar weight)}} \times \underbrace{46}_{\text{(Molar specific volume)}} \times \underbrace{\frac{1}{379.5}}_{\text{(Molar specific volume)}} \times \underbrace{\frac{459.67 + 60}{459.67 + 68}}_{\text{(temp difference in kelvin)}} = 0.093 \text{ lb/MMBtu}$$

In the PM2.5 Plan, the District estimates that 3.59 tons per day (tpd) of NOx and 3.3 tpd of SOx are emitted in the SJVAB from this source category. The estimated annual average emissions reductions from this rule are estimated in the PM2.5 Plan at 0.57 tpd. Staff review of the SCAQMD emissions analysis for Rule 1146.2 indicated a need for District staff to improve the estimated number of units in the SJVAB and emissions associated with this source category. District staff conducted a survey attempting to obtain information to form a more accurate emissions inventory. However, only about 50% of surveys were returned, and very few of them contained any shared information. Therefore, District staff will continue to use the estimates that were previously made.

The emissions and emissions reductions analysis from sources affected by this proposed rule amendments can be found in Appendix B. Emissions reductions for SOx were not calculated for this amendment. At this time, it is believed that the emissions of SOx from natural gas is as low as is feasible. Therefore, no emissions reductions for SOx from the proposed amendments will be claimed.

V. COST EFFECTIVENESS ANALYSIS

CH&SC Section 40920.6(a), requires the District to analyze the cost effectiveness of new rules or rule amendments that implement Best Available Retrofit Control Technology (BARCT) or all feasible measure. The estimated cost effectiveness is $1,500 - $2,000 per ton of NOx for an individual unit. District staff has prepared a cost effectiveness analysis of the rule to analyze the economic feasibility of the proposed rule amendments. This analysis can be found in Appendix C.

VI. SOCIOECONOMIC ANALYSIS

CH&SC Section 40728.5(a) requires the District to perform an assessment of the socioeconomic impacts of the adoption, amendment, or repeal of a rule or regulation that will significantly affect air quality or emission limitations. The socioeconomic analysis will be used to further refine the rule amendments. The socioeconomic report is published as part of the Final Draft Staff Report, and is located in Appendix D of the Final Draft Staff Report.

The Socioeconomic Analysis in Appendix D is an analysis that was conducted on August 21, 2009 on a previous version of the rule. The analysis assumes forced replacement every 15 years, thus showing some levels of significance. After that initial analysis, more revisions were made to the cost of units, showing even more impact to various different sectors of business. With the point of sale rule and the current proposed amendments, the socioeconomic impacts are no longer significant.

VII. ENVIRONMENTAL IMPACT ANALYSIS

Pursuant to the California Environmental Quality Act (CEQA), District staff has investigated any potential environmental impacts of the proposed rule amendments to Rule 4308 and will recommend appropriate action to the District Governing Board. Based on the lack of evidence to the contrary, District staff has concluded that the proposed amendments to the rules will not have a significant adverse effect on the environment. District staff has prepared a Draft Negative Declaration for the project. Upon approval of the proposed rule by the District's Governing Board, District staff will file a Notice of Determination with each County Clerk within the boundaries of the District, CEQA Guidelines §15075(d).

With the adoption of the District's policy on Climate Change and Greenhouse Gases (GHG), each new rule or rule amendment the District adopts should either decrease GHG emissions or show that there is no significant impact on GHG. For boilers of this size category, an 80% thermal and energy efficiency standard has been put in place by the California Energy Commission and the U.S. Department of Energy Regulations for appliances, including boilers, steam generator, process heaters, and water heaters. There is the slight possibility that fuel or energy efficiency would decrease as a result of this rule project because of the impact on fuel efficiency that low NOx and ultra low NOx burner technology can have. With the current NOx limit, boilers can reach 95% energy efficiency, but with the ultra low NOx burner, that efficiency becomes more difficult to achieve. High efficiency units are available that achieve the 20 ppmv NOx limit, but those units tend to be more expensive.

A. POTENTIAL EMISSIONS OF GHG

District staff has calculated the estimated effect this rule amendment project will have on greenhouse gas emissions, taking into consideration the slight impact on efficiency of the units.

Taking the population of boilers here in the SJVAB and the number of units on average that are replaced each year over a 20 year period, staff has calculated the number of units that may have already been replaced with the higher efficiency units because of the adoption of this rule in 2005. Section III B of Appendix B of the Staff Report contains the calculation of the number of units on average that are replaced each year.

882 units each year x 4 years of the 2005 rule = 3,530 units that comply with 30 ppmv

Based on data that staff has received from stakeholders and retailers, these 3,530 units tend to be 3-5% more efficient than units that meet the 20ppmv. If a new unit that reaches the 20 ppmv NOx limit is less efficient, that lost efficiency would be minimal, such as going from 87% energy efficiency to 84% energy efficiency. Therefore, exchanging these units in the future may cause a slight increase in GHG emissions.

However, approximately 75% of the boiler population is made up of uncontrolled units with lower efficiencies that have yet to be replaced and will be impacted by the rule amendment project.

17,600 units total – 3,530 units already replaced = 14,070 uncontrolled units

These uncontrolled units typically run at a lower efficiency and can be estimated to meet the 80% appliance efficiency standard. These units, once replaced, will be more efficient by 7-10%, therefore causing a decrease in GHG emissions.

District staff believes that the overall net effect of this rule amendment project will be a decrease in GHG emissions. The uncontrolled units, which make up 75% of the boiler population, are going from a lower efficiency to a higher efficiency rate; whereas, the units complying with the 30 ppmv, which make up 25% of the population, may decrease in efficiency. The increase in efficiency by 7-10% for 75% of the population is a much greater impact than the possible 3-5% efficiency decrease for 25% of the population. Therefore, the greenhouse gas impacts for this rule amendment project will be less than significant.

VIII. RULE CONSISTENCY ANALYSIS

Pursuant to CH&SC Section 40272.2, District staff has prepared a rule consistency analysis of Rule 4308 as part of the rule development process that compares the elements of proposed rule amendments with the corresponding elements of other

District rules, federal regulations and guidelines that apply to the same source category or type of equipment.

IX. REFERENCES

1. Emissions Inventory Improvements for Selected Source Categories prepared by Pacific Environmental Services Inc. on External Combustions Boilers, Steam Generators and Process Heaters, published July 6, 2001.

2. SCAQMD Final Staff Report for Rule 1146.2 adopted April 2006.

3. SCAQMD Rule 1146.2 (Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers), Adopted January 9, 1998 and Amended January 7, 2005.

4. San Joaquin Valley Unified Air Pollution Control District 2007 Ozone Plan, April 30, 2007.

5. San Joaquin Valley Unified Air Pollution Control District 2008 PM2.5 Plan, April 30, 2008

6. Federal Clean Air Act, Amended 1990

7. San Joaquin Valley Unified Air Pollution Control District, Rules and Regulations

8. Bay Area AQMD Regulation 9 Rule 6

9. Bay Area AQMD Regulation 9 Rule 6 Staff Report

10. Los Alamos National Laboratory Environmental Documents http://www.lanl.gov/environment/air/docs/progs/OpPermit_LANLSect3-4.pdf

11. Lochinvar's Unit List prices, effective August 18, 2008, Efficiency Information

12. Fulton unit information and source testing, 2009, Test Report of Fulton Boilers with Low NOx Burner

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