Clean Air Act Subpart 4:
The 2012 PM2.5 Plan for the 2006 PM2.5 Standard and District Rule 2201 (New and Modified Stationary Source Review)
Supplemental Document: Clean Air Act Subpart 4 Requirements

This document demonstrates that the San Joaquin Valley Unified Air Pollution Control District’s (District) adopted 2012 PM2.5 Plan\(^1\) satisfies federal PM2.5 plan requirements under subpart 4 of Part D of Title I of the Clean Air Act (CAA) (referenced herein as subpart 4). Additionally, this supplemental document also demonstrates that Valley attainment of the 2006 PM2.5 standard by 2015 is not practicable. As such, the District requests the U.S. Environmental Protection Agency (EPA) approve the already submitted 2012 PM2.5 Plan and reclassify the San Joaquin Valley air basin (Valley) as a serious nonattainment area. Finally, this document demonstrates that the District’s most recently adopted Rule 2201, New and Modified Stationary Source Review\(^2\) (adopted April 21, 2011) fully satisfies the requirements of subpart 4.

1 BACKGROUND

The District adopted its 2012 PM2.5 Plan on December 20, 2012 to satisfy requirements from EPA’s 2007 Fine Particle Implementation Rule\(^3\), which was grounded in subpart 1 of the CAA. However, weeks later, in January 2013, the D.C. Circuit Court\(^4\) found that EPA erred in implementing federal PM2.5 standards pursuant solely to the general implementation provisions of CAA subpart 1 of Part D of Title I without also considering the particulate matter-specific provisions of subpart 4 of Part D (subpart 4). As a result, on June 2, 2014, EPA classified the Valley (and all other PM2.5 nonattainment areas) as “moderate” under subpart 4.\(^5\) EPA must evaluate the District’s 2012 PM2.5 Plan under subpart 4 for the CAA, per the court ruling.

CAA subpart 1 provides general guidance for nonattainment areas, while CAA subpart 4 provides additional provisions for particulate matter nonattainment areas. The following is a comparison of requirements air districts must comply with pursuant to subpart 4 requirements versus analogous requirements in subpart 1. Requirements specific to subpart 1 that have no analogous requirement in subpart 4 will not be included in this summary because this supplemental document is specific to subpart 4 requirements. While subpart 4 requirements are specific to PM10, the court has ruled that subpart 4 applies equally to PM2.5, and so the references below refer to PM2.5, the subject of this document.


Classification and Reclassification

- **Subpart 1**: EPA may classify nonattainment areas, but is not required to (CAA §172(a)(1)).
- **Subpart 4**: All areas designated nonattainment for PM2.5 are classified as Moderate nonattainment by order of law (CAA §188(a)).
  - Moderate nonattainment areas can be reclassified to Serious nonattainment (CAA §188(b)) under the following conditions:
    - If the area shows it cannot reasonably attain the standard by the deadline associated with the Moderate nonattainment classification, it can be reclassified before the attainment date.
    - If a Moderate nonattainment area fails to attain the standard by the Moderate nonattainment attainment date, then the area shall be reclassified as Serious nonattainment.

Attainment Dates

- **Subpart 1**: Five years from the date of designation (CAA §172(a)(2)).
  - The attainment date may be extended up to 10 years from date of designation and (2) 1-year extensions may be issued.
- **Subpart 4** (CAA §188(d & e))
  - Moderate nonattainment areas have an attainment deadline of the end of the sixth calendar year after designation.
    - Up to two 1-year extensions are available to each Moderate nonattainment area without reclassification to Serious nonattainment.
  - Serious nonattainment areas have an attainment deadline of the end of the tenth calendar year after designation.
    - One extension of up to five years is available if the attainment deadline is unfeasible and the state complies with all requirements and commitments, and the state implementation plan (SIP) includes the most stringent measures practicable.

Plan Submissions Deadlines

- **Subpart 1**: Plans due three years after designation
- **Subpart 4**
  - Moderate nonattainment areas must submit a plan within 18 months after nonattainment designation.
  - Serious nonattainment areas must submit a plan containing best available control measures at 18 months and a full attainment plan no later than four years after reclassification to Serious; however, areas reclassified under CAA §188(b)(2) must submit the attainment demonstration within 18 months after reclassification to Serious.
  - If an area fails to attain, that area must submit SIP revisions to EPA within 12 months of the failed attainment date that demonstrates attainment and an annual 5% reduction of PM2.5 or PM2.5 precursors.
Level of Emissions Controls
- **Subpart 1**: Reasonably Available Control Measures (RACM) must be implemented as soon as practical
- **Subpart 4**:
  - Moderate nonattainment areas must implement RACM within 4 years of designation.
  - Serious nonattainment areas must implement Best Available Control Measures (BACM) within 4 years after the area is classified as Serious nonattainment.
  - EPA will issue RACM and BACM guidance for urban fugitive dust, residential wood combustion, and prescribed silviculture and agriculture burning (CAA §190)

Precursor Requirement Presumptions and RACM
- **Subpart 1**: Areas are required to address sources of ammonia and VOCs, unless it is technically demonstrated that ammonia or VOC significantly contributes to PM2.5 concentrations in the area (EPA Implementation Rule).
- **Subpart 4**: Areas must address sources of ammonia and VOCs for RACT and other areas of the plan, unless the state demonstrates that such sources do not significantly contribute to PM2.5 exceedances in the area (CAA §189(e)).

Permitting program
- **Subpart 1**:
  - An area needs a permitting program that meets CAA §173 for PM10 new and modified major stationary sources.
  - An area is not required to address sources of ammonia and VOCs, unless EPA or the state technically demonstrates that ammonia or VOC significantly contributes to PM2.5 concentrations in the area (EPA Implementation Rule).
- **Subpart 4**:
  - A Moderate nonattainment area needs a permitting program that meets CAA §173 (in Subpart 1) for new and modified major PM2.5 stationary sources (CAA §189(a)(1)(A)).
  - A Serious nonattainment area must change the definition of Major Sources to include a stationary source or any group of stationary sources with a potential to emit of at least 70 tons per year of PM2.5 (CAA §189(b)(3)).
  - Major stationary sources must address precursors of PM2.5, unless the state demonstrates that such sources do not significantly contribute to levels that exceed the standard (CAA §189(e)).

Available Waivers
- **Subpart 1**: No analogous waivers are available in Subpart 1 as allowed in Subpart 4.
- **Subpart 4**:
  - No available waivers for a Moderate nonattainment area.
  - For a Serious nonattainment area, EPA may waive any Subpart 4 requirement (including a specific date for the attainment deadline) if
anthropogenic PM2.5 sources do not contribute significantly to PM2.5 violations. (CAA §188(f)).

This supplemental document addresses the five aspects of PM2.5 implementation where Subpart 4 differs from Subpart 1 for the Valley:

1. Attainment Date
2. Reasonably Available Control Measures
3. Reasonable Further Progress
4. Contingency Measures
5. New Source Review Program

2 ATTAINMENT DATE

Pursuant to subpart 4 Section 188(c)(1), the attainment date for a moderate area shall be as expeditiously as practicable but no later than the end of the sixth calendar year after the area’s designation, unless EPA determines that the moderate area cannot practically attain the NAAQS by the attainment date and reclassifies the area as a serious nonattainment area (serious area). For a serious area, the attainment date shall be as expeditiously as practicable, but no later than the end of the tenth calendar year after designation.

The Valley was designated nonattainment for the 2006 PM2.5 standard in 2009; therefore, the attainment date for the Valley as a moderate area is 2015. The following discussion will substantiate that the District assessed the feasibility of attainment by 2015 in the 2012 PM2.5 Plan and determined attainment by this date is not practicable and as such demonstrates the necessity of EPA to reclassify the Valley as a serious area.

2.1 Valley Attainment of the 2006 Standard by 2015 Is Not Practicable

The 2012 PM2.5 Plan addresses the 2015 attainment date in Chapter 9 as a part of the analysis to determine the most expeditious timeline in which the Valley can attain the standard. The analysis confirms that attainment of the 2006 standard by 2015 is not practicable.

Photochemical modeling and other technical analyses establish an emissions level at which the Valley would attain the federal 24-hour PM2.5 standard. Given the significant contribution of ammonium nitrate to the Valley’s PM2.5 concentrations, reductions in NOx emissions are particularly important. To achieve the NOx reductions critical for reaching attainment in the Valley, ARB has adopted regulations that will significantly reduce NOx emissions from various mobile sources. Achieving this level of emissions reductions requires adequate time and carries a tremendous cost. These reductions

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are ultimately achieved in time to bring most of the Valley into attainment well before 2019, with the exception of Bakersfield.

All areas of the Valley will attain the standard in 2019 with the regulatory controls in the 2012 PM2.5 Plan. Kern County is projected to be the last portion of the Valley to attain, and is thus the area with the most need for additional emissions reductions through the 2012 PM2.5 Plan. In order for Bakersfield to attain by 2015, an additional 11.8 tons per day (tpd) of NOx reductions (as well as an additional 0.4 tpd of PM2.5 reductions) would be needed in Kern County by 2015 (see Table 1). To put this in perspective, achieving this level of emissions reductions is equivalent to virtually eliminating all passenger vehicles AND 75% of stationary source NOx emissions in Kern County next year (2015).

The District’s “no stone unturned” evaluation of emissions sources and emissions controls did not reveal any additional reasonably available emissions reductions opportunities that provide for attainment in 2015. All new control strategies are scheduled for implementation by 2017. The District intends to amend Rule 4692 (Commercial Charbroiling) in 2016 with implementation in 2017. Rule development cannot be expedited for this measure because time is needed for continued research and technology demonstration projects, which the District is actively facilitating\(^7\). The District also committed in the 2012 PM2.5 Plan to amend Rule 4901 (Wood Burning Fireplaces and Wood Burning Heaters) in 2016. District Rule 4901 is already amongst the most stringent rules for this source category, and expediting this rule alone would not be enough to accelerate attainment. That said, the District is working to amend this rule early, with implementation in 2014.

Thus, the 2012 PM2.5 Plan’s 2019 attainment year demonstration also illustrates that attainment by 2015 is not practicable, supporting a request for recategorization to serious.

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\(^7\) See the District’s Restaurant Charbroiler Technology Partnership program: [http://www.valleyair.org/grants/content/rctp.html](http://www.valleyair.org/grants/content/rctp.html)
Table 1  Kern County Attainment Outlook (tons per day)

<table>
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<tr>
<th>Ref#</th>
<th>Description</th>
<th>2007 base year</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
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<td>1</td>
<td>Winter PM2.5 emissions inventory, reflecting adopted control measures</td>
<td>15.4</td>
<td>11.5</td>
<td>11.4</td>
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<td>0.1</td>
<td>0.3</td>
<td>0.3</td>
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<td></td>
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<tr>
<td>3</td>
<td>Winter PM2.5 emissions inventory reflecting full plan control strategy (Line 1 – Line 2 above)</td>
<td>11.5</td>
<td>11.3</td>
<td>11.1</td>
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<td>4</td>
<td>Direct PM2.5 Attainment Target</td>
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<td></td>
<td></td>
<td></td>
<td>11.1</td>
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<tr>
<td>5</td>
<td>Winter NOx emissions inventory, reflecting full plan control strategy</td>
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<td>51.5</td>
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<td>Winter SOx emissions inventory, reflecting full plan control strategy</td>
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</table>

Projected attainment year 2019

2.2  Reclassification from Moderate Area to Serious Area

Pursuant to subpart 4 Section 188(b) a moderate area may be reclassified for one of the following two circumstances:

1. Before the Attainment Date: Any moderate area that EPA determines cannot practically attain the NAAQS by the attainment date.

2. Upon Failure to Attain: Any moderate area that EPA finds is not in attainment after the applicable attainment date shall be reclassified by operation of law as a serious area.

As discussed above, attainment by the moderate deadline of 2015 is not practicable, so the Valley should be reclassified as a serious nonattainment area. For a serious area, the attainment date shall be as expeditiously as practicable but no later than the end of the tenth calendar year; therefore, should the Valley be redesignated as a serious area, the latest attainment deadline would be 2020. The District would demonstrate an
appropriate attainment year in a new attainment plan satisfying serious area requirements upon EPA reclassification to serious.

3 REASONABLY AVAILABLE CONTROL MEASURES (RACM)

3.1 Subpart 4 requirements for RACM

Subpart 4 Section 189(a)(1)(C) states that moderate area SIPs must demonstrate that reasonably available control measures (RACM) must be in place within four years of its nonattainment designation. Areas classified serious must implement best available control measures (BACM) (Section 189(b)(1)(B), but as the Valley is currently classified as moderate, BACM will be addressed in a future plan. The subpart 4 RACM requirement is satisfied by section 9.2 of the 2012 PM2.5 Plan, and is summarized below.

For a plan demonstrating the impracticability of attainment by the moderate area deadline, “EPA believes it is reasonable for all available control measures that are technologically and economically feasible to be adopted for areas that do not demonstrate attainment. … EPA anticipates that any future implementation of BACM for these sources will be additive to, and hence compatible with, RACM.”

RACM are, by definition, reasonable. Although an air quality attainment plan must include a thorough analysis of reasonably available measures, it need not analyze every conceivable measure; reasonability must drive the analysis. Any measure that is absurd, unenforceable, impractical, or would cause severely disruptive socioeconomic impacts is unreasonable. This analysis must consider all agencies’ opportunities together, but the starting point is the separate analyses of each agency.

As discussed in Section 2.0 above, the District is adopting reasonably available control measures as expeditiously as practicable. Furthermore, most of the nation’s most stringent controls are already in place in the Valley. This is demonstrated in great detail in Chapter 5 and Appendices C and D of the District’s 2012 PM2.5 Plan, and summarized below. There are no reasonable regulatory control measures excluded from use in the plan; therefore, there are no emissions reductions associated with unused regulatory control measures.

3.2 NOx and PM

Although NOx and directly emitted PM2.5 emissions are key to attaining the NAAQS and commitments were made to amend NOx and PM2.5 specific rules in the plan, adopting amendments to these rules earlier than committed to in the 2012 PM2.5 Plan will not get the District into attainment before the 2015 deadline assigned to moderate areas.

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8 General Preamble to the CAA, 57 FR 13544.
Specifically, the 2012 PM2.5 Plan committed to amend District Rules 4901 (Wood Burning Fireplaces and Wood Burning Heaters) and Rule 4692 (Commercial Charbroiling), both in 2016. The District’s Board directed staff to amend Rule 4901 in 2014 based on the District’s Health Risk Reduction philosophy. Rule 4901 is in the process of undergoing the public amendment process this year and is expected to be taken to the Governing Board for public hearing in the third quarter of 2014, with a plan emission reductions commitment of at least 1.5 tpd of PM2.5. However, the federally-enforceable commitment for Rule 4901 remains as implementation in 2016. While early adoption of Rule 4901 amendments will provide important public health benefits, it would not accelerate PM2.5 attainment since time is needed to fully implement the adopted mobile source regulations that achieve critical NOx emissions reductions for 2019 attainment.

Rule 4692 is scheduled for amendment in 2016 because the technology has not been proven feasible to require yet. The SCAQMD and District have been working together to demonstrate potential technologies in a controlled setting and are now moving forward to demonstrate control technologies in real-world settings in Valley restaurants. The 2016 timeline will allow for technologies to be proven feasible and to become commercially available. The amendments to this rule will reduce emissions by 0.4 tpd of PM2.5.
3.3 Ammonia

3.3.1 Ammonia Contribution to PM2.5 Concentrations

The switch from CAA subpart 1 to subpart 4 for PM2.5 implementation shifts the precursor presumption for planning purposes. Under EPA’s original PM2.5 implementation rule (based on CAA subpart 1), regions were not required to address ammonia unless technical demonstration shows that ammonia reductions contribute to PM2.5 attainment. Now, under subpart 4, regions are required to address ammonia as a precursor unless EPA determines that ammonia sources do not contribute significantly to PM concentrations. The starting presumption has thus changed, but scientific evaluation can still override that presumption. In the Valley, there is extensive scientific research and technical analysis demonstrating that ammonia reductions do not contribute to PM2.5 attainment. As such, the Valley’s ammonia emissions do not need to be reduced to address EPA’s PM2.5 standard.

The role of ammonia in the Valley’s PM2.5 concentrations is discussed in detail in Chapter 4 of the 2012 PM2.5 Plan, and is summarized here. Early air quality research in the Valley identified ammonium nitrate (nitrate) as a predominant secondary PM2.5 species in the region, with high concentrations forming during the winter months. Studies have continued to show that ammonium nitrate is a primary component of wintertime PM2.5 in the Valley, followed by other species, such as organic carbon, ammonium sulfate, and geologic material. In addition, PM2.5 speciation data, collected for many years at four Valley urban monitoring locations, also shows nitrate’s substantial contribution to the Valley’s total PM2.5 concentrations, especially on days when the 24-hour average concentration exceeds the 35 µg/m³ 24-hour PM2.5 standard.

Nitrate buildup is a signature outcome of multi-day stagnation periods during the winter (similar buildup is not observed during warmer seasons). The modeled regional variation of nitrate concentrations is shown in Figure 4-2 of the 2012 PM2.5 Plan. Higher concentrations of nitrate occur in the southernmost Valley as a result of slower wind speeds and higher levels of reactive nitrogen and ammonia.

Both nitric acid and ammonia are needed to form ammonium nitrate. The extensive research conducted through CRPAQS and subsequent studies, as well as ongoing evaluation and modeling demonstrates that there is a relative abundance of ammonia (NH₃) compared to nitric acid (HNO₃), and that the amount of nitric acid (resulting from NOx emissions) drives the ultimate formation of ammonium nitrate. Figure 4-3 of the 2012 PM2.5 Plan illustrates this ammonia abundance at the rural Angiola (Fresno County) air monitoring site in the Valley during the CRPAQS field study. Ammonia

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concentrations are considerably higher than nitric acid concentrations throughout the Valley, including urban areas with concentrated NOx emissions.11

Because of the regional surplus in ammonia, even substantial ammonia emissions reductions yield a relatively small reduction in nitrate. Figures 4-4 and 4-5 of the 2012 PM2.5 Plan provide a simplified illustration of this situation. As seen in Figure 4-6 of the 2012 PM2.5 Plan, a comparable modeling analysis based on CRPAQS observational data found a higher disparity between the efficiency of NOx versus ammonia controls. Reductions in nitrate concentrations of 30% to 50% were realized through a 50% reduction in NOx, while a 50% reduction in ammonia only realized less than 5% reductions in nitrate concentrations. Finally, Figure 4-7 of the 2012 PM2.5 Plan provides clear correlative evidence from observed data that NOx controls are effectively reducing ammonium nitrate, despite an increase in the regional ammonia inventory over the same time period.

Due to this extensive body of science that clearly shows the much greater efficacy of reducing NOx emissions relative to ammonia, ammonia reductions have not historically been considered a significant precursor to PM2.5 formation in the Valley. However, the District and ARB have continued to examine the potential role of ammonia with regard to PM2.5 formation (see Appendices F and G of the 2012 PM2.5 Plan).

The modeling sensitivity analysis conducted for the 2012 PM2.5 Plan shows that reductions in ammonia emissions achieve insignificant reductions in the 2019 PM2.5 design values compared to reductions of direct PM2.5 and NOx emissions. As Appendix G of the 2012 PM2.5 Plan details:

- A 1 ton reduction in the Valley’s total direct PM2.5 emissions reduces the Bakersfield-California PM2.5 design value by 0.34 µg/m³
- A 1 ton reduction in the Valley’s total NOx emissions reduces the Bakersfield-California PM2.5 design value by a 0.08 µg/m³
- A 1 ton reduction in in the Valley’s total ammonia emissions reduces the Bakersfield-California PM2.5 design value by a mere 0.008 µg/m³

Relative to the other pollutants, ammonia emission reductions at the Bakersfield-California site are only 2.3% as effective as directly emitted PM2.5 emission reductions, and only 10% as effective as NOx emission reductions.

Furthermore, it would take an unreasonable tonnage of ammonia reductions to reduce a significant amount of PM2.5 mass. Since, as noted above, 1 ton of reduction in ammonia achieves a 0.008 µg/m³ reduction in the PM2.5 design value, it would take a total ammonia reduction of 125 tons per day for the Valley to achieve only a 1 µg/m³ reduction in the PM2.5 design value. Based on the total ammonia emissions inventory for the Valley in the year 2019, this would equate to a 34% reduction of the total tonnage. Thus, current technical analyses demonstrate that ammonia reductions would

not significantly contribute to the Valley’s attainment of the 2006 PM2.5 standard, so sources of ammonia emissions were not evaluated under the 2012 PM2.5 Plan.\textsuperscript{12}

Based on 2018 emissions and analysis, as discussed in the 2012 PM2.5 Plan, the District estimates the 2018 design value for Bakersfield-California is at least 1 µg/m³ higher than the attainment level. It would take at least 125 tons of additional ammonia emissions reductions to advance attainment by one year. As discussed in Chapter 5 of the 2012 PM2.5 Plan, this is an infeasible amount of emissions reductions for ammonia.

Nationwide, as regions continue to look into the issue of ammonia as a PM2.5 precursor, research should continue to assess the relationship between ammonia emissions and ambient PM2.5 emissions. Ammonia control measures should only be required if additional ammonia reductions are found to be needed to meet health-based air quality standards.

### 3.3.2 Ammonia Controls

As noted in section 3.3.1, under subpart 4, regions are required to address ammonia as a precursor in RACT analyses and other areas of the plan unless EPA determines that ammonia sources do not contribute significantly to PM concentrations. To improve public health while also ensuring effective use of resources, additional ammonia controls should only be required when there is clear scientific evidence that reasonable measures to reduce ammonia emissions would be effective in significantly reducing ambient PM2.5 concentrations.

Extensive scientific research and technical analysis described above (and more extensively in the 2012 PM2.5 Plan) demonstrates that ammonia reductions do not contribute to the Valley’s PM2.5 attainment. That said, this section shows that the Valley’s ammonia emissions have been significantly reduced through stringent District regulations. This section also shows that additional ammonia reductions are infeasible. Because the science indicates that ammonia reductions do not contribute to the Valley’s PM2.5 attainment, and because additional ammonia controls are infeasible, the Valley’s ammonia emissions do not need to be further reduced to address EPA’s PM2.5 standard.

As demonstrated in Appendix B of the 2012 PM2.5 Plan, the three main sources of ammonia emissions in the Valley from stationary and area sources account for 96% of the Valley’s ammonia emissions and are as follows (based on 2015 estimates):

- Farming Operations with 239.2 tons per day (tpd),
- Solvent evaporation from Agricultural Fertilizers at 66.1 tpd, and
- Composting Solid Waste Operations at 20.5 tpd.

Attachment A of this document presents a detailed evaluation of:

- Confined Animal Facilities (District Rule 4570)
- Agricultural Fertilizers
- Organic Material Composting (District Rule 4566)
- Biosolids, Animal Manure, and Poultry Litter Operations (District Rule 4565)
- Major Sources of Ammonia

Based on this analysis and the analysis summarized in section 3.3.1, there are no additional ammonia controls the District could adopt that would advance PM2.5 attainment.

3.4 VOCs

3.4.1 VOC Contribution to PM2.5 Concentrations

As discussed in the ammonia section above, the switch from CAA subpart 1 to subpart 4 for PM2.5 implementation shifts the precursor presumption for planning purposes. Under EPA’s original PM2.5 implementation rule (based on CAA subpart 1), regions were not required to address VOCs unless technical demonstration shows that ammonia reductions contribute to PM2.5 attainment. Now, under subpart 4, regions are required to address VOCs as a precursor unless EPA determines that VOC sources do not contribute significantly to PM concentrations. The starting presumption has thus changed, but scientific evaluation can still override that presumption. In the Valley, there is extensive scientific research and technical analysis demonstrating that VOC reductions do not contribute to PM2.5 attainment. As such, the Valley’s VOC emissions do not need to be reduced to address EPA’s PM2.5 standard.

The role of VOCs in the Valley’s PM2.5 concentrations is discussed in detail in Chapter 4 and Appendix F (Modeling Protocol) of the 2012 PM2.5 Plan, and is summarized here.

As noted in Appendix F13, to evaluate the significance and effectiveness of VOC controls, isopleths of PM2.5 nitrate response generated with the CIT-UCD model of the January 4-6, 2006 IMS-95 episode accounted for both NOx and VOC emission reductions14. This modeling showed that NOx controls are the most effective approach to reduce PM2.5 nitrate concentrations, and once NOx controls are taken into consideration, VOC emission reductions produce essentially no benefit. In fact, in some instances, VOC emissions reductions may actually lead to an increase in PM2.5 nitrate formation. Nitrogen-containing molecules such as PAN can act as temporary sinks for NO2. When VOCs are controlled, the reduced availability of certain radicals which are

generated from VOCs reduces the amount of NO2 that is sequestered, thereby increasing the availability of NO2 and enhancing ammonium nitrate formation\textsuperscript{15}.

For the 2012 PM2.5 Plan, the effectiveness of reducing PM2.5 precursors, including VOCs, was compared to reducing direct PM2.5 emissions was quantified using inter-pollutant equivalency ratios\textsuperscript{16}. Sensitivity analysis was performed for 10% reductions of primary PM2.5 as well as for each precursor separately. The change in PM2.5 concentrations per unit emissions change was then determined by dividing the change in the 24-hour PM2.5 design value by the amount of emission reductions corresponding to the 10% reduction. The equivalency ratios between PM2.5 precursors and primary PM2.5 were determined by dividing primary PM2.5 effectiveness by the precursors' effectiveness.

The results of the modeling runs are plotted on isopleth diagrams, also referred to as carrying capacity diagrams. These carrying capacity diagrams show the level of emissions that the atmosphere can “carry” and still demonstrate attainment. These diagrams help show what combinations of precursor emissions reductions (including which precursors are most effective to reduce as well as the magnitude of reductions needed) might lead to attainment, informing the development of a corresponding control strategy. The carrying capacity diagrams presented in Chapter 4 of the 2012 PM2.5 Plan (Figures 4-15 through 4-24)\textsuperscript{17} show that NOx and directly-emitted PM2.5 are the most effective precursors to reduce to improve 24-hour PM2.5 design values, while additional VOC reductions do not correspond to improvements in PM2.5 design values.

### 3.4.2 VOC Controls

As noted in section 3.4.1, under subpart 4, regions are required to address VOC as a precursor unless EPA determines that VOC sources do not contribute significantly to PM concentrations. Extensive scientific research and technical analysis described above (and more extensively in the 2012 PM2.5 Plan) demonstrates that VOC reductions do not contribute to the Valley’s PM2.5 attainment.

That said, the Valley’s VOC emissions have been significantly reduced through stringent District regulations as part of the District’s ozone attainment planning efforts. Each District VOC regulation was evaluated in depth for the 2009 RACT SIP\textsuperscript{18} as well as for the 2007 Ozone Plan\textsuperscript{19}. Each VOC rule has also been approved by EPA as
meeting reasonably available control technology (RACT) levels of emission control within the last two years. Table 3 in the District’s 2014 RACT State Implementation Plan (SIP)\textsuperscript{20} lists each of the District’s VOC rules and their respective EPA RACT approval date.

Because the science indicates that VOC reductions do not reduce PM2.5 levels, and because the nation’s most stringent VOC controls are already in place in the Valley, the Valley’s VOC emissions do not need to be further reduced to address EPA’s PM2.5 standard.

4 REASONABLE FURTHER PROGRESS (RFP)

In CAA Subpart 4, Section 189(c)(1) requires that PM plan submissions to EPA contain quantitative milestones which are to be achieved every three years until the area is redesignated attainment and which demonstrate RFP toward attainment by the applicable date. This requirement is more general than the one specified in EPA’s 2007 implementation rule\textsuperscript{21}, followed in Section 9.3 of the 2012 PM2.5 Plan. The linear progress milestones identified in the 2012 plan can serve as the quantitative milestones for subpart 4.

Table 9-4 in the 2012 PM2.5 Plan identifies target emissions levels for generally linear progress that can serve as the quantitative milestones for subpart 4. Table 9-5 in the 2012 PM2.5 Plan demonstrates that the plan’s adopted control strategy meets these quantitative milestones. These milestones are summarized in Table 2 below.

Table 2 Quantitative Milestones

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5 CONTINGENCY MEASURES

5.1 Subpart 4 Contingency Requirements

Contingency measures are extra emissions reductions that go into effect automatically without further regulatory action. In an attainment plan, the measures must be “extra” in the sense that the reductions are not accounted for in RFP or in the attainment demonstration. The total emissions reductions available from contingency measures

\textsuperscript{20} SJVAPCD (June 2014) 2014 RACT SIP. Retrieved from: \url{http://www.valleyair.org/Board_meetings/GB/agenda_minutes/Agenda/2014/June/final/09.pdf}

\textsuperscript{21} 72 FR 20633, codified at 40 CFR 51 Subpart Z Section 51.1000 (Definitions)
should be equivalent to about one year of reductions needed for RFP\textsuperscript{22} as discussed in Chapter 9 of the 2012 PM2.5 Plan.

Table 3 Contingency Emissions Reductions Target (tpd)

<table>
<thead>
<tr>
<th></th>
<th>Contingency Need = “One year’s worth of RFP”</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM2.5</td>
<td>2.0</td>
</tr>
<tr>
<td>NOx</td>
<td>21.4</td>
</tr>
<tr>
<td>SOx</td>
<td>0.3</td>
</tr>
</tbody>
</table>

Interpollutant trading can be used to demonstrate equivalent emissions reductions levels between PM2.5, NOx, and SOx reductions strategies. Appendix G of the 2012 PM2.5 Plan documents the methodology used to develop the relative efficacy of emission reductions from the different PM2.5 precursors based on photochemical modeling sensitivity runs. The current modeling using Valley-wide emissions reductions demonstrates that the greatest benefits are achieved from reductions in directly emitted PM2.5, followed by NOx (based on EPA’s relative response factor procedures). Kern County specific model sensitivity runs were also conducted to evaluate the benefits of emission reductions focused on the Bakersfield area. These runs show that directly emitted PM2.5 emission reductions are approximately eight times more effective than NOx reductions. Additionally, due to the photochemistry of ammonium sulfate formation, one ton of SOx reductions is equivalent to one ton of PM2.5 reductions; therefore, for contingency purposes, SOx is equivalent to directly emitted PM2.5.

Subpart 4 does not have specific requirements for contingency, so the previously-identified RFP milestone years of 2014 and 2017 still apply. Attainment year (2019) contingencies no longer apply at this time, since the 2012 PM2.5 Plan is now a request for reclassification to serious with the associated attainment year extension to 2019. Therefore, the contingency measures demonstration for 2014 and 2017 presented in Section 9.4 of the 2012 PM2.5 Plan therefore satisfy subpart 4 requirements, and are summarized below.

5.2 PM2.5 Plan Contingency Demonstration

Contingency measures can include measures already adopted and scheduled for implementation, as long as these measures are not relied on to provide emissions reductions needed to provide for RFP or expeditious attainment. For 2014 and 2017, the District is utilizing two types of contingency measures:

1. Surplus reductions from implementation of traditional regulations
2. SIP-creditable incentive-based emissions reductions

5.2.1 Surplus Reductions from Implementation of Traditional Regulations

Although contingency measures must be surplus to RFP and attainment calculations, areas are not required to wait until there is an RFP or attainment failure to implement the measures. As shown in the RFP demonstration in chapter 9 of the 2012 PM2.5 Plan, significant regulatory emissions reductions are being achieved by 2014 and 2017 – more than the minimum needed to demonstrate RFP. As such, the difference between the RFP target emissions level and the actual projected emissions level can serve as contingency reductions in 2014 and 2017. The following table shows the amount of reductions available in 2014 and 2017, as documented in Chapter 9 of the 2012 PM2.5 Plan.

<table>
<thead>
<tr>
<th>Year</th>
<th>2014</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RFP target emissions level</td>
<td>Projected emissions inventory</td>
</tr>
<tr>
<td>PM2.5</td>
<td>73.5</td>
<td>64.4</td>
</tr>
<tr>
<td>NOx</td>
<td>315.5</td>
<td>275.7</td>
</tr>
<tr>
<td>SOx</td>
<td>10.6</td>
<td>8.6</td>
</tr>
</tbody>
</table>

The control measures achieving the contingency reductions include amendments to Rule 4692 (Commercial Charbroiling), ARB mobile source measures and adopted stationary and area source measures such as District Rule 4307 (Boilers, Steam Generators, and Process Heaters – 2.0 MMBtu/hr to 5.0 MMbtu/hr), Rule 4308 (Boilers, Steam Generators, and Process Heaters- 0.075 MMBtu/hr to less than 2.0 MMBtu/hr), Rule 4320 (Advanced Emission Reduction Options for Boilers, Steam Generators, and Process Heaters Greater than 5.0 MMbtu/hr), Rule 4702 (Internal Combustion Engines), and Rule 4103 (Open Burning). All of the aforementioned control measures are discussed in detail in Chapter 9 of the 2012 PM2.5 Plan.

5.2.2 Sufficient Contingency Reductions

The following table shows how the abovementioned combination of approaches reduces enough emissions to meet contingency requirements for 2014 and 2017.
Table 5 Demonstration of Sufficient Contingency Reductions, 2014 and 2017 (based on Table 9-9 of the 2012 PM2.5 Plan)

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2017</th>
<th>PM2.5 Plan Data reference(^{23})</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM2.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surplus from traditional regulations</td>
<td>9.1</td>
<td>4.4</td>
<td>Tables 9-7 and 9-8</td>
</tr>
<tr>
<td>Regulations with contingency trigger</td>
<td>0</td>
<td>0</td>
<td>Section 9.4.1.2</td>
</tr>
<tr>
<td>Subtract PM2.5 reductions, trade for SOx</td>
<td>0</td>
<td>0</td>
<td>1:1 trading ratio(^*)</td>
</tr>
<tr>
<td>Subtract PM2.5 reductions, trade for NOx</td>
<td></td>
<td></td>
<td>1:8 trading ratio(^*)</td>
</tr>
<tr>
<td>Total contingency reductions achieved</td>
<td>9.1</td>
<td>4.4</td>
<td></td>
</tr>
<tr>
<td>Contingency reductions required</td>
<td>2.0</td>
<td></td>
<td>Table 9-6</td>
</tr>
<tr>
<td>Contingency need met?</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2017</th>
<th>PM2.5 Plan Data reference(^{23})</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOx</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surplus from traditional regulations</td>
<td>39.7</td>
<td>24.4</td>
<td>Tables 9-7 and 9-8</td>
</tr>
<tr>
<td>Regulations with contingency trigger</td>
<td>0</td>
<td>0</td>
<td>Section 9.4.1.2</td>
</tr>
<tr>
<td>SIP-creditable incentives</td>
<td>0</td>
<td>0</td>
<td>Section 9.4.1.3</td>
</tr>
<tr>
<td>Substitute PM2.5 reductions</td>
<td></td>
<td></td>
<td>Above, with 1:8 trading ratio(^*)</td>
</tr>
<tr>
<td>Total contingency reductions achieved</td>
<td>39.7</td>
<td>24.4</td>
<td></td>
</tr>
<tr>
<td>Contingency reductions required</td>
<td>21.4</td>
<td></td>
<td>Table 9-6</td>
</tr>
<tr>
<td>Contingency need met?</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2017</th>
<th>PM2.5 Plan Data reference(^{23})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sox</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surplus from traditional regulations</td>
<td>2.0</td>
<td>0.8</td>
<td>Tables 9-7 and 9-8</td>
</tr>
<tr>
<td>Regulations with contingency trigger</td>
<td>0</td>
<td>0</td>
<td>Section 9.4.1.2</td>
</tr>
<tr>
<td>SIP-creditable incentives</td>
<td>0</td>
<td>0</td>
<td>Section 9.4.1.3</td>
</tr>
<tr>
<td>Substitute PM2.5 reductions</td>
<td></td>
<td></td>
<td>Above, with 1:1 trading ratio(^*)</td>
</tr>
<tr>
<td>Total contingency reductions achieved</td>
<td>2.0</td>
<td>0.8</td>
<td></td>
</tr>
<tr>
<td>Contingency reductions required</td>
<td>0.3</td>
<td></td>
<td>Table 9-6</td>
</tr>
<tr>
<td>Contingency need met?</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

\(^*\) 1 ton of direct PM2.5 emissions reductions is equivalent to 1 ton of SOx reductions or 8 tons of NOx reductions as demonstrated in the Weight of Evidence (Appendix G). These ratios are conservative estimates summarizing the plan as a whole, not reflecting ratios appropriate for New Source Review (NSR)

6 NEW SOURCE REVIEW PROGRAM

On April 21, 2011, the District’s NSR rule (Rule 2201) was amended to address the federal PM2.5 nonattainment NSR permitting requirements of subpart 1. These amendments were based on EPA’s two final rules called “Clean Air Fine Particle Implementation” (promulgated on April 25, 2007, 72 FR20586) and “Implementation of the New Source Review (NSR) Program for Particulate Matter Less than 2.5 Microns” (PM2.5 NSR Rule) requirements (promulgated on May 16, 2008, 73 FR28321) which outlined the necessary requirements of subpart 1 of Part D of Title I of the CAA. Items

addressed in the April 2011 amendments to Rule 2201 included defining major sources of PM2.5 at 100 tons per year, establishing PM2.5 significant emissions rates to determine when NSR requirements apply to modified sources, establishing the PM2.5 offset ratio, and allowing for PM2.5 interpollutant emission offset ratios. The District’s April 2011 NSR amendments fulfilled the necessary NSR SIP requirements previously established by EPA as necessary under subpart 1.

EPA then issued its June 2, 2014 PM2.5 final rule in response to a remand from the D.C. Circuit Court of Appeals in January 2013 which, in part, required that subpart 4 be applied to PM2.5 permitting programs, rather than subpart 1. Under this final rule, the District must demonstrate that its permitting program satisfies the nonattainment new source review SIP elements pursuant to subpart 4 of the federal CAA. EPA set a deadline of December 31, 2014 for such submittals.

EPA’s rulemaking clarifying NSR requirements for PM2.5 under subpart 4 is forthcoming, but, unfortunately, will not be proposed until late summer or fall of 2014. It is not expected to be finalized until several months thereafter. Waiting for EPA to finalize its NSR rulemaking would not allow the District sufficient time to meet the December 31, 2014 deadline. Rather than await EPA’s rulemaking and, as a result, missing federal rule development deadlines, this document describes how the District already satisfies subpart 4 requirements for NSR.

As described in this document, no additional NSR SIP elements or NSR rule modifications are necessary to augment the District’s previous NSR SIP submittal pursuant to subpart 1. This document demonstrates that the existing NSR rule, as adopted by the District on April 21, 2011, meets all subpart 4 requirements.

6.1 Permitting PM2.5 Precursors at Major Sources

Section 189(e) of subpart 4 of the CAA requires the control of PM10 precursors at major stationary sources “except where the Administrator determines that such sources do not contribute significantly to PM10 levels which exceed the standard in the area.”

PM2.5 precursors are emissions of NOx, SOx, VOC and ammonia that contribute to PM2.5 formation. Under Rule 2201, section 3.31, NOx and SOx are currently identified and controlled as precursors to PM2.5, and thus Rule 2201 meets the requirements of subpart 4 with respect to NOx and SOx as precursors. In the Valley, however, VOC and ammonia are not considered precursors that contribute significantly to the formation of PM2.5 pertaining to NSR permitting requirements.

The CAA recognized that there may be circumstances in which it is not appropriate to subject certain precursors, such as ammonia and VOC, to permitting control requirements. Based on the scientific data and modeling analyses outlined in the District’s 2012 PM2.5 Plan, summarized in Section 3 of this document, VOC and ammonia do not significantly contribute to PM2.5 formation in the Valley.
6.1.1 Ammonia

As stated previously, the District is required to address ammonia as a precursor unless it is determined that ammonia sources do not contribute significantly to PM concentrations. The District’s 2012 PM2.5 Plan, as summarized in section 3.3 of this document, demonstrates that control of ammonia emissions does not contribute significantly to PM2.5 attainment. Therefore, ammonia need not be addressed as a precursor to PM2.5 in the District's NSR program.

6.1.2 VOC

Similarly, the District demonstrates in the 2012 PM2.5 Plan and summarizes in section 3.4 of this document that VOC does not contribute significantly to the formation of PM2.5 and therefore does not need to be addressed as a PM2.5 precursor in the District’s NSR program.

Although VOC is not a significant contributor to PM2.5 in the Valley, Rule 2201 provides for the regulation of VOC as a precursor to ozone. The level to which major sources of VOC are controlled in the District’s NSR rule is extensive, since the Valley is classified as an extreme nonattainment area for ozone. VOC sources in the Valley are major sources at 10 tpy, have an emission offset threshold of 10 tpy, have a distance offset ratio of 1.5 to 1 for new major sources of federal major modification, require BACT if daily emissions exceed 2 pounds per day, and have a significant modification level set to zero for federal major modifications. Therefore, VOC as an ozone precursor is controlled through the District’s NSR rule at levels much lower than if they would be controlled as a PM2.5 precursor.

6.2 Major Source and Major Modification Thresholds

On June 2, 2014, EPA classified the Valley as a “moderate” nonattainment area for PM2.5 under subpart 4. Under this classification, major sources of PM2.5 are defined as sources with a potential to emit equal to or greater than 100 tons per year (tpy). Rule 2201, as amended April 2011, includes this threshold.

In addition, Rule 2201 specifically identifies SOx and NOx as precursors of PM2.5, and includes appropriate thresholds for determining whether proposed emission increases of PM2.5, SOx or NOx constitute a major modification of a major PM2.5 source under subpart 4. Rule 2201 also includes all the appropriate federal requirements for proposed major sources and major modifications (notification, BACT, offsets, etc.), none of which are specific to subpart 4 and are therefore already included in the latest SIP-approved version of Rule 2201.

7 CONCLUSION

As shown in this supplemental document, the 2012 PM2.5 Plan satisfies all subpart 4 requirements and demonstrates that attainment by 2015 is not practicable. The District
formally requests EPA approve said plan and reclassify the Valley as a serious area. Serious area requirements will be addressed after the Valley is redesignated by EPA as a serious area and will be in conjunction with the District’s 2016 air quality attainment plan.

In addition, this document demonstrates that the District’s April 21, 2011 version of Rule 2201 (New and Modified Stationary Source Review Rule) fully complies with and satisfies subpart 4 requirements. The District formally requests that EPA approve this rule as satisfying NSR requirements for PM2.5 under subpart 4 for moderate nonattainment areas for both the 1997 and 2006 standards.
Attachment A: Ammonia Controls

Under subpart 4, regions are required to address ammonia as a precursor in RACT analyses and other areas of the plan unless EPA determines that ammonia sources do not contribute significantly to PM concentrations. To improve public health while also ensuring effective use of resources, additional ammonia controls should only be required when there is clear scientific evidence that reasonable measures to reduce ammonia emissions would be effective in significantly reducing ambient PM2.5 concentrations.

Extensive scientific research and technical analysis described above (and more extensively in the 2012 PM2.5 Plan) demonstrates that ammonia reductions do not contribute to the Valley’s PM2.5 attainment. That said, this section shows that the Valley’s ammonia emissions have been significantly reduced through stringent District regulations. This section also shows that additional ammonia reductions are infeasible. Because the science indicates that ammonia reductions do not contribute to the Valley’s PM2.5 attainment, and because additional ammonia controls are infeasible, the Valley’s ammonia emissions do not need to be further reduced to address EPA’s PM2.5 standard.

As demonstrated in Appendix B of the 2012 PM2.5 Plan, the three main sources of ammonia emissions in the Valley from stationary and area sources account for 96% of the Valley’s ammonia emissions and are as follows (based on 2015 estimates):

- Farming Operations with 239.2 tons per day (tpd),
- Solvent evaporation from Agricultural Fertilizers at 66.1 tpd, and
- Composting Solid Waste Operations at 20.5 tpd.

The following discussion evaluates:
- Confined Animal Facilities (District Rule 4570)
- Agricultural Fertilizers
- Organic Material Composting (District Rule 4566)
- Biosolids, Animal Manure, and Poultry Litter Operations (District Rule 4565)
- Major Sources of Ammonia

A.1 Confined Animal Facilities (District Rule 4570)

I. District Rule Description:

District Rule 4570, was originally adopted on June 15, 2006 and was most recently amended on October 21, 2010. The purpose of this rule is to limit emissions of volatile organic compounds (VOC) from Confined Animal Facilities (CAF). District Rule 4570 applies to facilities where animals are corralled, penned, or otherwise caused to remain in restricted areas and primarily fed by a means other than grazing for at least 45 days in any twelve-month period. In addition to limiting VOC emissions, District Rule 4570 also includes measures that limit ammonia (NH3) emissions from these operations; the
required measures have also reduced ammonia emissions by over 100 tpd\textsuperscript{24} (this reduction is already reflected in the emissions inventory data above). The analysis below focuses on how District Rule 4570 limits NH\textsubscript{3} emissions in comparison to other rules and regulations.

A. Types of Confined Animal Facilities

Confined Animal Facilities are used for the raising of animals including, but not limited to, cattle, calves, chickens, ducks, goats, horses, sheep, swine, rabbits, and turkeys, which are corralled, penned, or otherwise caused to remain in restricted areas for commercial agricultural purposes and fed by a means other than grazing. (CH&SC 39011.5 (a)(1)). The major categories of Confined Animal Facilities are listed below.

- Dairy Operations - Dairy operations are those operations producing milk or animals for facilities that produce milk.
- Poultry Operations - Poultry facilities operate either as layer ranches for egg production or as broiler ranches where birds are grown for the fresh meat market.
- Beef Cattle Feeding Operations – Beef cattle facilities are facilities that raise beef cattle (heifers and steers) for their meat.
- Swine Operations – These operations raise pigs for their meat. The production cycle for hogs has three (3) phases: farrowing (giving birth), nursing, and finishing.

B. Rule 4570 Applicability Thresholds

The thresholds for a facility to be classified as a large CAF in the San Joaquin Valley and the thresholds for a facility to be subject to District Rule 4570 are shown in the following table. The large CAF thresholds are based on the definition of a large CAF adopted by the California Air Resources Board (ARB) as required by California Senate Bill (SB) 700. District Rule 4570 applies to confined animal facilities that have the capacity to house a number of animals equal to or exceeding the Rule 4570 regulatory thresholds, which are lower than the large CAF thresholds for certain facilities.

\textsuperscript{24} Appendix F of the Staff Report for the June 2009 re-adoption of Rule 4570, starting on the 329\textsuperscript{th} page of the pdf available here http://www.valleyair.org/Board_meetings/GB/agenda_minutes/Agenda/2009/June/Agenda%20Item_10_June_18_2009.pdf
### Rule 4570 Thresholds for Regulation

<table>
<thead>
<tr>
<th>Livestock Category</th>
<th>SJVAPCD Large CAF Thresholds</th>
<th>Rule 4570 Regulatory Thresholds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairy</td>
<td>1,000 milking cows</td>
<td>500 milking cows</td>
</tr>
<tr>
<td>Beef Feedlots</td>
<td>3,500 beef cattle</td>
<td>3,500 beef cattle</td>
</tr>
<tr>
<td>Other Cattle Facility</td>
<td>7,500 calves, heifers, or other cattle</td>
<td>7,500 calves, heifers, or other cattle</td>
</tr>
<tr>
<td>Poultry Facilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chicken</td>
<td>650,000 head</td>
<td>400,000 head</td>
</tr>
<tr>
<td>Duck</td>
<td>650,000 head</td>
<td>400,000 head</td>
</tr>
<tr>
<td>Turkey</td>
<td>100,000 head</td>
<td>100,000 head</td>
</tr>
<tr>
<td>Swine Facility</td>
<td>3,000 head</td>
<td>3,000 head</td>
</tr>
<tr>
<td>Horses Facility</td>
<td>3,000 head</td>
<td>3,000 head</td>
</tr>
<tr>
<td>Sheep and Goat Facilities</td>
<td>15,000 head of sheep, goats, or any combination of the two</td>
<td>15,000 head of sheep, goats, or any combination of the two</td>
</tr>
<tr>
<td>Any livestock facility not listed above</td>
<td>30,000 head</td>
<td>30,000 head</td>
</tr>
</tbody>
</table>

### C. Emission Control Requirements of District Rule 4570

District Rule 4570 requires multiple mitigation measures from the following CAF categories: Dairy, Beef Feedlots, Other Cattle Facilities, Swine Facilities, Poultry facilities, and various other smaller operations. Each of these facilities consists of multiple sources of emissions within the facility. Since these facilities generally cover a large area and have different processes, a single mitigation measure or technology is generally not sufficient to control overall emissions from the facility. Mitigation measures required by Rule 4570 have been tailored for each source of emissions, thereby ensuring that the overall emissions from a facility are reduced. The current methodology in Rule 4570 allows for the greatest overall control from the entire facility.

District Rule 4570 recognized the following five emission sources for all of the CAFs: Feed, Housing, Solid Waste, Liquid Waste, and Land Application of Manure. Rule 4570 requires each CAF to implement a certain number of mitigation measures for each of these sources. District Rule 4570 also distinguishes between the different types of housing configurations (freestall vs. open corrals) for cattle and, as such, requires specific mitigation measures for each type of housing. By requiring mitigation measure(s) for each source of emissions at a facility, District Rule 4570 ensures that reductions are achieved throughout the facility.

The following describes some of the mitigation measures and the ways in which these measures reduce ammonia emissions:
- **Nutritional management:** Ammonia emissions result from the decomposition of undigested nitrogen compounds in animal waste. Proper nutritional management, with diets formulated to feed proper amounts of protein, improves nitrogen utilization by the animal, reducing production of ammonia from animal waste.
• Increased cleaning and removal of manure and litter from animal housing areas: Because animal waste is the primary source of ammonia emissions, increased removal of waste from animal housing areas will reduce emissions by reducing the exposed area. Proper management of the waste will stabilize the nitrogen compounds in the waste, which will reduce the rate that these compounds are converted to ammonia that can be lost to the atmosphere. In addition, ammonia is highly soluble in water; therefore, when a flush system is used, ammonia emissions will be reduced because much of the ammonia will dissolve in the water rather than volatilize to the air.

• Incorporation of manure into fields: Incorporation of manure in fields reduces volatilization of gaseous pollutants by minimizing the amount of time that the manure is exposed to the atmosphere. Once the waste has been incorporated into the soil, VOCs and ammonia are absorbed onto soil particles, providing the opportunity for these soil microbes to oxidize these compounds into carbon dioxide, water, and nitrates.

One area to which some of these rules may apply is silage and silage-based total mixed ration (TMR) used as feed for cattle. Research has demonstrated that silage and TMR are one of the largest sources of VOC emissions at cattle facilities but are not significant sources of NH₃ emissions, which primarily results from the animal waste at Confined Animal Facilities; therefore, the measures that specifically apply to management of silage and TMR will not be discussed in detail in this analysis.

II. How does District Rule 4570 compare with federal rules and regulations?

A. EPA-Control Technique Guidelines (CTG)

There is no EPA CTG guidance document for confined animal facilities.

B. EPA - Alternative Control Technology (ACT)

There is no EPA ACT guidance document for confined animal facilities.

C. Standards of Performance for New Stationary Sources (NSPS)

There is no NSPS guidance document for guidance document for confined animal facilities.

D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)

There is no NESHAP guidance document for confined animal facilities.

III. How does District Rule 4570 compare to rules in other air districts?
As the largest agricultural area in California, the District took the lead in devising a list of mitigation measures for the various emission sources during the initial development of District Rule 4570. This list of mitigation measures was essentially utilized, almost identically, by all air districts in their rules. However, during the last amendments to District Rule 4570, all of the mitigation measures were reevaluated in light of the latest available science. In comparison to the previous version of the rule, the current rule lowered threshold limits to bring in additional CAFs, requires additional mitigation measures, clarified previous mitigation measures, and added additional monitoring, testing, and recordkeeping to improve enforceability.

The following California air district rules were compared to District Rule 4570:

- South Coast AQMD Rule 223, adopted June 2, 2006
- South Coast AQMD Rule 1127, adopted August 6, 2004
- Bay Area AQMD Regulation 2 Rule 10, adopted July 19, 2006
- Ventura County APCD Rule 23 (Exemptions), amended April 8, 2008
- Sacramento Metropolitan AQMD Rule 496, adopted August, 24, 2006
- Imperial County APCD Rule 217 and Policy 38, adopted October 10, 2006
- Butte County AQMD Rule 450, adopted December 21, 2006

Idaho Administrative Procedure Act (IDAPA) 02.04.14 was also considered for comparison with District Rule 4570 but was found not to be relevant to this analysis.

It is important to note that only District Rule 4570, Sacramento Metropolitan AQMD Rule 496, and South Coast AQMD Rule 1127 are prohibitory rules. For this reason, these rules include detailed recordkeeping as well as monitoring and testing requirements. Generally, the level of detail in a prohibitory rule is absent from permits rules because the purpose of a permit rule is different from the purpose of a prohibitory rule.

A. South Coast AQMD (SCAQMD) Rule 223

Applicability/Exemption/Large CAF Definition

SCAQMD Rule 223 was adopted on June 2, 2006 and has not been amended.

SCAQMD Rule 223 applies to large CAFs as defined by ARB. District Rule 4570 defines large CAFs the same way except for large CAFs for horses. District Rule 4570 defines a large CAF for horses as having at least 3,000 head, whereas SCAQMD Rule 223 defines a large CAF for horses as having at least 2,500 head. There are currently no CAFs in the San Joaquin Valley with the capacity to house at least 2,500 horses and no CAFs for horses in the San Joaquin Valley are expected to exceed this threshold in the foreseeable future.

In addition to applying to large CAFs, District Rule 4570 lowers the applicability thresholds for the following CAFs:
- Dairies – from 1,000 milk cows to 500 milk cows
• Broilers/Ducks and Layers – from 650,000 birds to 400,000 birds

Therefore, Rule 4570 is more stringent regarding applicability.

Requirements for Dairy CAFs

Feed Mitigation Measures

District Rule 4570 has seven mitigation measures for feed and two mitigation measures for silage. Operators must implement four mandatory feed mitigation measures and chose another one from a list of three, for a total of five mitigation measures required for feed. In the SCAQMD rule, there are nine feed mitigation measures, from which the operator must implement five. Both rules require selection of five mitigation measures for feed, excluding silage, but four of the five feed mitigation measures are mandatory in District Rule 4570. Therefore, overall District Rule 4570 is more stringent.

Milk Parlor Mitigation Measures

The milk parlor mitigation measures for SCAQMD includes one Class One and one Class Two mitigation measure. District Rule 4570 contains the same mitigation measures included in the SCAQMD rule as Class One and has removed the Class Two mitigation measures due to infeasibility; see the Staff Report for the October 21, 2010 amendments to Rule 4570 for more detail. Therefore, both rules will be considered identical in this category.

Freestall Mitigation Measures

District Rule 4570 has five mitigation measures, two of which are mandatory. The facility is also required to choose one additional mitigation measure from the remaining three. SCAQMD Rule 223 has eight Class One mitigations measures, from which facilities are required to implement at least two. District Rule 4570 requires one additional mitigation measure; therefore, District Rule 4570 is more stringent.

SCAQMD Rule 223 has three Class One mitigation measures that require increased frequency in comparison to the corresponding District Rule 4570 measures: (inspect water pipes and troughs and repair leaks; remove animal waste that is not dry from individual cow freestall beds; and rake, harrow, scrape, or grade bedding in freestalls). The South Coast rule requires pipes and troughs to be inspected daily, and manure from freestall beds to be removed daily, whereas District Rule 4570 does not require inspection of pipes and troughs in freestall barns. In the San Joaquin Valley the majority of freestall barns use flush systems for manure management and may also use misters or water sprays to keep animals cool; therefore, inspection of the pipes and troughs in the freestall barns was determined to be irrelevant since this is already a wet system.
SCAQMD Rule 223 requires freestall beds to be raked/harrowed/graded at least twice every seven days, whereas District Rule 4570 requires this measure to be carried out once every 7 days for large dairies and once every 14 days for medium dairies. Although, SCAQMD Rule 223 has a higher frequency for these measures, the emissions generated from these sources are not significant, including the reductions achieved from the overall dairy. In addition, the CAF stakeholders have questioned the cost effectiveness of a daily frequency. Based on the above, the increased frequency required by SCAQMD Rule 223 can be considered to exceed RACT requirements.

**Corral Mitigation Measures**

District Rule 4570 has nine mitigation measures, six of which are mandatory. The facility is also required to choose one additional mitigation measure from the remaining three. SCAQMD Rule 223 has 14 Class One mitigation measures and two Class Two mitigation measures, from which facilities are required to choose at least six. District Rule 4570 requires one additional mitigation measure; therefore, District Rule 4570 is more stringent.

SCAQMD Rule 223 has one Class One mitigation measure (*inspect water pipes and troughs and repair leaks*) that require increased frequency in comparison to the corresponding District Rule 4570 measure. SCAQMD Rule 223 requires this measure to be carried out daily, whereas District Rule 4570 requires it to be carried out only once every seven days. Although, SCAQMD Rule 223 has a higher frequency for this measure, the difference in the emissions reductions from the two frequencies is not expected to be significant. In addition, as discussed earlier the frequency required by SCAQMD Rule 223 exceeds RACT when compared to inspection leak requirements in other rules and regulations.

**Solid Waste and Separated Solids Mitigation Measures**

District Rule 4570 contains only two mitigation measures, from which operators are required to choose at least one. SCAQMD Rule 223 has three Class One mitigation measures and three Class Two mitigation measures, from which facilities are required to choose at least two.

Available studies have indicated that NH3 emissions from stored solid waste and separated solids pile to be a very small fraction of total NH3 emissions at dairies. Since the NH3 emissions from solid manure account for a very small fraction of emissions from the overall dairy, there would not be a significant increase in NH3 emission reductions if more measures are required from this category.

**Liquid Waste Mitigation Measures**

District Rule 4570 has four mitigation measures, from which operators are required to choose at least one. SCAQMD Rule 223 has five Class One
mitigation measures and five Class Two mitigation measures, from which operators are required to choose at least one. Since only one measure is required by both rules, the rules are similar in stringency.

*Manure Land Application Mitigation Measures*

District Rule 4570 has two mitigation measures required out of six optional measures. SCAQMD Rule 223 has four mitigation measures, from which facilities are required to choose at least two. All the mitigation measures are similar in stringency.

**Requirements for Poultry CAFs**

There is a large degree of variability in the manure management practices, housing techniques, and potential feeding practices for the different type of poultry operations in the San Joaquin Valley. Due to these differences, District Rule 4570 separates poultry CAFs into the following categories: 1) layers and 2) broilers, ducks, and turkeys.

Although on the surface the poultry requirements results in fewer mitigation measures compared to the other rules, the segregating of the types of poultry has allowed the mitigation measures to be tailored specifically to the type of poultry operation. In addition, all measures for poultry in District Rule 4570 are now mandated rather than left as options. Due to this reconfiguration and taking into consideration the latest science, the District Rule 4570 requirements for poultry are more stringent than SCAQMD Rule 223.

**Requirements for Other CAF Categories**

In addition to dairy and poultry CAF mitigation measures discussed above, District Rule 4570 provides specific mitigation measures for beef cattle feedlots, other cattle, and swine CAFs. SCAQMD Rule 223 does not address mitigation measures for these additional CAF categories. For these types of large CAFs, District Rule 4570 is more stringent.

**Requirements – Suspension and Substitution of Mitigation Measures**

Both rules allow the temporary suspension of a mitigation measure upon the determination by a certified veterinarian or nutritionist that such a suspension is necessary for animal health purposes. The District must be notified within 48 hours, and a new measure must be implemented if the suspension is expected to last longer than 30 days. In addition, both rules allow for substitution of one mitigation measure with an equivalent or more stringent one with the submission of the appropriate information. Therefore, the suspension and substitution requirements of both rules are equally stringent.
Conclusion – Comparison with South Coast AQMD Rule 223

Based on the analysis of the CAF categories in District Rule 4570 and SCAQMD Rule 223, it is clear that District Rule 4570 is more stringent than SCAQMD Rule 223. There are differences in the frequency with which some mitigation measures are to be implemented. However, as stated earlier, many of these sources are a small portion of a dairy’s overall emissions. The amended version of District Rule requires facilities to choose more mitigation measures and makes several mitigation measures mandatory.

District Rule 4570 also provides mitigation for more CAF categories (beef feedlots, other cattle, and swine) that are not addressed by SCAQMD Rule 223, and also has much more detailed recordkeeping requirements to demonstrate implementation of selected mitigation measures. In addition, SCAQMD recently identified District Rule 4570 as the most stringent rule for this source category in their ozone Reasonably Available Control Technology (RACT) Demonstration.\textsuperscript{25}

B. South Coast AQMD (SCAQMD) Rule 1127

Applicability/Exemption/Large CAF Definition

SCAQMD Rule 1127 was adopted on August 4, 2004 and has not been amended.

SCAQMD Rule 1127 applies to dairies with 50 or more cows, heifers, and/or calves. The rule applies to dairy farms and related operations such as heifer and calf farms and the manure produced on them. By comparison, District Rule 4570 applies to dairy CAFs with at least 500 milking cows, but applies to more than just manure-handling operations. Although the SCAQMD Rule has a lower applicability threshold, the overall control effectiveness of Rule 1127 when compared to District Rule 4570, is far less stringent.

Requirements for Dairy CAFs

Milking Parlor and Freestall Mitigation Measures

For the milking parlor, the District rule has one mandatory mitigation measure. District Rule 4570 has five mitigation measures for freestalls, two of which are mandatory. The facility is also required to choose one additional mitigation measure from the remaining three to implement. SCAQMD Rule 1127 does not address these operations. Therefore, overall District Rule 4570 is more stringent than SCAQMD Rule 1127.

\textsuperscript{25} South Coast Air Quality Management District (June 6, 2014). Reasonably Available Control Technology Demonstration. \url{http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2014/2014-jun6-031.pdf?sfvrsn=2}
Corral Mitigation Measures

District Rule 4570 has nine mitigation measures, six of which are mandatory. The facility is also required to choose one additional mitigation measure from the remaining three. SCAQMD Rule 1127 has eight mitigation measures, from which facilities are required to choose at least six. The mitigation measures required by SCAQMD Rule 1127 specify the removal of manure from the corrals, the minimization of water in the corrals, and the cleaning schedule and cleaning strategy for the corrals. While the mitigation measures in the two rules are not phrased the same way, they cover similar requirements. District Rule 4570 requires one additional measure; therefore, Rule 4570 is more stringent.

Solid Waste, Separated Solids, and Liquid Waste, and Manure Land Application Mitigation Measures

District Rule 4570 has two mitigation measures for solid waste/separated solids, from which operators are required to choose at least one. For liquid waste, District Rule 4570 has four mitigation measures for liquid waste, from which operators are required to choose at least one. District Rule 4570 has two mitigation measures for land application of manure, from which operators are required to choose at least one. SCAQMD Rule 1127 states that manure removed must be either treated at an approved manure processing operation, or applied on agricultural land with local approval. SCAQMD Rule 1127 does not specify different mitigation measures for solid waste, separated solids, or liquid waste. District Rule 4570 has specific mitigation measures for each of these operations; therefore, it is able to better target the reduction of emissions from these different operations. District Rule 4570 is therefore as stringent as or more stringent than SCAQMD Rule 1127.

Requirements for Other CAFs

District Rule 4570 provides specific mitigation measures for beef cattle feedlots, other cattle facilities, poultry facilities, and swine facilities. SCAQMD Rule 1127 does not address mitigation measures for these additional CAF categories. Therefore, District Rule 4570 is more stringent for this category.

Requirements – Suspension and Substitution of Mitigation Measures

SCAQMD Rule 1127 provides one exemption per year from one of the corral clearings required every 90 days if the moisture content in the corrals is greater than 50%. The operator is required to notify SCAQMD 30 days before the required cleaning, and test moisture content weekly. If moisture content is still above 50% when the cleaning is due, the operator may claim the exemption.

In comparison, District Rule 4570 allows an operator to temporarily suspend any mitigation measure as long as the suspension is recommended by a licensed
veterinarian of animal nutritionist on the basis of animal health. The operator must notify the District within 48 hours prior to the suspension. If the suspension is expected to last longer than 30 days, then the operator must submit a new mitigation plan that identifies a new mitigation measure to be implemented in place of the suspended one.

District Rule 4570’s exemption under this category is much more stringent because it is only a temporary suspension that cannot exceed 30 days, whereas SCAQMD Rule 1127’s exemption may be permanent, without any requirement to substitute another measure.

Therefore, in this category of mitigation measure suspensions/substitutions, District Rule 4570 is more stringent than SCAQMD Rule 1127.

Testing, Monitoring, Recordkeeping Requirements

Both SCAQMD Rule 1127 and District Rule 4570 require monitoring, record keeping and source testing as appropriate and sufficient to provide evidence of each mitigation measure being implemented.

In addition to record keeping, Rule 1127 requires an annual report of manure being shipped out from the dairy. No annual reporting is required by Rule 4570. Rule 1127 requires records be retained for 3 years for minor sources and 5 years for major sources, whereas Rule 4570 requires records be retained for five years for all sources.

Overall, the monitoring, testing and record keeping requirements are similar for both rules.

Conclusion – Comparison with South Coast AQMD Rule 1127

For dairy CAFs, District Rule 4570 is more stringent than SCAQMD Rule 1127. District Rule 4570 requires emission reductions from additional emission categories - milk parlors, freestall barns, and liquid manure - that are not addressed by SCAQMD Rule 1127 as well as requiring emission reductions from CAFs from other animal species. As mentioned above, the current version of District Rule 4570 requires facilities to choose more mitigation measures and makes several mitigation measures mandatory. District Rule 4570 also provides specific mitigation measures for beef cattle feedlots, other cattle, poultry, and swine CAFs, while SCAQMD Rule 1127 does not. District Rule 4570 is, therefore, more stringent than SCAQMD Rule 1127.

C. Bay Area AQMD (BAAQMD) Regulation 2 Rule 10 (Rule 2-10)

BAAQMD Rule 2-10 is a permit rule. As such, it has fewer specifics about large CAFs than District Rule 4570, which is a prohibitory rule.
Applicability/Exemption/Large CAF Definition

BAAQMD Rule 2-10 was adopted on July 19, 2006 and has not been amended.

BAAQMD Rule 2-10 applies to large CAFs as defined by ARB. District Rule 4570 defines large CAFs the same way except for large CAFs for horses. District Rule 4570 defines a large CAF for horses as having at least 3,000 head, whereas BAAQMD Rule 2-10 defines a large CAF for horses as having at least 2,500 head. There are currently no CAFs in the San Joaquin Valley with the capacity to house at least 2,500 horses and no CAFs for horses in the San Joaquin Valley are expected to exceed this threshold in the foreseeable future.

In addition to applying to large CAFs, District Rule 4570 lowers the applicability thresholds for the following CAFs:
- Dairies – from 1,000 milk cows to 500 milk cows
- Broilers/Ducks and Layers – from 650,000 birds to 400,000 birds

Therefore, Rule 4570 is more stringent regarding applicability.

Requirements for CAFs

The BAAQMD permit conditions must implement control measures that represent Reasonably Available Control Technology (RACT) to reduce emissions of VOC, NOx and PM from the facility. BAAQMD Rule 2-10 requires RACT mitigation measures rather than the more stringent BARCT controls required by District Rule 4570 as specifically noted in the BAAQMD staff report for their rule. District staff previously contacted BAAQMD staff and verified that there is no list of RACT mitigation measures in place should a large CAF apply for a permit. In this respect, District Rule 4570 is more stringent than BAAQMD Rule 2-10, especially considering that EPA has already determined that District Rule 4570 satisfies RACT for VOC emissions. [26]

Testing, Monitoring, Recordkeeping Requirements

District Rule 4570 requires records to be maintained and retained for at least five years, whereas BAAQMD Rule 2-10 requires records to be retained for three years. District Rule 4570 therefore has a more stringent record retention requirement.

District Rule 4570 requires facilities not subject to the mitigation measure requirements to maintain sufficient records to demonstrate their exemption status. Facilities subject to the mitigation measure requirements must maintain

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sufficient records to demonstrate implementation of each mitigation measure selected. Facilities must also maintain animal population records. BAAQMD Rule 2-10 requires the maintenance of animal population records but does not require specific records needed to demonstrate implementation of each mitigation measure selected. District Rule 4570 is therefore more stringent in the type of records that must be maintained.

Conclusion – Comparison with Bay Area AQMD Regulation 2 Rule 10

District Rule 4570 requires facilities to choose specific mitigation measures, makes several mitigation measures mandatory. In addition, District Rule 4570 has lower applicability thresholds for dairies, chickens, and ducks. Based on this information and the discussion above, District Rule 4570 is far more stringent than BAAQMD Rule 2-10.

D. Ventura County APCD (VCAPCD) Rule 23 – Exemptions from Permit

In response to California Senate Bill (SB) 700, VCAPCD revised its “Exemptions from Permit” rule to remove an exemption for agricultural operations, including CAFs. VCAPCD does not have a specific rule for CAFs. In its staff report for the rule revision, VCAPCD staff noted that no facilities in their jurisdiction would meet the “large CAF” definition and there was no expectation that a large CAF would move into the area in the foreseeable future; therefore, no separate CAF rule was necessary.

Applicability/Exemption/Large CAF Definition

VCAPCD Rule 23 adopted ARB’s definition of large CAFs. District Rule 4570 defines large CAFs the same way except for large CAFs for horses. District Rule 4570 defines a large CAF for horses as having at least 3,000 head, whereas VCAPCD Rule 23 defines a large CAF for horses as having at least 2,500 head. There are currently no CAFs in the San Joaquin Valley with the capacity to house at least 2,500 horses and no CAFs for horses in the San Joaquin Valley are expected to exceed this threshold in the foreseeable future.

In addition to applying to large CAFs, District Rule 4570 lowers the applicability thresholds for the following CAFs:

- Dairies – from 1,000 milk cows to 500 milk cows
- Broilers/Ducks and Layers – from 650,000 birds to 400,000 birds

Therefore, Rule 4570 is more stringent regarding applicability.

Requirements for CAFs

There are no facilities that would trigger the large CAF threshold within Ventura County, as stated in the Ventura County CAPCD staff report for amending Rule
23. The VCAPCD New Source Review Rule does not list mitigation measures for large CAFs. Instead, BACT would be triggered by a new CAF that met the “large CAF” definition or BACT would be triggered if an existing CAF expanded operations enough to meet the “large CAF” definition. At that point, VCAPCD staff would determine BACT for the CAF.

Conclusion – Ventura County APCD Rule 23

Ventura County APCD does not have a specific rule for CAFs; therefore, District Rule 4570 is more stringent.

E. Sacramento Metropolitan AQMD (SMAQMD) Rule 496

Like District Rule 4570, Sac Metro AQMD Rule 496 is a prohibitory rule, meaning that there are detailed requirements for operators.

Applicability/Exemption/Large CAF Definition

SMAQMD Rule 496 was adopted on August 24, 2006 and has not been amended.

SMAQMD Rule 496 applies to large CAFs as defined by ARB. District Rule 4570 defines large CAFs the same way except for large CAFs for horses. District Rule 4570 defines a large CAF for horses as having at least 3,000 head, whereas SMAQMD Rule 496 defines a large CAF for horses as having at least 2,500 head. There are currently no CAFs in the San Joaquin Valley with the capacity to house at least 2,500 horses and no CAFs for horses in the San Joaquin Valley are expected to exceed this threshold in the foreseeable future.

In addition to applying to large CAFs, District Rule 4570 lowers the applicability thresholds for the following CAFs:
- Dairies - 1,000 milk cows to 500 milk cows
- Broilers/ducks and Layers – 650,000 – 400,000

Therefore, Rule 4570 is more stringent regarding applicability.

Requirements for Dairy CAFs

Feed Mitigation Measures

District Rule 4570 has seven mitigation measures for feed and two mitigation measures for silage. Operators must implement four mandatory feed mitigation measures and chose another one from a list of three, for a total of five mitigation measures required for feed.
SMAQMD Rule 496 has seven Class One mitigation measures for feed and two Class One mitigation measures for silage. Operators must implement four feed mitigation measures and one silage mitigation measure.

District Rule 4570 requires a total of five feed mitigation measures, excluding silage, which is greater than the four feed mitigation measures required by SMAQMD Rule 496. In addition, four of the five feed mitigation measures are mandatory in District Rule 4570. Therefore, District Rule 4570 is more stringent.

**Milk Parlor Mitigation Measures**

District Rule 4570 has one required milk parlor mitigation measure. SMAQMD Rule 496 also only requires one mitigation measure for milk parlors. Since both rules only require the use of one mitigation measure, both rules will be considered identical for this category.

**Freestall Mitigation Measures**

District Rule 4570 has five freestall mitigation measures, two of which are mandatory. The facility is also required to choose one additional mitigation measure from the remaining three. SMAQMD Rule 496 has eight Class One mitigation measures and one Class Two mitigation measure from which facilities are required to implement at least two.

Rule 4570 will be considered more stringent since it requires more mitigation measures.

**Corral Mitigation Measures**

District Rule 4570 has nine corral mitigation measures, six of which are mandatory. The facility is also required to choose one additional mitigation measure from the remaining three. SMAQMD Rule 496 has 15 Class One mitigation measures, which are all optional, and three Class Two mitigation measures, from which facilities are required to choose at least six. District Rule 4570 requires one additional mitigation measure; therefore in this respect District Rule 4570 is more stringent.

SMAQMD Rule 496 has one Class One mitigation measure (*inspect water pipes and troughs and repair leaks*) that require increased frequency in comparison to the corresponding District Rule 4570 measure. SMAQMD Rule 496 rule requires this measure to be carried out daily, whereas District Rule 4570 requires it to be carried out only once every seven days. Although, SMAQMD Rule 496 has a higher frequency for this measure, the difference in the emissions reductions from the two frequencies is not expected to be significant. In addition, as discussed earlier the frequency required by SMAQMD Rule 496 exceeds RACT
when compared to inspection leak requirements in other rules and regulations. Overall, District Rule 4570 is more stringent.

**Solid Waste and Separated Solids Mitigation Measures**

District Rule 4570 contains only two mitigation measures, from which operators are required to choose at least one. SMAQMD Rule 496 has five Class One mitigation measures and three Class Two mitigation measures, from which facilities are required to choose at least two.

Available studies have indicated that NH3 emissions from stored solid waste and separated solids pile to be a very small fraction of total NH3 emissions at dairies. Since the NH3 emissions from solid manure account for a very small fraction of emissions from the overall dairy, there would not be a significant increase in NH3 emission reductions if more measures are required from this category.

**Liquid Waste Mitigation Measures**

District Rule 4570 has four mitigation measures mitigation measures, from which operators are required to choose at least one. SMAQMD Rule 496 has four Class One mitigation measures and four Class Two mitigation measures, from which facilities are required to choose at least one. Since only one measure is required, both rules are equivalent in this respect.

**Manure Land Application Mitigation Measures**

District Rule 4570 has two mitigation measures required out of six measures. SMAQMD Rule 496 has six Class One mitigation measures, from which facilities are required to choose at least two. Since two mitigation measures are required, both rules are equivalent in this respect.

**Requirements for Poultry Large CAFs**

There is a large degree of variability in the manure management practices, housing techniques, and potential feeding practices for the different type of poultry operations in the San Joaquin Valley. Due to these differences, District Rule 4570 separates poultry CAFs into the following categories: 1) layers and 2) broilers, ducks, and turkeys.

Although on the surface the poultry requirements results in fewer mitigation measures compared to the other rules, the segregating of the types of poultry has allowed the mitigation measures to be tailored specifically to the type of poultry operation. In addition, all measures for poultry in District Rule 4570 are now mandated rather than left as options. Due to this reconfiguration and taking into consideration the latest science, the District Rule 4570 requirements for poultry are more stringent than SMAQMD Rule 496.
Other CAFs

In addition to dairy and poultry CAF mitigation measures discussed above, District Rule 4570 provides specific mitigation measure option tables for beef cattle feedlots, other cattle facilities, and swine facilities. SMAQMD Rule 496 does not address mitigation measures for these additional CAF categories. For these types of large CAFs, District Rule 4570 is more stringent.

Requirements – Suspension and Substitution of Mitigation Measures

Both rules allow for substitution of one mitigation measure with an equivalent or more stringent measure with the submission of the appropriate application. District Rule 4570 also allows the temporary suspension of a mitigation measure upon the determination by a certified veterinarian or nutritionist that such a suspension is necessary for animal health purposes. The District must be notified within 48 hours, and a new measure must be implemented if the suspension is expected to last longer than 30 days. SMAQMD Rule 496 does not have a specific provision for temporary suspension of mitigation measures. As discussed above, District Rule 4570 is as stringent as SMAQMD Rule 496.

Testing, Monitoring, Recordkeeping Requirements

The testing, monitoring, and recordkeeping provisions of District Rule 4570 and SMAQMD Rule 496 are nearly identical and are of equal stringency.

Conclusion – Comparison with Sac Metro AQMD Rule 496

For dairy CAFs, District Rule 4570 is more stringent than SMAQMD Rule 496. District Rule 4570 requires emission reductions from four additional emission categories - milk parlors, feed, freestall barns, and liquid manure - that are not addressed by SMAQMD Rule 496 as well as having specific requirements for other types of CAFs. District Rule 4570 also requires facilities to choose more mitigation measures and mandates several mitigation measures. In addition, Rule 4570 applies to dairies with greater than 500 milk cows and 400,000 layers and broilers while SMAQMD Rule 496 applies to dairies with 1,000 milk cows or more and broiler and layer operations with more than 650,000 birds. As shown in the discussion above, District Rule 4570 is more stringent than SMAQMD Rule 496.

F. Imperial County APCD (ICAPCD) Rule 217 – Large Confined Animal Facilities Permits Required and ICAPCD Policy Number 38 – Recommended Mitigation Measures for Large Confined Animal Facilities

Imperial County APCD Rule 217 is a permits rule. ICAPCD Rule 217 requires that owners or operators of large CAFs submit an emissions mitigation plan that demonstrates that the facility will use RACT to reduce emissions of pollutants that
contribute to the non-attainment of any ambient air quality standard and are within the ICAPCD’s regulatory authority.

ICAPCD Rule 217 requires operators of large CAFs to implement the control measures identified in their emissions mitigation plan, which may be selected from the ICAPCD Policy Number 38, Recommended Mitigation Measures for Large Confined Animal Facilities. ICAPCD Policy Number 38 specifies the number of mitigation measures the operator should implement for each operation within the CAF. The following discussion compares the recommended mitigation measures in ICAPCD Policy Number 38 to the measures in District Rule 4570. However, since the mitigation measures in ICAPCD Policy Number 38 are only recommended by ICAPCD Rule 217 rather than being explicitly required, it is clear that District Rule 4570 is more stringent.

Applicability/Exemption/Large CAF Definition

Imperial County Rule 217 was adopted on October 10, 2006 and has since not been amended.

ICAPCD adopted ARB’s definition of large CAF. District Rule 4570 defines large CAFs the same way except for large CAFs for horses. District Rule 4570 defines a large CAF for horses as having at least 3,000 head, whereas ICAPCD Rule 217 defines a large CAF for horses as having at least 2,500 head. There are currently no CAFs in the San Joaquin Valley with the capacity to house at least 2,500 horses and no CAFs for horses in the San Joaquin Valley are expected to exceed this threshold in the foreseeable future.

In addition to applying to large CAFs, District Rule 4570 lowers the applicability thresholds for the following CAFs:
- Dairies – from 1,000 milk cows to 500 milk cows
- Broilers/Ducks and Layers – from 650,000 birds to 400,000 birds

ICAPCD Policy Number 38 only lists mitigation measures for dairy operations and beef feedlot operations while District Rule 4570 covers additional CAFs (swine, chicken layer, chicken broiler, duck and turkey, and other CAFs). Therefore, more CAFs are subject to the requirements of District Rule 4570 than ICAPCD Rule 217.

Therefore, Rule 4570 is more stringent regarding applicability.

Requirements for Dairy CAFs

Milk Parlor Mitigation Measures
ICAPCD Policy Number 38 has only one mitigation measure for the milk parlor. The District rule also only has one mitigation measure. Since the mitigation measure is identical, both rules are identical under this section.

**Freestall Mitigation Measures**

District Rule 4570 has five freestall mitigation measures, two of which are mandatory. The facility is also required to choose one additional mitigation measure from the remaining three. ICAPCD Policy Number 38 has eight mitigation measures, from which operators are required to choose at least two. Since District Rule 4570, requires three mitigation measures and mandates two out of the three, District Rule 4570 is more stringent than ICAPCD Policy Number 38.

**Corral Mitigation Measures**

District Rule 4570 has nine mitigation measures, six of which are mandatory. The facility is also required to choose one additional mitigation measure from the remaining three. ICAPCD Policy Number 38 has eight mitigation measures, from which facilities are required to choose at least four.

For three of the mitigation measures, the compliance times differ between the District rule and ICAPCD Policy Number 38. For these measures, ICAPCD Policy Number 38 allows longer time periods between repeated performance of the measures than District Rule 4570. For these three mitigation measures, District Rule 4570 is more stringent because District Rule 4570 requires repeated performance of the otherwise identical mitigation measures in shorter time periods.

For two of the mitigation measures, the maximum depth of manure differs significantly between the District Rule 4570 and ICAPCD Policy Number 38. For these measures, ICAPCD Policy Number 38 allows manure depths that are deeper than allowed by District Rule 4570. For these two mitigation measures, District Rule 4570 rule is more stringent because the District Rule 4570 requires shallower manure depths for otherwise identical mitigation measures.

Therefore, District Rule 4570 is far more stringent than the ICAPCD Policy Number 38.

**Solid Waste and Separated Solids Mitigation Measures**

District Rule 4570 has two solid waste and separated solids mitigation measures, from which operators are required to choose at least one. ICAPCD Policy Number 38 has four mitigation measures from which facilities are required to choose at least one. Therefore, both rules are identical in this category.
There are a few differences in ICAPCD Policy Number 38 mitigation measures when compared to District Rule 4570. ICAPCD Policy Number 38 policy requires that manure piles are covered year round whereas District Rule 4570 requires that the piles be covered from October through May – the months the months in the San Joaquin Valley in which rainfall is most likely. However, because of the greater depth of manure allowed in corrals and increased duration (up to two years) for removal of manure from the corrals allowed by ICAPCD Policy Number 38, CAFs in the ICAPCD are able to allow manure to accumulate in the corrals until it can be hauled offsite. Few, if any, CAFs in the ICAPCD are expected to actually store manure onsite outside of corrals, so it is likely than no facilities in ICAPCD are actually choosing and implementing this measure. Separated solids piles are not specifically addressed in ICAPCD Policy Number 38. Overall District Rule 4570 is as stringent as ICAPCD Policy Number 38.

**Liquid Waste Mitigation Measures**

District Rule 4570 has four liquid waste mitigation measures, from which operators are required to choose at least one. ICAPCD Policy Number 38 has four mitigation measures, from which operators are required to choose at least one. ICAPCD Policy Number 38 contains an option to manage the facility so that lagoons only contain waste from milking parlor and storm water as a mitigation measure. District Rule 4570 does not contain this option. This difference, although worth noting, is not expected to influence the overall effectiveness of District Rule 4570 and District Rule 4570 is as stringent as ICAPCD Policy Number 38.

**Manure Land Application Mitigation Measures**

District Rule 4570 has two mitigation measures that are mandatory if applicable. Imperial County APCD policy has a menu of five mitigation measures from which operators are required to choose two. Since two measures are required by both ICAPCD Policy Number 38 and District Rule 4570, they will be considered identical under this category.

**Requirements for Beef Feedlot CAFs**

**Animal Housing Mitigation Measures**

District Rule 4570 has nine mitigation measures, six of which are mandatory. The facility is also required to choose one additional mitigation measure from the remaining three. ICAPCD Policy Number 38 has nine mitigation measures, from which facilities are required to choose at least four. Since operators in Imperial County are required to implement fewer mitigation measures, District Rule 4570 is more stringent.
For three of the mitigation measures, the compliance times differ between the District rule and ICAPCD Policy Number 38. For these measures, ICAPCD Policy Number 38 allows longer time periods between repeated performances of the measures than District Rule 4570. For these three mitigation measures, the District rule is more stringent because the District Rule 4570 requires repeated performance of the otherwise identical mitigation measures in shorter time periods.

For two of the mitigation measures, the maximum depth of manure differs significantly between the District Rule 4570 and ICAPCD Policy Number 38. For these measures, ICAPCD Policy Number 38 allows manure depths that are deeper than allowed by District Rule 4570. For these two mitigation measures, District Rule 4570 rule is more stringent because the District Rule 4570 requires shallower manure depths for otherwise identical mitigation measures.

**Solid Waste and Separated Solids Mitigation Measures**

District Rule 4570 has two solid waste and separated solids mitigation measures, from which operators are required to choose at least one. ICAPCD Policy Number 38 has four mitigation measures from which facilities are required to choose at least one. Therefore, both rules are identical in this category.

ICAPCD Policy Number 38 policy requires that manure piles are covered year round whereas District Rule 4570 requires that the piles be covered from October through May – the months the months in the San Joaquin Valley in which rainfall is most likely. However, because of the greater depth of manure allowed in corrals and increased duration (up to two years) for removal of manure from the corrals allowed by ICAPCD Policy Number 38, CAFs in the ICAPCD are able to allow manure to accumulate in the corrals until it can be hauled offsite. Few, if any, CAFs in the ICAPCD are expected to actually store manure onsite outside of corrals, so it is likely than no facilities in ICAPCD are actually choosing and implementing this measure. Overall District Rule 4570 is as stringent as ICAPCD Policy Number 38.

**Liquid Manure Handling**

ICAPCD Policy Number 38 does not address liquid manure handling for beef feedlot operations. This is likely because beef feedlot facilities in ICAPCD do not generally use liquid manure management systems. District Rule 4570 requires one measure to be selected out of a menu of options, if applicable. Therefore, Rule 4570 is more stringent in this category.

**Manure Land Application Mitigation Measures**

District Rule 4570 has two mitigation measures that are mandatory if applicable. ICAPCD Policy 38 has a menu of five mitigation measures from which operators
are required to choose two. Since two measures are required by both ICAPCD Policy Number 38 and District Rule 4570, they will be considered identical under this category.

Requirements for Other CAFs

In the same manner as for dairy and beef feedlot operations, District Rule 4570 specifies mitigation methods for confined animal facilities other than dairies and beef feedlots. ICAPCD Policy 38 only has mitigation measures for dairy and beef feedlot operations. In comparing the two documents, District Rule 4570 is therefore more comprehensive and stringent.

Requirements – Suspension and Substitution of Mitigation Measures

District Rule 4570 and ICAPCD Policy 38 allow for substitution of one mitigation measure with an equivalent or more stringent one with the submission of the appropriate application. District Rule 4570 also allows the temporary suspension of a mitigation measure upon the determination by a certified veterinarian or nutritionist that such a suspension is necessary for animal health purposes. The District must be notified within 48 hours, and a new measure must be implemented if the suspension is expected to last longer than 30 days. ICAPCD Policy 38 allows for temporary suspension of mitigation measures under circumstances similar to District Rule 4570. Based on the discussion, Rule 4570 is as stringent as ICAPCD Policy 38.

Testing, Monitoring, Recordkeeping Requirements

District Rule 4570 requires records to be maintained and retained for at least five years, whereas ICAPCD Rule 217 requires records to be retained for two years. District Rule 4570 therefore has a more stringent record retention requirement.

District Rule 4570 requires facilities not subject to the mitigation measure requirements to maintain sufficient records to demonstrate their exemption status. Facilities subject to the mitigation measure requirements must maintain sufficient records to demonstrate implementation of each mitigation measure selected. Facilities must also maintain animal population records. ICAPCD Rule 217 requires the maintenance of animal population records but does not require specific records needed to demonstrate implementation of each mitigation measure selected. District Rule 4570 is therefore more stringent in the type of records required to be maintained.

Conclusion – Comparison with Imperial County APCD Rule 217 and Imperial County APCD Policy Number 38

ICAPCD Rule 217 requires operators of large CAFs to implement the control measures identified in their emissions mitigation plan, which may be selected from the ICAPCD Policy Number 38, Recommended Mitigation Measures for Large
Confined Animal Facilities; however, compliance with ICAPCD Policy Number 38 is not explicitly required by the rule. District Rule 4570 contains several mandatory mitigation measures, unlike the optional nature of the mitigation measures in Imperial County APCD Rule 217. District Rule 4570 also has a lower applicability threshold for dairies (500 milk cows). In addition, ICAPCD Policy Number 38 only lists mitigation measures for dairy operations and beef feedlot operations while District Rule 4570 covers additional CAFs (swine, chicken layer, chicken broiler, duck and turkey, and other CAFs). As shown the discussion above, District Rule 4570 is far more stringent than ICAPCD Rule 217 and ICAPCD Policy Number 38.

G. Butte County AQMD (BCAQMD) Rule 450 – Large Confined Animal Facilities

Butte County AQMD Rule 450 is a permits rule. It outlines, in general terms, the requirements for a complete permit application and how the staff would evaluate and approve/disapprove the permit application.

Applicability/Exemption/Large CAF Definition

Butte County AQMD Rule 450 was adopted on December 21, 2006 and has since not been amended.

BCAQMD adopted ARB’s definition of large CAF. District Rule 4570 defines large CAFs the same way except for large CAFs for horses. District Rule 4570 defines a large CAF for horses as having at least 3,000 head, whereas BCAQMD Rule 450 defines a large CAF for horses as having at least 2,500 head. There are currently no CAFs in the San Joaquin Valley with the capacity to house at least 2,500 horses and no CAFs for horses in the San Joaquin Valley are expected to exceed this threshold in the foreseeable future.

In addition to applying to large CAFs, District Rule 4570 lowers the applicability thresholds for the following CAFs:

- Dairies – from 1,000 milk cows to 500 milk cows
- Broilers/Ducks and Layers – from 650,000 birds to 400,000 birds

Therefore, Rule 4570 is more stringent regarding applicability.

CAF Requirements

BCAQMD Rule 450 requires large CAFs to obtain a permit and to submit and implement a mitigation plan; however, the rule does not list mitigation measures or specify the number of mitigation measures required. District Rule 4570 has a menu of specific mitigation measures and stipulates the number of mitigation measures an operator is required to implement. In this regard, District Rule 4570 is more stringent than the BCAQMD Rule 450.
Testing, Records, and Reporting Requirements

BCAQMD Rule 450 requires that all CAFs record the daily number of animals on-site. These records are to be kept on-site for two years and presented if requested. District Rule 4570 requires testing and records be kept to demonstrate compliance with the operator’s selected mitigation measures. The records are to be kept for five years and presented upon request of EPA or the District. Because District Rule 4570 covers testing, as well as having a longer record retention time, it is more stringent than BCAQMD Rule 450.

Conclusion – Comparison with Butte County AQMD Rule 450

District Rule 4570 contains specifies the actual mitigation measures that facilities are required to implement. In addition, District Rule 4570 has lower applicability thresholds for dairies, chicken facilities, and duck facilities. As shown in the discussion above, District Rule 4570 is more stringent than BCAQMD Rule 450.

H. Idaho Administrative Procedure Act (IDAPA) 02.04.14 – Rules Governing Dairy Waste

The Idaho State Department of Agriculture found that these rules were “necessary to protect the public health, safety, and welfare of Idaho, enhance Idaho water quality and preserve the integrity of the Idaho dairy industry.” The rules set standards for waste containment and storage and nutrient management for the protection of water quality.

It was determined that these rules are not relevant to the current analysis since they do not specifically limit air emissions and more stringent water quality requirements than these are already implemented in the San Joaquin Valley by the California Environmental Protection Agency Central Valley Regional Water Quality Control Board implements.

IV. Conclusion:

After careful evaluation of federal rules and regulations as well as prohibitory rules in other areas, District staff concludes that District Rule 4570 satisfies RACT for NH3 emissions from Confined Animal Facilities. This conclusion is supported by the fact the EPA previously determined that District Rule 4570 satisfied RACT for VOC emissions from Confined Animal Facilities and many of the same measures will also limit NH3 emissions from these facilities. The District also evaluated the feasibility of additional ammonia emissions reductions. However, the District has not identified any additional reasonable measures. In fact, the South Coast Air Quality Management District
recently identified District Rule 4570 as the most stringent rule for this source category in their ozone Reasonably Available Control Technology Demonstration.²⁷

A.2 Agricultural Fertilizers

Farms have continued to improve methods of fertilizer application over the years to maximize nitrogen use efficiency and minimize environmental impacts. Best management practices are being implemented to minimize nitrate leaching in irrigated crop production. Researchers at UC Cooperative Extension have been studying the nitrogen use efficiency for various crop types and have begun identifying the point at which the application of additional nitrogen no longer significantly increases crop quality and yields. This will allow growers to apply fertilizer with more precision to reduce the amount of nitrogen left in the soil.

Agricultural operations in California are regulated by the State Water Resources Control Board, which is charged by the state Legislature in enforcing state and federal water quality protection laws. The State Water Resources Control Board consists of Regional Water Quality Control Boards (Regional Boards) that develop objectives and plans to protect the beneficial uses of water, recognizing local differences in climate, topography, geology and hydrology. All dairy farms in California’s Central Valley are regulated by the Central Valley Regional Water Quality Control Board (“Regional Board”). The vast majority of dairies - about 1,200 dairies are regulated under a Regional Board General Order²⁸ and the remainder are regulated via individual orders that ensure compliance with the same requirements. These requirements include:

- A Nutrient Management Plan (NMP), prepared by a certified professional crop advisor or equivalent, designed to control nutrient losses for protection of surface water and groundwater;
- A Waste Management Plan (WMP), prepared by a licensed engineer;
- Environmental sampling and monitoring of soil, manure, water and plant tissue for compliance;
- Routine site inspections, record-keeping, and reporting; and
- Additional groundwater monitoring to assess ongoing water quality protection

A major purpose of these regulations is to ensure responsible storage and use of manure as an important crop fertilizer and soil builder, thus preventing unnecessary runoff or leaching of nitrogen compounds to the environment, where they can impact water quality. The NMP is designed to assure that the amount of nitrogen excreted by milking cows and support stock is in reasonable balance with the needs of crops grown at the dairy farm. Manure nitrogen in excess of crop needs should be exported off the farm to where it can be used by other farmers. Nitrogen used on the farm is required to be stored safely until it is used (the major purpose of the WMP) and then only applied to

agricultural fields when needed for crop growth and in the amounts needed. Over-application or mistimed application of nitrogen fertilizers can result in unnecessary losses of nitrogen to the environment, both as seepage below the root zone (in the form of nitrate or other nitrogen compounds)\(^{29}\) or as air emissions of ammonia gas, ammonium, and oxides of nitrogen.

The University of California suggested in 2005 that “... optimal N loading rates of 1.4 to 1.65 times the crop N harvest removal are practical and, based on field observations, achievable if the production field is properly managed.”\(^{30}\) The UC assessment was the ultimate basis for performance standards set by the Regional Board in the General Order, which was adopted in 2007 and revised and re-issued in 2013.

Research suggests that to achieve the more stringent targets in the General Order, many dairies had to greatly increase the precision of their manure and fertilizer applications, while also reducing the overall amount of nitrogen applied to their crops compared to plant uptake.\(^{31}\) On a group of San Joaquin Valley dairy farms, it was estimated that prior to adoption of the General Order in 2007, losses of nitrogen to groundwater alone ranged from 370 to 570 pounds per acre compared to 500 pounds of uptake by crops.\(^{32}\) Similar or larger amounts of nitrogen are expected to volatilize to the atmosphere as ammonia and other compounds following excretion of manure from animals, during storage of manure in ponds or corrals, and in the process of applying manure to soil as a crop nutrient.\(^{33}\) Thus, as a result of full implementation of the General Order, losses of nitrates to groundwater on dairies may be reduced by up to 85 percent compared to pre-General Order conditions, though this number will be smaller for dairies where manure was managed more precisely prior to the General Order’s adoption.

Increasing crop nutrient uptake is also expected to reduce air emissions by providing for application of less excess fertilizer to crops, and therefore, less opportunity for volatilization in the fields. Some research already conducted found lower emissions with moderate nitrogen applications and suggested “synchronizing N applications with crop N demand. Once the N requirement for each crop stage is known, the N applications can be adjusted accordingly. This strategy should lead to improved N use efficiency and likely lower N2O emissions.”\(^{34}\)

Other nitrogen compounds such as ammonia can also volatilize to air during application to fields. The University of California Committee of Experts on Dairy Manure Management has suggested that during application of manure water to crops, significant ammonia emissions can occur when manure water is not properly diluted (to

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\(^{30}\) Ibid., p. 47


\(^{32}\) Ibid., Harter.

\(^{33}\) Ibid., “Managing Dairy Manure in the Central Valley of California.”

\(^{34}\) “Assessment of Nitrous Oxide Emissions in California’s Dairy Systems, DRAFT FINAL REPORT, California Air Resources Board, Contract No. 09-325, William R. Honwath, Martin Burger, Stuart Pettygrove, [http://www.arb.ca.gov/research/rsc/10-18-13/item6df09-325.pdf](http://www.arb.ca.gov/research/rsc/10-18-13/item6df09-325.pdf)
below 100 ppm NH₃/N) or applied during early growth of the crop. However, “in systems with frequent, but well diluted manure water applications, ammonia losses from the ground surface will commonly be minimal during the irrigation (10% or less).”

Although additional research will be helpful in quantifying the environmental benefits of improved waste management and nutrient applications, the weight of evidence suggests that managing nutrient applications to fields as prescribed in the General Order, especially compared to pre-General Order management on some dairy farms, has significantly reduced losses of nitrogen compounds to the environment, including leaching of nitrogen compounds to groundwater and air emissions such as ammonia and nitrous oxide.

A.3 Organic Material Composting (District Rule 4566)

I. District Rule Description:

District Rule 4566 (Organic Material Composting) is the most stringent rule in the nation for controlling emissions from composting operations; additional controls are infeasible. Additionally, as discussed in Chapter 7 of the 2012 PM2.5 Plan, one of the technology focus areas for the District’s Technology Advancement Program is for waste solutions that focus on waste systems or technologies that minimize or eliminate emissions from existing waste management systems and processes, including waste-to-fuel systems, such as dairy digesters and other bio-fuel applications. The District has taken every regulatory action feasible to reduce emissions from this source and continues to seek additional methods to reduce emissions through innovative strategies such as the support of research and technology demonstrations with potential to reduce emissions further.

District Rule 4566, was adopted on August 18, 2011, to limit volatile organic compounds (VOC) emissions from composting facilities whose feedstock consists of greenwaste and/or foodwaste. District Rule 4566 applies to operations that stockpile and compost greenwaste and foodwaste. In addition to limiting VOC emissions, District Rule 4566 also limits ammonia (NH₃) emissions from these operations. The analysis below focuses on how District Rule 4566 limits NH₃ emissions in comparison to other rules and regulations.

II. How does District Rule 4566 compare with federal rules and regulations?

A. EPA-Control Technique Guidelines (CTG)

There is no EPA CTG guidance document for greenwaste or foodwaste composting operations.

B. EPA - Alternative Control Technology (ACT)

There is no EPA ACT guidance document for greenwaste or foodwaste composting operations.

C. Standards of Performance for New Stationary Sources (NSPS)

There is no NSPS guidance document for greenwaste or foodwaste composting operations.

D. National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)

There is no NESHAP guidance document for greenwaste or foodwaste composting operations.

III. How does District Rule 4566 compare to rules in other air districts?

District staff compared District Rule 4566 with the rules for greenwaste and foodwaste composting operations from other California air districts. The results of the analysis are discussed below. District staff only located one other air district rule that applied to similar sources: South Coast Air Quality Management District (SCAQMD) Rule 1133.3. No other air district rules that applied to greenwaste or similar sources were found.

A. South Coast Air Quality Management District (SCAQMD) Rule 1133.3 - Emission Reductions from Greenwaste Composting Operations (Adopted July 8, 2011)

The purpose of SCAQMD Rule 1133.3 is to reduce emissions of volatile organic compounds (VOC) and ammonia (NH3) from greenwaste and foodwaste composting operations. The table below compares the significant similarities and differences between SJVAPCD Rule 4566 and SCAQMD Rule 1133.3. For purposes of this analysis, the ammonia control efficiencies achieved by the requirements of SJVAPCD Rule 4566 are assumed to be the same as the VOC control efficiencies since the same control measures will reduce both VOC and NH3 from these operations. It is worth noting that greenwaste/foodwaste composting produces about 16% of the ammonia emissions on a per ton basis compared to co-composting.36

SCAQMD Rule 1133.3, baseline NH3 emissions from greenwaste/foodwaste composting = 0.46 lb-NH3/ton-throughput. SCAQMD Rule 1133.2, baseline NH3 emissions from co-composting = 2.93 lb-NH3/ton-throughput.

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<table>
<thead>
<tr>
<th>Rule Section</th>
<th>SCAQMD Rule 1133.3</th>
<th>SJVUAPCD Rule 4566</th>
<th>Explanation of Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicability</td>
<td>New and existing greenwaste and foodwaste composting operations.</td>
<td>New and existing organic material composting and stockpiling facilities. (Organic material is defined as green material, food material, or mixtures of the two, with &lt;100 ton/yr biosolids or manure.)</td>
<td>SCAQMD Rule 1133.3 limits foodwaste stockpiling time (48 hr), whereas SJVAPCD Rule 4566 limits organic material stockpiling time (3 or 10 days, depending on throughput).</td>
</tr>
<tr>
<td>Exemptions</td>
<td>Applicability/exemptions based on facility type, not throughput.</td>
<td>Applicability/exemptions based on facility type, not throughput.</td>
<td>The same types of facilities are exempt in both rules: facilities subject to a co-composting rule (SCAQMD Rule 1133.2 or SJVAPCD Rule 4565, nursery, household, recreational, and community composting facilities. SJVAPCD Rule 4566 also exempts agricultural facilities which are subject to SJVAPCD Rule 4204, 4550, or 4570.</td>
</tr>
<tr>
<td>Composting Control Requirements</td>
<td>• ≤5,000 ton/yr foodwaste or &lt;20% manure (watering and finished compost cover or ≥20% control for NH₃)</td>
<td>• &lt;200,000 ton/yr organic material (watering system or ≥19% control for NH₃), • ≥200,000 and &lt;750,000 ton/yr organic material (watering system and finished compost cover or ≥60% control for NH₃)</td>
<td>The throughput/control levels in Rule 4566 are based on cost-effectiveness and socio-economic studies conducted by the District as part its Final Staff Report Revised Proposed New Rule 4566 (Appendices C and D, August 18, 2011). Rule 4566 requires the same management practices and control requirements as Rule 1133.3; however, the throughput levels at which the stricter control requirements in Rule 4566 become triggered are much higher than in Rule 1133.3. Thus, on paper, Rule 1133.3 appears to be more stringent than Rule 4566. However, SCAQMD does not have any greenwaste composting facilities (that are not under an experimental research permit) subject to the 80% control requirements of Rule 1133.3.</td>
</tr>
</tbody>
</table>

As shown in the table above, based on discussions with SCAQMD permitting and rule development staff, SCAQMD does not have any greenwaste composting production facilities subject to the 80% ammonia reduction requirement of Rule 1133.3. SCAQMD has recently issued Authority to Construct permits for two experimental research greenwaste composting facilities located in Fontana and Riverside operated by Burrtec. The permits authorize Burrtec to perform greenwaste composting for one year (with the possibility of an extension) in order to evaluate the feasibility of three different compost emissions control technologies and conduct emissions testing for each technology. If at the end of the permitted experimental research period, Burrtec wanted to convert one or
both facilities into a regular greenwaste composting production facility, they would need to obtain new ATC permits. The Burrtec facilities then are not representative of a commercial production greenwaste composting facility.

RACT is generally understood to apply to existing sources. Because SCAQMD has no existing production greenwaste composting facilities that are subject to the 80% ammonia control requirement of Rule 1133.3, and the new facilities are permitted under experimental research exemptions, then Rule 1133.3 cannot be used to establish RACT as 80% for that category/throughput level of greenwaste composting. Moreover, the types of controls that will meet the 80% requirement are considered equivalent to Best Available Control Technology (BACT) for composting sources, which is a higher level of control than RACT. Therefore, SCAQMD exceeds RACT requirements.

B. No rules that apply to biosolids, animal manure, and/or poultry litter operations were located for the air districts listed below

- Amador County Air Pollution Control District (ACAPCD)
- Bay Area Air Quality Management District (BAAQMD)
- Eastern Kern County Air Pollution Control District (EKAPCD)
- El Dorado County Air Quality Management District
- Imperial County Air Pollution Control District (ICAPCD)
- Mojave Desert Air Quality Management District (MDAQMD)
- North Coast Unified Air Quality Management District (NCAQMD)
- Placer County Air Pollution Control District (PCAPCD)
- Sacramento Metropolitan Air Quality Management District (SMAQMD)
- San Diego County Air Pollution Control District (SDCAPCD)
- Ventura County Air Pollution Control District (VCAPCD)
- Yolo-Solano Air Quality Management District (YSAQMD)

C. Idaho Administrative Procedure Act (IDAPA) 02.04.14 – Rules Governing Dairy Waste

The Idaho State Department of Agriculture found that these rules were “necessary to protect the public health, safety, and welfare of Idaho, enhance Idaho water quality and preserve the integrity of the Idaho dairy industry.” The rules set standards for waste containment and storage and nutrient management for the protection of water quality.

It was determined that these rules are not relevant to the current analysis since they do not specifically limit air emissions and more stringent water quality requirements than these are already implemented in the San Joaquin Valley by the California Environmental Protection Agency Central Valley Regional Water Quality Control Board implements.

37 SJVAPCD BACT Clearinghouse Guideline 6.4.9, Co-Composting Operation.
Conclusion

After careful evaluation of federal rules and regulations as well as prohibitory rules in other California areas, District staff concludes that District Rule 4566 satisfies RACT for ammonia emissions from greenwaste and foodwaste composting operations.

A.4  Biosolids, Animal Manure, and Poultry Litter Operations (District Rule 4565)

I. District Rule Description:

District Rule 4565, was adopted on March 15, 2007, to limit volatile organic compounds (VOC) emissions from facilities whose throughput consists entirely or in part of biosolids, animal manure, or poultry litter. District Rule 4565 applies to operations that landfill, land apply, compost, or co-compost these materials. In addition to limiting VOC emissions, District Rule 4565 also limits ammonia (NH3) emissions from these operations. The analysis below focuses on how District Rule 4565 limits NH3 emissions in comparison to other rules and regulations.

II. How does District Rule 4565 compare with federal rules and regulations?

A.  EPA-Control Technique Guidelines (CTG)

There is no EPA CTG guidance document for biosolids, animal manure, and/or poultry litter operations.

B.  EPA - Alternative Control Technology (ACT)

There is no EPA ACT guidance document for biosolids, animal manure, and/or poultry litter operations.

C.  Standards of Performance for New Stationary Sources (NSPS)

There is no NSPS guidance document for biosolids, animal manure, and/or poultry litter operations.

D.  National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technologies (MACTs)

There is no NESHAP guidance document for biosolids, animal manure, and/or poultry litter operations.

III. How does District Rule 4565 compare to rules in other air districts?

District staff compared District Rule 4565 with the rules for biosolids, animal manure, and poultry litter operations from other California air districts. The results of the analysis are discussed below. District staff only located one other air district rule that applied to
similar sources, South Coast Air Quality Management District (SCAQMD) Rule 1133.2. No other air district rules that applied to similar sources were found.

A. **South Coast Air Quality Management District (SCAQMD) Rule 1133.2 - Emission Reductions from Co-Composting Operations (Adopted January 10, 2003)**

SCAQMD adopted SCAQMD Rule 1133.2. This rule applies to new and existing co-composting operations in the SCAQMD.

Staff notes that there are some differences between District Rule 4565 and SCAQMD Rule 1133.2. This does not mean that one rule is more stringent than the other; rather the differences are due to the following factors:

1. Technology has changed significantly since SCAQMD Rule 1133.2 was adopted on January 10, 2003;
2. Additional research projects regarding mitigation measures have been completed since SCAQMD Rule 1133.2 was adopted; and
3. The socioeconomic climate of the SCAQMD is significantly different from that of the San Joaquin Valley Unified Air Pollution Control District.

The table below summarizes the significant differences between SCAQMD Rule 1133.2 and SJVAPCD Rule 4565. Below are the important differences between the two rules. For purposes of this analysis, the NH3 control efficiency for the requirements of SJVAPCD Rule 4565 are assumed to be the same as the VOC control efficiency for these requirements since the same measures will generally reduce both VOC and NH3 from these operations.
<table>
<thead>
<tr>
<th>Category</th>
<th>SCAQMD Rule 1133.2</th>
<th>SJVUAPCD Rule 4565</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facilities Other Than Co-Composting (Landfilling, Land Applying)</td>
<td>Rule does not apply to these operations</td>
<td>Management practice requirements</td>
<td>Knowledge of control options has increased since Rule 1133.2 adoption and staff believes that cost-effective methods of controlling VOC and NH3 emissions from these facilities exist.</td>
</tr>
<tr>
<td>Co-Composting Threshold for Applicability</td>
<td>Facilities with at least 1,000 tpy throughput</td>
<td>Facilities that handle 100 tpy or more of biosolids, animal manure, or poultry litter</td>
<td>Staff believes that there are reasonable options that are not exceedingly costly for facilities with throughputs of ≥100 tpy that would not impose an undue burden on operators.</td>
</tr>
<tr>
<td>Composting Control Requirements</td>
<td>In-vessel composting with 70% control efficiency for VOC and NH3 for existing facilities and 80% control efficiency for VOC and NH3 for new facilities</td>
<td>Control efficiency of 10% - 80% for VOC (and NH3) depending on type of operation and facility throughput</td>
<td>Management practices (mitigation measures) are effective, reasonable, and have been achieved in practice for smaller facilities. In-vessel composting is not cost-effective for smaller or medium facilities and there are no known, unsubsidized facilities in the SCAQMD that would comply with such rule requirements.</td>
</tr>
</tbody>
</table>

It should also be noted that in practice, the facilities that are actually subject to SCAQMD Rule 1133.2 will have much larger throughputs than 1,000 ton per year throughput threshold given in the rule. SCAQMD Rule 1133.2 includes the following exemptions for existing co-composting operations with a design capacity of less than 35,000 tons of throughput per year containing no more than 20 percent biosolids by volume and new and existing municipal facilities using aeration and processing less than 5,000 tons of biosolids or manure per year. In addition many operations in the SCAQMD have found it to be economical to transport these materials to other jurisdictions for processing. An example of this is the Synagro South Kern Compost Manufacturing Facility, which is a newer facility located in the San Joaquin Valley and processes biosolids transported from SCAQMD.

Because some mitigation measures are only cost-effective for larger facilities, SJVAPCD staff developed the concept of Class One and Class Two mitigation measures. Class One mitigation measures are cost-effective options for all facilities, regardless of size. These measures are management practices found to be best practices for all composting operations.

Class Two mitigation measures are the technology options and achieve reductions greater than Class One mitigation measures; however, they were determined to not be cost effective for facilities with throughputs of less than 100,000 wet tons per year.

SJVAPCD Rule 4565 requires reductions from two additional categories (landfilling and land applying) when compared to SCAQMD Rule 1133.2. For the third
category, composting, SJVAPCD staff determined it is not cost effective to require in-vessel (enclosed) composting.

B. No rules that apply to biosolids, animal manure, and/or poultry litter operations were located for the air districts listed below

- Amador County Air Pollution Control District (ACAPCD)
- Bay Area Air Quality Management District (BAAQMD)
- Eastern Kern County Air Pollution Control District (EKAPCD)
- El Dorado County Air Quality Management District
- Imperial County Air Pollution Control District (ICAPCD)
- Mojave Desert Air Quality Management District (MDAQMD)
- North Coast Unified Air Quality Management District (NCAQMD)
- Placer County Air Pollution Control District (PCAPCD)
- Sacramento Metropolitan Air Quality Management District (SMAQMD)
- San Diego County Air Pollution Control District (SDCAPCD)
- Ventura County Air Pollution Control District (VCAPCD)
- Yolo-Solano Air Quality Management District (YSAQMD)

C. Idaho Administrative Procedure Act (IDAPA) 02.04.14 – Rules Governing Dairy Waste

The Idaho State Department of Agriculture found that these rules were “necessary to protect the public health, safety, and welfare of Idaho, enhance Idaho water quality and preserve the integrity of the Idaho dairy industry.” The rules set standards for waste containment and storage and nutrient management for the protection of water quality.

It was determined that these rules are not relevant to the current analysis since they do not specifically limit air emissions and more stringent water quality requirements than these are already implemented in the San Joaquin Valley by the California Environmental Protection Agency Central Valley Regional Water Quality Control Board implements.

Conclusion

After careful evaluation of federal rules and regulations as well as prohibitory rules in other California areas, District staff concludes that District Rule 4565 satisfies RACT for biosolids, animal manure, and poultry litter operations.

A.5 Major Sources of Ammonia

The facilities listed below were identified as potential major sources of NH3 in the San Joaquin Valley Air basin. In all cases the NH3 emissions from the facilities were entirely
or primarily the direct result of the use of catalytic emission controls to reduce NOx emissions to acceptable levels as determined by regulatory agencies including, the US EPA, the California Air Resources Board, the San Joaquin Valley APCD, and, in one case the California Energy Commission (CEC). Because the San Joaquin Valley Air basin is primarily a rural NOx-limited area, NOx reductions are the most critical element of San Joaquin Valley plans to reach attainment with the federal ambient air quality standards for both PM2.5 and ozone. Therefore, controls that reduce NH3 while increasing NOx would increase the formation of PM2.5 and ozone in the San Joaquin Valley and would be detrimental to the goals of reaching attainment with the federal ambient air quality standards.

Facility Name: J.R. Simplot Company; District Facility #C-705
This facility produces fertilizers. The NH3 emissions from this facility are associated with the Nitric acid production plant at the facility. Although ammonia is used in the production of nitric acid, the vast majority of the ammonia introduced is consumed in the production of the nitric acid or recovered. The ammonia emissions from the nitric acid are the result of the use of a non-selective catalytic reduction (NSCR) system to reduce NOx emissions from the nitric acid plant. The tail gas from nitric acid plants contains large amounts of NOx and this plant uses NSCR to reduce NOx to comply with 40 CFR 60 Subpart G - Standards of Performance for Nitric Acid Plants and Federally-enforceable New and Modified Source Review (NSR) limits. The NSR permit for this facility includes conditions minimizing the allowable amount of NH3 slip with associated emissions testing. Because the NH3 emissions are the direct result of the use of NSCR, which is required to comply with Federal NSPS and NSR requirements, and reducing the amount of NH3 would increase NOx emissions, this facility is considered to satisfy RACT for NH3.

Facility Name: Covanta Delano Inc.; District Facility #S-75
This facility is biomass power plant. The NH3 emissions from this facility are the result of the use of NH3 injection for Selective Non-Catalytic Reduction (SNCR) to control NOx from two biomass-fired boilers at the facility. Use of the SNCR to reduce NOx is required by the EPA-issued Prevention of Significant Deterioration (PSD) Permit PSD ATC SJ 90-01 and Federally-enforceable NSR conditions and also required to comply with 40 CFR 60 Subpart Db—Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units. The NSR permits state, “Ammonia shall be injected into boiler at a rate, in pounds per ton of biomass fuel introduced into boiler, which results in compliance with the NOx emission limitation.” and Permit PSD ATC SJ 90-01 states “… A SNCR system utilizing ammonia injection shall be incorporated within the boilers. Ammonia shall be injected continuously during all periods of operation at a rate which results in compliance with the NOx emission limits.…” Because a perfect reaction cannot be achieved, some excess NH3 must be injected in the boiler stacks to reduce NOx to acceptable levels and this excess unreacted NH3 escapes the stack as slip. The facility incurs a cost for all of the NH3 injected into the boiler stacks, so there is an incentive to minimize NH3 slip to reduce costs associated with compliance with the NOx limits. In addition, the NSR permits for the biomass-fired boilers include conditions limiting the allowable amount of NH3 slip.
The NH3 emissions from the biomass boilers are the direct result of the use of SNCR, which is required by NSR conditions and the EPA-issued PSD Permit PSD ATC SJ 90-01 and required to comply with the requirements of Federal NSPS. The NSR permits for the biomass-fired boilers include conditions limiting the allowable amount of NH3 slip with associated emissions testing, and further reducing the amount of NH3 could potentially increase NOx emissions; therefore, this facility is considered to satisfy RACT for NH3.

Facility Name: Northern California Power; District Facility #N-2697
This facility is a natural gas power plant. The NH3 emissions from this facility are the result of the use of NH3 injection for Selective Catalytic Reduction (SCR) to control NOx from two natural gas-fired turbines at the facility. Use of the SCR to reduce NOx is required by Federally-enforceable NSR conditions and also required to comply with the Federally-enforceable requirements of District Rule 4703 – Stationary Gas Turbines, which is included in the SIP. Because a perfect reaction cannot be achieved, some excess NH3 must be injected to reduce NOx to acceptable levels. The excess unreacted NH3 escapes the stack as slip. The facility incurs a cost for all of the NH3 injected into the stacks, so there is an incentive to minimize NH3 slip to reduce costs associated with the compliance with the NOx limits. In addition, the NSR permits for the natural gas-fired turbines include conditions limiting the allowable amount of NH3 slip.

The NH3 emissions from the natural gas-fired turbines are the direct result of the use SCR, which is required by NSR conditions and required to comply with the Federally-enforceable requirements of District Rule 4703. The NSR permits for the natural gas-fired turbines include conditions limiting the allowable amount of NH3 slip and associated emissions testing, and further reducing the amount of NH3 could potentially increase NOx emissions; therefore, this facility is considered to satisfy RACT for NH3.