

**BEST AVAILABLE CONTROL  
MEASURES/TECHNOLOGY  
AND  
REASONABLY AVAILABLE CONTROL  
MEASURES/TECHNOLOGY  
DEMONSTRATION FOR SOURCES OF  
PM10 AND PM10 PRECURSORS IN THE  
SAN JOAQUIN VALLEY AIR BASIN**

**Prepared for the 2003 PM10 Plan**

**San Joaquin Valley  
Unified Air Pollution Control District**

**April 28, 2003**



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## **Best Available Control Measure and Best Available Control Technology Demonstration for the San Joaquin Valley**

### **I. Introduction**

This document constitutes the San Joaquin Valley Air Pollution Control District's (District) best available control measure (BACM) and best available control technology (BACT) demonstration. It is a compilation of analyses designed to document the District's selection of controls for the 2003 PM10 Plan and measures previously adopted to implement the District's 1994 Serious Area PM10 Plan and the 1997 PM10 Attainment Demonstration Plan (withdrawn). As a secondary function, this document also demonstrates that the District has implemented reasonably available control measures (RACM) fulfilling a requirement under the District's previous status as a moderate nonattainment area.

The Clean Air Act (CAA) requires areas designated as serious nonattainment for PM10 to implement Best Available Control Measure (BACM) and Best Available Control Technology (BACT) on all significant sources of PM10 or PM10 precursor emissions. EPA defines significant sources as those contributing more than  $5 \mu\text{g}/\text{m}^3$  to a violation of the 24-hour PM10 standard or  $1 \mu\text{g}/\text{m}^3$  to a violation of the annual PM10 standard. BACM/BACT is defined as the maximum degree of emission reduction considering technical and economic feasibility and environmental impacts of the control.

BACM/BACT must be implemented independent of attainment requirements. This means that BACM/BACT must be implemented even if it is not needed to attain the standards by the applicable attainment date since it would allow for an earlier attainment date. Although BACM/BACT requirements apply to PM10 precursors, in some cases reductions of one or more of the precursors are ineffective at reducing ambient pollution levels. Pursuing ineffective measures would be an obvious waste of resources that would detract from the attainment strategy. Therefore, BACM/BACT is not required for those precursors.

The history of the District's PM10 control strategy is important for understanding the need for this current BACM/BACT demonstration. The District's previous plan submittals provided limited documentation of the measure selection process. This lack of information prevented EPA from concluding that the measures were BACM/BACT. EPA's actions published in the Federal Register regarding the District's failure to submit a PM10 Plan on schedule and partial approval and partial disapproval of Regulation VIII described this deficiency in some detail enabling the District to identify the appropriate corrective action. EPA identified the need for the District to justify the level of stringency selected for its measures when certain aspects of those measures were less stringent than those adopted in other serious nonattainment areas. The basic provisions of most of the measures are the same as adopted in other nonattainment areas. The differences in the measures are primarily in threshold levels and exemptions. The District's previous plan and rule submittals for directly emitted PM10 did not identify the

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differences in technical and economic feasibility applicable to this region that would justify the differences. This report provides the needed documentation.

Residential wood combustion is another special case. EPA partially approved and partially disapproved the District's Rule 4901. EPA identified three specific deficiencies needed to upgrade the rule to BACM. Although it is the District's understanding that correcting the deficiencies will result in EPA approval of Rule 4901 as BACM, additional analysis has been completed to provide adequate documentation.

### **BACM Demonstration Steps**

EPA guidance recommends the following procedure for demonstrating the BACM has been implemented on all significant sources:

- Inventory sources of PM<sub>10</sub> and PM<sub>10</sub> precursors
- Determine a de minimis level for each pollutant
- Identify significant source categories
- Identify candidate control measures/technologies
- Evaluate alternative control technologies for:
  - Technical feasibility analysis
  - Economic feasibility analysis
  - Environmental impacts
- Select and implement measures

EPA guidance recommends several sources of information to identify feasible controls for each source of emissions. Perhaps the most important source is a direct comparison with measures adopted by other air pollution control agencies in areas with similar PM<sub>10</sub> problems and nonattainment status. The District is not required to adopt a measure just because it was adopted in another region, but it must provide the reasoning for rejecting measures. However, if a measure has been successfully implemented in another area it is considered feasible unless there are local conditions that impact feasibility.

The District prepared and contracted to prepare comparative analyses to identify feasible measures and technical and economic feasibility analyses of candidate BACM and BACT. The results of this work are provided in the following sections. Based on the comparative analysis and analysis of technical and economic feasibility, the District made conclusions regarding BACM. When the District's rule or level of control meets the BACM/BACT definition, no further analysis was required. When a rule or control from another area or from EPA guidance was identified that was more stringent, the District and its consultants analyzed the measure for technical and economic feasibility based on San Joaquin Valley conditions. Measures that were found to be feasible, have been added to the 2003 PM<sub>10</sub> Plan as rule commitments.

### **RACM/RACT Requirements**

The District's 1991 Moderate Area PM10 Attainment Plan contained commitments to implement RACM. The EPA never acted to approve or disapprove the 1991 Plan, but it has acted on the rules and regulations submitted by the District to implement the 1991 Plan, the 1994 Serious Area Plan, and the 1997 PM10 Attainment Demonstration Plan. When the District was reclassified to serious nonattainment in 1993, it was required to implement the more stringent BACM within four years. After submittal of the 1994 Serious Area Plan, the District began amending the RACM rules and added several new rules to meet BACM. In 2001 and 2002, EPA completed its review of District PM10 rules that were submitted as early as 1993 and the new and amended rules.

In August of 2002, Earth Justice, on behalf of Medical Advocates for Healthy Air, Latino Issues Forum, and the Sierra Club, notified the EPA of their intent to file a lawsuit against the EPA insisting that a Moderate Area Federal Implementation Plan (FIP) containing RACM go forward in the San Joaquin Valley to be followed by a BACM FIP. Since the District was in the midst of preparing a BACM analysis for the 2003 PM10 Plan, it was the District's belief that the results of the more stringent BACM analysis would satisfy any RACM requirements for sources, hence, rendering an actual RACM analysis unnecessary. However, rule development to upgrade rules that are found to need increased stringency would take nine to twelve months to complete even with expedited timelines. Therefore, as an interim measure to eliminate the EPA's need to implement a RACM FIP, the District is including a RACM demonstration with this PM10 Plan.

### II. Determining PM10 De Minimis Levels

This analysis was prepared by Mel Zeldin as a consultant under contract with the San Joaquin Valley Air Pollution Control District.

#### Purpose

For purposes of implementing PM10 BACM (for certain area sources) and BACT on stationary sources contributing directly or through precursor emissions, EPA has established de minimis (DM) criteria for source categories contributing to PM10. Specifically, EPA has established a source category contribution level of 1 ug/m<sup>3</sup> based on the annual average PM10 national ambient air quality standard (NAAQS) and 5 ug/m<sup>3</sup> based on the 24-hour PM10 NAAQS. Should any source category contribute more than these levels to measured ambient PM10 concentrations in a serious non-attainment area, then BACM and BACT are required to be implemented.\*

The purpose of this report is to determine the DM conditions, on an emission per ug/m<sup>3</sup> basis, for sources of PM10 or PM10 precursors in the San Joaquin Valley. Such determinations are made separately for directly emitted PM10; oxides of nitrogen (NOx) emissions which lead to PM10 nitrate; volatile organic compounds (VOC) which lead to the formation of organic carbon particulates; and oxides of sulfur (SOx) emissions which lead to PM10 sulfate. Once the DM levels are determined, then any source category which exceeds those limits would be subject to BACM/BACT. The BACM/BACT requirement does not apply to mobile sources of emissions.

#### Process

To determine DM levels, two main pieces of data are needed: emissions and ambient air quality. However, since there are two standards, annual and 24-hour, it is necessary to utilize appropriate data relative to each standard, and calculate two separate DM levels. Whichever DM level is more restrictive is the appropriate DM level for determining BACM/BACT applicability. For example, if it is shown that the annual DM for directly emitted PM10 is 3 tons per ug/m<sup>3</sup> and the 24-hour DM level is 4 tons per u/m<sup>3</sup>, then the more restrictive value of 3 tons per ug/m<sup>3</sup> would be the determinant for BACM/BACT applicability.

In calculating the DM conditions, it is important to most accurately reflect the relevant ambient and emissions inventory. For the annual standard, the annual average daily emissions must be matched against the annual average daily PM10 measurements. For the 24-hour standard, the worst-case 24-hour ambient measurements during the period of record are most appropriately matched against the seasonal quarter emissions inventory representing the period of the year when the worst-case ambient conditions occurred. In determining worst-case ambient conditions, it is most appropriate to

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\* State Implementation Plans for Serious PM-10 Non-Attainment Areas, and Attainment Date Waivers for PM-10 Non-Attainment Areas Generally; Addendum to the General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990, Federal Register, Vol. 59, No. 157, August 16, 1994.

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specifically examine the worst-case condition for each component of PM10 separately, e.g., when the highest nitrate was observed; when the highest sulfate was observed, and so on, even though these are not from the same worst-cast PM10 day. This approach is to assure that we are capturing the worst possible conditions measured for each component, under the conservative assumption that had all these worst-case conditions occurred on the same day, then the measured PM10 levels would have been much higher than the highest measured level. In essence, this approach determines a DM level for each contributing component of PM10 based on the *potential* for a worst-case PM10 day, which is greater than the actually measured highest 24-hour PM10 concentration.

Another consideration is to more accurately match the emissions and ambient data on a spatial basis. While the DM levels can arguably be determined based on the Valley-wide emissions inventories against the highest PM10 levels measured in the Valley, the fact that the worst PM10 conditions occur under more stagnant conditions suggests that a match between county-level emissions and PM10 measurements at the highest PM10 measured site within the same county is a more appropriate approach. In other words, more localized emissions are more important in determining local PM10 levels than are emissions from distant sources. This approach also assures (that since county-level emissions are much lower than Valley-wide emissions) that the DM levels will be more stringent than DM levels determined on a Valley-wide basis.

There are some key assumptions which are an integral part of the DM determinations. Foremost is the assumption that emissions are linearly proportional to the resultant concentrations. In other words, a 20% change in SOx emissions corresponds to a 20% change in PM10 sulfate. This assumption applies equally to all components, and is generally similar to the approaches used in the speciated linear rollback analyses. This assumption applies equally to all PM10 components, and is a similar assumption used in linear rollback attainment demonstration processes. Secondly, it is assumed, as mentioned in the previous paragraph, that all emissions in the county are responsible for the observed PM10 levels at the worst site in that county. While this assumption may be the dominant condition in counties with higher emissions, such as Kern County, it will be a very conservative assumption for counties with lower emissions, but higher ambient levels, such as Kings County, where the regional nature of PM10 secondaries may be more pronounced. Thirdly, it is assumed that DM levels for ammonia are not necessary, and likely cannot be determined with any confidence using this approach. The formation of ammonium nitrate and ammonium sulfate is generally NOx and SOx limited, respectively, based on recent scientific assessments. Accordingly, reductions in nitrate and sulfate will benefit from NOx and SOx reductions to a much greater degree than from ammonia reductions. It follows, then, that linear applicability to ammonia emissions versus ammonium nitrate and sulfate is a poor assumption, and such estimates would essentially be meaningless.

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### Data

#### Air Quality Data

For purposes of determining specific DM levels, speciated PM10 data are necessary. Total PM10 mass and speciated data were collected as part of the CRPAQS program, as well as the routine PM10 network. Available data during the period 1997-2001 were used. *For each site* within the Valley with speciated data, the following information was compiled:

- (a) annual average PM10 mass (and year of occurrence)
- (b) annual average nitrate (and year of occurrence)
- (c) annual average sulfate (and year of occurrence)
- (d) annual average total carbon (and year of occurrence)
- (e) annual average geologic component (and year of occurrence)
- (f) highest 24-hour PM10 mass (and date of occurrence)
- (g) highest 24-hour nitrate (and date of occurrence)
- (h) highest 24-hour sulfate (and date of occurrence)
- (i) highest 24-hour total carbon, if available (and date of occurrence)
- (j) highest 24-hour geologic concentration (and date of occurrence)

The results are shown in Tables 1 and 2.

| <b>Table G-1.<br/>Annual PM10 Maxima and Year of Occurrence<br/>(ug/m<sup>3</sup>)</b> |                  |                     |                     |                     |                   |
|--|------------------|---------------------|---------------------|---------------------|-------------------|
| <b>County</b>  | <b>Mass (Yr)</b> | <b>Nitrate (Yr)</b> | <b>Sulfate (Yr)</b> | <b>Total C (Yr)</b> | <b>Geol. (Yr)</b> |
| San Joaquin  | 36.4 (1999)      | 5.7 (2001)          | 2.4 (1999)          | 6.5 (1998)          | 12.4 (1999)       |
| Stanislaus   | 40.3 (1999)      | *                   | *                   | *                   | *                 |
| Merced   | 47.5 (2001)      | *                   | *                   | *                   | *                 |
| Fresno   | 52.1 (2001)      | 7.9 (2001)          | 2.6 (1999)          | 9.7 (1998)          | 15.0 (1999)       |
| Kings  | 56.5 (2001)      | 9.8 (2001)          | 2.9 (1999)          | *                   | 20.6 (1997)       |
| Tulare   | 54.5 (1999)      | 9.4 (2001)          | 3.0 (1999)          | *                   | 19.2 (1998)       |
| Madera   | *                | *                   | *                   | *                   | *                 |
| Kern   | 61.1 (2001)      | 13.2 (2001)         | 3.4 (1999)          | 9.9 (2001)          | 17.7 (1997)       |
| * insufficient data  |                  |                     |                     |                     |                   |

**Table G-2.  
24-Hour PM10 Maxima and Date of Occurrence  
(ug/m<sup>3</sup>)**

| County   | Mass (Day)   | Nitrate (Day) | Sulfate (Day) | Total C (Day) | Geol. (Day) |
|--|--------------|---------------|---------------|---------------|-------------|
| San Joaquin  | 150 (102199) | 70 (010701)   | 6 (100399)    | 26 (122598)   | 76 (101599) |
| Stanislaus   | 158 (010701) | 81 (010701)   | 10 (010399)   | 45 (012201)   | 75 (101599) |
| Merced   | 134 (122099) | *             | *             | *             | *           |
| Fresno   | 193 (010101) | 72 (010101)   | 9 (061400)    | 52 (010401)   | 66 (091200) |
| Kings  | 199 (110697) | 98 (010701)   | 9 (061400)    | 35 (122399)   | 95 (110697) |
| Tulare   | 160 (123198) | 79 (123198)   | 11 (061400)   | 37 (011000)   | 67 (091200) |
| Madera   | *            | *             | *             | *             | *           |
| Kern   | 207 (010401) | 98 (010400)   | 8 (120500)    | 39 (122900)   | 91 (091200) |
| * insufficient data (Note: day given in mmddyy format) |              |               |               |               |             |

Emissions Data

The 1999 emissions inventory is the base year inventory for the PM10 SIP, and accordingly, this inventory is utilized for the DM determinations. Table 3 shows the annual average daily emissions for each of the key pollutants, by county.

**Table G-3.  
Annual Average Daily Emissions by County  
(tons/day)**

| County      | NOX   | SOx  | ROG   | PM10 |
|-------------|-------|------|-------|------|
| San Joaquin | 92.1  | 4.8  | 64.8  | 36.6 |
| Stanislaus  | 60.3  | 3.3  | 72.3  | 35.6 |
| Merced      | 39.5  | 1.2  | 39.0  | 38.1 |
| Fresno      | 123.2 | 8.8  | 99.3  | 88.3 |
| Kings       | 24.8  | 0.9  | 22.8  | 31.1 |
| Tulare      | 61.0  | 1.4  | 73.2  | 62.4 |
| Madera      | 30.4  | 1.0  | 21.4  | 20.3 |
| Kern        | 162.4 | 11.6 | 111.7 | 53.7 |

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Table G-4 shows the seasonal emissions for summer and winter periods.

| <b>Table G-4.<br/>Annual Average Seasonal Emissions by County:<br/>Summer/Winter Emissions<br/>(tons/day)</b> |             |            |             |             |
|---|-------------|------------|-------------|-------------|
| <b>County</b>   | <b>NOX</b>  | <b>SOx</b> | <b>ROG</b>  | <b>PM10</b> |
| San Joaquin   | 94.6/ 90.3  | 4.6/ 4.5   | 62.2/ 59.7  | 43.9/ 35.4  |
| Stanislaus  | 58.1/ 59.1  | 3.1/ 3.1   | 67.3/ 67.2  | 46.2/ 30.6  |
| Merced  | 40.2/ 39.9  | 1.1/ 1.1   | 37.0/ 37.4  | 45.1/ 31.5  |
| Fresno  | 120.3/117.8 | 9.0/ 7.9   | 89.5/ 91.0  | 93.5/ 81.2  |
| Kings   | 25.8/ 25.3  | 0.9/ 0.8   | 21.5/ 19.8  | 29.3/ 33.4  |
| Tulare  | 56.8/ 53.8  | 1.3/ 1.0   | 69.3/ 56.1  | 73.2/ 45.3  |
| Madera  | 30.9/ 30.3  | 1.1/ 0.8   | 18.0/ 19.3  | 23.3/ 18.2  |
| Kern  | 150.2/170.9 | 11.2/11.1  | 104.0/102.9 | 55.1/ 48.4  |

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### Calculation of Annual DM Levels

From the information presented in Tables 1 and 3, DM values can be calculated for each pollutant and county for which ambient data exists. The following additional assumptions are made:

- (1) All observed nitrate levels are caused by NO<sub>x</sub> emissions;
- (2) All observed sulfate levels are caused by SO<sub>x</sub> emissions;
- (3) All the total carbon (TC) measurements exist as organic carbon, and are caused by ROG emissions. (Since TC includes both organic and elemental carbon, the assumption that all TC exists as organic carbon is a highly conservative assumption);
- (4) All the non-geological material is primary emitted PM<sub>10</sub>, and is determined by taking the highest measured mass value and subtracting the highest measured geologic component. (Because there is no direct measurement of primary emitted PM<sub>10</sub>, again, a highly conservative approach is taken, by assuming that there are no secondaries [nitrate, sulfate, TC] in the sample, and that anything other than geologic is due to primary PM<sub>10</sub> emissions.)

By making conservative assumptions, and by taking worst-case ambient data, the estimates of DM levels are going to be more stringent than actually exists. However, since direct measurements of DM levels are not possible, this approach errs substantially on the side of greater stringency. The calculation of the DM levels is simply made by dividing the emissions by the matching ambient levels identified in Table G-1 to obtain an emissions rate per microgram per cubic meter (e.g., tons of NO<sub>x</sub> emissions per microgram per cubic meter of ambient nitrate). The results are shown in Table G-5.

| County      | NO <sub>x</sub> | SO <sub>x</sub> | ROG  | PM <sub>10</sub> |
|-------------|-----------------|-----------------|------|------------------|
| San Joaquin | 16.2            | 2.0             | 10.0 | 1.5              |
| Stanislaus  | *               | *               | *    | *                |
| Merced      | *               | *               | *    | *                |
| Fresno      | 15.6            | 3.4             | 10.2 | 2.4              |
| Kings       | 2.5             | 0.3             | *    | 0.9              |
| Tulare      | 6.5             | 0.5             | *    | 1.8              |
| Madera      | *               | *               | *    | *                |
| Kern        | 12.3            | 3.4             | 11.3 | 1.2              |

\*insufficient ambient data available.

**Calculation of 24-hr DM Levels**

A similar process is used for determining the 24-hour DM levels. Here, the maximum 24-hour value from Table 2 is paired with its seasonal emissions data, based on the date of the occurrence. Any date in the period November through April will be paired with the corresponding winter emissions data; any date during the May through October period will be paired with the corresponding summer emissions data. For each pair, the emissions are divided by the concentration to get an emissions rate per ug/m<sup>3</sup>. Once that value is determined, it is multiplied by 5 to correspond to the 24-hour DM level of 5 ug/m<sup>3</sup>, per EPA Guidance. The results are shown in Table G-6. The letter after the value indicates whether this is based on the winter (W) or summer (S) inventory.

| <b>Table G-6.<br/>Annual 24-Hour De Minimis Levels<br/>(tons per day/ 5 ug/m<sup>3</sup>)</b> |            |            |            |             |
|---|------------|------------|------------|-------------|
| <b>County</b>   | <b>NOX</b> | <b>SOx</b> | <b>ROG</b> | <b>PM10</b> |
| San Joaquin   | 6.5 (W)    | 3.8 (S)    | 11.4 (W)   | 3.0 (S)     |
| Stanislaus  | 3.6 (W)    | 1.6 (W)    | 7.5 (W)    | 1.8 (W)     |
| Merced  | *          | *          | *          | *           |
| Fresno  | 8.2 (W)    | 5.0 (S)    | 8.8 (W)    | 3.2 (W)     |
| Kings   | 1.3 (W)    | 0.5 (S)    | 2.8 (W)    | 1.6 (W)     |
| Tulare  | 3.4 (W)    | 0.6 (S)    | 7.6 (W)    | 2.4 (W)     |
| Madera  | *          | *          | *          | *           |
| Kern  | 8.7 (W)    | 6.9 (W)    | 13.2 (W)   | 2.3 (W)     |
| *insufficient ambient data available. W= winter inventory S=summer inventory                  |            |            |            |             |

**Analysis of DM Calculations**

In determining DM levels, it is important to assure that the calculations are reasonably demonstrative of the underlying assumptions which link emissions to observed air quality. One way of gaining insight into the reasonableness of the assumptions is to examine the ranges of DM's calculated on a county-by-county basis. If local, county emissions were primarily responsible for the observed ambient concentrations, there should be reasonable agreement among DMs by county. Comparative statistics are shown in Table G-7.

| <b>Table G-7.<br/>Ranges and Max/Min Ratios of<br/>County-by-County De Minimis Levels</b> |                   |                  |                   |                  |
|---|-------------------|------------------|-------------------|------------------|
| <b>Parameter</b>  | <b>NOX</b>        | <b>SOx</b>       | <b>ROG</b>        | <b>PM10</b>      |
| <b>Range of DM's</b>  | <b>1.3 - 16.2</b> | <b>0.3 - 6.9</b> | <b>2.8 - 13.2</b> | <b>0.9 - 3.2</b> |
| <b>Max/Min Ratio</b>  | <b>12.5</b>       | <b>23.0</b>      | <b>4.7</b>        | <b>3.6</b>       |

If the relationship between local emissions and local air quality were to be strong, then there should be consistency among counties, and the ranges and ratios should be small. If, on the other hand, regional factors affecting chemistry and transport of pollutants were dominant, the county-to-county comparisons would be more disparate. Looking at the results in Table G-7, it can be seen that local effects are most pronounced for PM10 (with the lowest ratio of only 3.6), and that ROG also demonstrates localized effects. By comparison, both NOx and SOx show much higher ratios, and are therefore more indicative of more regionalized influences. For NOx, although the ratio is high, the importance of nitrate as a key component of PM10 warrants a highly conservative approach for estimating DM levels, and for that reason, will be treated as a locally influenced by NOx emissions. For SOx, however, the high ratio (almost twice that for NOx), coupled with the fact that emissions and air quality levels are generally low, warrants a regional consideration.

**Identification of DM Levels**

For the purpose of establishing appropriate DM levels for each of the four key pollutants, localized effects are the approach used for NOx, ROG, and PM10 emissions. From Tables 5 and 6, the lowest value for each pollutant, regardless of the county, represents the DM for that pollutant as applicable to the entire San Joaquin Valley. For SOx, however, for the reasons cited above, the average of the ratios among all counties was used as the appropriate DM level. The results are given in Table G-8.

As can be seen from the results, the DM levels for NOx, ROG, and PM10 are driven by the values calculated for Kings County, where the occurrence of low emission levels coupled with ambient concentrations similar to those observed in other counties lead to

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low DM levels. This assures that the DM estimates for NO<sub>x</sub>, ROG, and PM<sub>10</sub> are conservative; that is, the actual DM conditions valley-wide will be greater than these. For NO<sub>x</sub>, the DM levels are highly conservative in the sense that the regional nature of the nitrate is being treated as a local influence. As indicated previously, it would be unreasonable to extrapolate that approach for SO<sub>x</sub> and resulting sulfate, and so the average of the county DM values were used for this pollutant only.

| <b>Table G-8.<br/>De Minimis Emission Levels for the San Joaquin Valley<br/>(tons per day)</b> |                       |                           |                     |                           |
|--|-----------------------|---------------------------|---------------------|---------------------------|
|  | <b>NO<sub>x</sub></b> | <b>SO<sub>x</sub></b>     | <b>ROG</b>          | <b>PM<sub>10</sub></b>    |
| Based on:<br>(County- Std)   | 1.3<br>(Kings–24 hr)  | 2.5<br>(Regional<br>Avg.) | 2.8<br>(Kings-24hr) | 0.9<br>(Kings-<br>Annual) |

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### III. List of Significant and De Minimis Source Categories

Based on the de minimis levels set in the previous section, the District examined the emission inventory to identify significant source categories that require further analysis. Table G-9 lists the emissions of VOC, NOx, SOx, and PM10 for each source category. Source categories that have a source specific rule already adopted by the District provide the rule number.

| <b>Source Category</b>                         | <b>VOC</b> | <b>NOX</b> | <b>SOX</b> | <b>PM10</b> |
|--|------------|------------|------------|-------------|
| 4103-Open Burning                              | 10.3       | 4.6        | 0.1        | 11.4        |
| 4106-Prescribed Burning                        | 16.5       | 0.0        | 0.0        | 28.9        |
| 8021-Earthmoving                               | 0.0        | 0.0        | 0.0        | 12.9        |
| 8051-Open Areas                                | 0.0        | 0.0        | 0.0        | 3.1         |
| 8061-Paved and Unpaved Roads                   | 0.0        | 0.0        | 0.0        | 66.8        |
| 8081-Unpaved Road Travel Dust-<br>Farm Roads   | 0.0        | 0.0        | 0.0        | 11.0        |
| Tilling Dust                                   | 0.0        | 0.0        | 0.0        | 36.4        |
| Harvest Operations                             | 0.0        | 0.0        | 0.0        | 36.8        |
| Windblown Dust                                 | 0.0        | 0.0        | 0.0        | 6.6         |
| Dust From Agricultural Lands (Non-<br>Pasture) | 0.0        | 0.0        | 0.0        | 41.4        |
| Cattle Feedlot Dust                            | 0.0        | 0.0        | 0.0        | 7.0         |
| Livestock Wastes                               | 57.1       | 0.0        | 0.0        | 0.0         |
| 4901-Res. Wood Comb.                           | 6.0        | 1.2        | 0.2        | 11.3        |
| 4902-Res. Water Heaters                        | 0.0        | 1.6        | 0.0        | 0.0         |
| 4403-Components at Oil and Gas<br>Facilities.  | 10.4       | 0.0        | 0.0        | 0.0         |
| 4601-Architectural Coatings                    | 11.8       | 0.0        | 0.0        | 0.0         |
| 4661-Organic Solvents                          | 7.6        | 0.0        | 0.0        | 0.0         |
| 4662-Degreasing                                | 11.3       | 0.0        | 0.0        | 0.0         |
| 4692-Charbroiling                              | 0.4        | 0.0        | 0.0        | 1.3         |
| 4701-IC Engines                                | 4.9        | 47.0       | 1.3        | 0.5         |
| 4703-Stationary Gas Turbines                   | 0.2        | 10.2       | 0.1        | 0.8         |
| Ag Crop Processing Losses                      | 0.2        | 3.1        | 0.5        | 4.4         |
| Ag Pesticides                                  | 28.1       | 0.0        | 0.0        | 0.0         |
| Ag Products Processing Losses                  | 1.4        | 6.2        | 0.0        | 0.5         |
| Ag. Irrigation I.C. Engines                    | 1.4        | 17.4       | 1.7        | 1.2         |
| Ind. Equip                                     | 0.5        | 3.6        | 0.0        | 0.1         |
| Consumer Products                              | 24.0       | 0.0        | 0.0        | 0.0         |
| Fuel Combustion - Space Heating                | 0.1        | 2.7        | 0.1        | 0.2         |
| Gasoline Cans                                  | 7.7        | 0.0        | 0.0        | 0.0         |
| 4305-Boilers, Steam Gen & Proc.<br>Htrs.       | 0.6        | 10.112.9   | 6.99.0     | 1.41.9      |

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| <b>Table G-9.<br/>Significant Source Categories of PM10 and PM10 Precursors (1999<br/>emissions in tons/day)</b> |            |            |            |             |
|--|------------|------------|------------|-------------|
| <b>Source Category</b>   | <b>VOC</b> | <b>NOX</b> | <b>SOX</b> | <b>PM10</b> |
| 4352-Solid Fueled Boilers, SG & Proc. Htrs   | 0.1        | 3.5        | 1.6        | 0.3         |
| 4354-Glass Melting Furnaces  | 0.2        | 12.3       | 4.0        | 0.6         |
| 4401-Steam Enhanced Oil Well Vents   | 14.0       | 0.0        | 0.0        | 0.0         |
| Oil Drilling And Workover  | 0.7        | 10.8       | 0.0        | 0.4         |
| Other Manu & Ind Fuel Comb   | 0.1        | 24.3       | 5.2        | 0.5         |
| Other Mineral Processes  | 0.1        | 1.2        | 0.8        | 0.6         |
| Other Srvc & Comm Fuel Comb  | 2.5        | 25.7       | 0.8        | 1.0         |
| Plastics And Plastic   | 0.6        | 0.0        | 0.0        | 1.5         |
| Timber And Brush Fires   | 1.3        | 1.8        | 0.0        | 7.5         |
| Cotton Gins  | 0.0        | 0.0        | 0.0        | 2.7         |
| Wineries   | 7.0        | 0.0        | 0.0        | 0.0         |
| <b>Mobile Sources - BACM not Required</b>  |            |            |            |             |
| Aircraft   | 11.0       | 3.3        | 0.4        | 0.3         |
| HHD Diesel Trucks  | 4.1        | 86.0       | 2.2        | 2.3         |
| LD Passenger   | 52.4       | 47.2       | 0.5        | 1.4         |
| LD Trucks  | 44.1       | 53.6       | 0.3        | 1.2         |
| Lt Comm Equip  | 1.9        | 3.2        | 0.0        | 0.2         |
| Lt HD Diesel Trucks  | 0.2        | 3.4        | 0.1        | 0.0         |
| Lt HD Gas Trucks   | 8.3        | 3.7        | 0.0        | 0.0         |
| MD Trucks  | 7.4        | 11.8       | 0.2        | 0.6         |
| Med HD Diesel Trucks   | 0.7        | 18.0       | 0.6        | 0.6         |
| Med HD Gas Trucks  | 5.7        | 3.0        | 0.0        | 0.0         |
| Mobile Construction. & Mining Equip  | 3.7        | 32.7       | 0.0        | 2.0         |
| Ag Equip – Tractors, Harvestors, etc.  | 16.8       | 66.2       | 0.0        | 4.2         |
| Rec. Boats   | 12.2       | 2.2        | 0.0        | 0.5         |
| Trains   | 0.9        | 19.9       | 0.3        | 0.4         |
| Trans. Refrigeration Units   | 0.6        | 3.2        | 0.0        | 0.3         |
| School Buses   | 0.0        | 2.0        | 0.0        | 0.0         |
| Motor Homes  | 0.0        | 2.1        | 0.0        | 0.0         |
| Off-Road Recreational Vehicles   | 4.8        | 0.0        | 0.0        | 0.0         |
| HHD Gas Trucks   | 3.6        | 5.5        | 0.0        | 0.0         |
| Industrial Equipment   | 0.0        | 3.6        | 0.0        | 0.0         |
| Lawn and Garden Equipment  | 5.5        | 0.0        | 0.0        | 0.0         |
| Lt. Commercial Equipment   | 0.0        | 3.2        | 0.0        | 0.0         |
| HDD Urban Buses  | 0.0        | 3.6        | 0.0        | 0.0         |
| Total = 64   |            |            |            |             |

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Table G-10 lists de minimis source categories. Note that many source categories, although de minimis already have rules in place. Most of these rules were adopted as part of the District's ozone control strategy, and in many cases are among the most stringent in the nation.

**Table G-10.  
De Minimis Source Categories of PM10 and PM10 Precursors  
(1999 emissions in tons/day)**

| <b>Source Category</b>  | <b>VOC</b> | <b>NOx</b> | <b>SOx</b> | <b>PM10</b> |
|---|------------|------------|------------|-------------|
| 4104-Reduction of Animal Matter   | 0.03       | 0.00       | 0.02       | 0.03        |
| 4402-Crude Oil Production Sumps   | 0.44       | 0.00       | 0.00       | 0.00        |
| 4404-Components Serving Lt Crude Oil or Gases at Lt Crude Oil and Gases Prod Facilities & Components at Nat Gas Processing Facilities | 0.27       | 0.00       | 0.00       | 0.00        |
| 4451- Valves, Pressure Relief Valves, Flanges, Threaded Connections And Process Drains at Petroleum Refineries and Chemical Plants    | 0.37       | 0.00       | 0.00       | 0.00        |
| 4452-Pump and Compressor Seals at Petroleum Refineries and Chemical Plants  | 0.1        | 0.00       | 0.00       | 0.00        |
| 4602-Motor Vehicle and Mobile Equipment Refinishing Operations  | 1.43       | 0.00       | 0.00       | 0.00        |
| 4603-Surface Coating of Metal Parts And Products  | 1.47       | -          | -          | -           |
| 4605-Aerospace Assembly and Component Manufacturing Operations  | 0.00       | 0.00       | 0.00       | 0.00        |
| 4606-Wood Products Coating Operations   | 1.02       | 0.00       | 0.00       | -           |
| 4607-Graphic Arts   | 1.52       | 0.00       | 0.00       | 0.04        |
| 4621-Gasoline Transfer Into Stationary Storage Containers, Delivery Vessels and Bulk Plants   | 2.38       | 0.02       | 0.00       | 0.00        |
| 4622-Gasoline Transfer Into Motor Vehicle Fuel Tanks  | 2.03       | 0.00       | -          | -           |
| 4624-Organic Liquid Loading   | 0.06       | 0.00       | 0.00       | 0.00        |
| 4625- Wastewater Separators   | 0.16       | 0.00       | 0.00       | 0.00        |
| 4641-Cutback, Slow Cure, & Emulsified Asphalt, Paving & Maintenance Operations  | 1.13       | 0.00       | 0.00       | 0.00        |
| 4651-VOC Soil Decontamination   | 0.01       | 0.00       | 0.00       | -           |
| 4653-Adhesives  | 0.73       | 0.00       | 0.00       | 0.00        |
| 4663-Organic Solvent Cleaning, Storage And Disposal   | 1.08       | -          | -          | 0.00        |
| 4672-Petroleum Solvent Dry Cleaning Operations  | 0.05       | 0.00       | 0.00       | 0.00        |
| 4681-Rubber Tire Manufacturing  | 0.04       | 0.00       | 0.00       | 0.00        |

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**Table G-10.  
De Minimis Source Categories of PM10 and PM10 Precursors  
(1999 emissions in tons/day)**

| <b>Source Category</b>   | <b>VOC</b> | <b>NOx</b> | <b>SOx</b> | <b>PM10</b> |
|--|------------|------------|------------|-------------|
| 4682-Polystyrene Foam, Polystyrene,<br>And Polypropylene Manufacturing | 0.25       | 0.00       | 0.00       | 0.01        |
| 4684-Polyester Resin Operations  | 0.52       | 0.01       | 0.00       | 0.04        |
| 4691-Vegetable Oil Processing<br>Operations                            | 0.00       | 0.00       | 0.00       | 0.01        |
| 4693-Bakery Ovens  | 0.80       | 0.00       | 0.00       | 0.00        |
| 7021-Ethylene Oxide - Sterilizers &<br>Aerators                        | 0.00       | 0.00       | 0.00       | 0.00        |
| Aerosol Coatings   | 1.96       | 0.00       | 0.00       | 0.00        |
| Asphalt Roofing Operations   | 1.07       | 0.00       | 0.00       | 0.00        |
| Asphaltic Concrete Production  | 0.11       | 0.19       | 0.36       | 0.50        |
| Cargo Tanks - Pressure Related<br>Fugitive Losses                      | 0.90       | 0.00       | 0.00       | 0.00        |
| Cargo Tanks - Product Hose Fugitive<br>Losses                          | 0.20       | 0.00       | 0.00       | 0.00        |
| Cement Concrete Manufacturing And<br>Fabrication                       | 0.00       | 0.00       | 0.00       | 0.78        |
| Deep Fat Frying  | 0.00       | 0.00       | 0.00       | 0.64        |
| Fuel Combustion - Cooking  | 0.00       | 0.20       | 0.00       | 0.00        |
| Fugitive Losses - Well Cellars   | 0.13       | 0.00       | 0.00       | 0.00        |
| Gas Urban Buses  | 0.30       | 0.70       | 0.00       | 0.00        |
| Grass And Woodland Fires   | 0.60       | 0.00       | 0.00       | 0.80        |
| Logging Equip  | 0.24       | 0.69       | 0.00       | 0.05        |
| Military Tactical Support Equipment                                    | 0.01       | 0.08       | 0.00       | 0.00        |
| Motorcycles  | 2.41       | 0.39       | -          | 0.02        |
| Natural Gas Transmission Losses  | 0.08       | 0.00       | 0.00       | 0.00        |
| Other Chemical Processes   | 0.10       | 0.00       | 0.00       | 0.00        |
| Other Cogen  | 0.10       | 0.10       | 0.10       | 0.00        |
| Other Food & Ag Fuel Comb  | 0.50       | 0.00       | 0.10       | 0.10        |
| Other Res Fuel Combustion  | 0.00       | 1.10       | 0.00       | 0.00        |
| Other Wood & Paper Processes   | 0.00       | 0.00       | 0.00       | 0.10        |
| Pet Seeps  | 0.30       | 0.00       | 0.00       | 0.00        |
| Road Oils  | 0.10       | 0.00       | 0.00       | 0.00        |
| Rubber And Rubber Products<br>Manufacturing                            | 0.23       | 0.00       | 0.00       | 0.00        |
| Secondary Metal Production   | 0.14       | 0.00       | -          | 0.02        |
| Structural Pesticides  | 0.36       | 0.00       | 0.00       | 0.00        |
| Wine Fermentation  | 1.00       | 0.00       | 0.00       | 0.00        |

### **IV. PM10 Rules Approved by EPA as BACM**

EPA has taken action to approve two District rules applying to significant PM10 sources. The source categories are open burning, and prescribed and hazard reduction burning.

#### **Open Burning**

Open burning includes all burning activities except for prescribed burning and hazard reduction burning. The largest activity included in this source category is agricultural burning. The District adopted Rule 4103 – Open Burning on June 18, 1992 and subsequently amended the rule on December 17, 1992, December 16, 1993, and June 21, 2001.

On July 26, 2000, EPA finalized its limited approval and limited disapproval of the version of Rule 4103 adopted on December 16, 1993 (FR Vol. 65, No. 144, July 26, 2000, page 4591). The District corrected deficiencies related to the limited disapproval as RACM and BACM in its June 21, 2001 version of Rule 4103.

On February 27, 2002 EPA took direct final action effective April 29, 2002 to approve Rule 4103 (FR February 27, 2002, page 8894). EPA stated that the rule fulfilled policy and guidance for BACM/BACT. Based on this approval this source category has demonstrated that BACM has been implemented.

#### **Prescribed Burning and Hazard Reduction Burning**

This source category covers burning to improve forest and rangeland health and to reduce hazards from wildfires. This source category was previously covered by Rule 4103. The District created a separate rule (Rule 4106 – Prescribed Burning and Hazard Reduction Burning) in order to meet the specific needs of the agencies and individuals engaged in this activity.

Since Rule 4103 previously covered this source category, EPA's July 26, 2000 limited approval and limited disapproval also affected prescribed burning and hazard reduction burning. Deficiencies identified by EPA for this source category were corrected in Rule 4106.

On February 27, 2002 EPA took direct final action effective April 29, 2002 to approve Rule 4106 (FR February 27, 2002, page 8894). EPA stated that the rule fulfilled policy and guidance for BACM/BACT. Based on this approval this source category has demonstrated that BACM has been implemented.

### V. BACM Demonstration for Fugitive Dust Source Categories

#### EPA Action on Regulation VIII

As part of its notice of proposed rule making process, EPA prepared a Technical Support Document (TSD) dated March 14, 2002 to support its review of Regulation VIII. An excerpt from this TSD is provided below.

On September 23, 1999, EPA proposed a limited approval and limited disapproval of six rules (8010, 8020, 8030, 8040, 8060 and 8070). 64 FR 51489. Together, these rules made up SJVUAPCD's Regulation VIII Fugitive PM10 Prohibitions. On March 8, 2000, EPA finalized its action, incorporating these rules into the federally approved California State Implementation Plan (SIP). 65 FR 12118. However, the rulemaking also identified several deficiencies including those related to the need for a Reasonably Available Control Measures (RACM) demonstration and Best Available Control Measures (BACM) demonstration. The rulemaking limited the RACM/BACM demonstration to source categories covered under the six rules, as opposed to the universe of sources in the San Joaquin PM-10 nonattainment area. Evaluation of the rules' exemptions under the rulemaking was limited to the extent that they impact emission reductions from these source categories. In response to EPA's rulemaking, the District proposed to sunset the Regulation VIII rules and replace them with new rules that address the same fugitive dust source categories. SJVUAPCD conducted three rounds of public workshops at its Fresno, Bakersfield, and Modesto offices between April 2000 and September 2001, and received approximately 100 comment letters. A public hearing was held on October 31, 2001 and continued on November 15, 2001, at which time the District Board adopted Rules 8011, 8021, 8031, 8041, 8051, 8061, 8071, and 8081.

Despite the recent conditional approval of Regulation VIII, Fugitive PM10 Prohibitions, and subsequent staying of both emission offset and highway funding sanctions by the EPA on April 1, 2002, the District must still achieve commitments to completely resolve the sanctions issue. The District must provide a RACM Demonstration of existing Regulation VIII within 12 months and upgrade to BACM with a BACM Demonstration within 18 months, respectively, of final EPA approval of Regulation VIII or the sanctions will be immediately imposed.

Areas of specific concern called-out by EPA include the following

- Rule 8081 unpaved road trip count thresholds;
- Rule 8071 and Rule 8081 unpaved vehicle/equipment traffic area trip count thresholds;
- Rule 8071 and Rule 8081 unpaved vehicle/equipment traffic area size threshold;
- Rule 8041 threshold for when trackout control devices must be employed;
- Rule 8041 trackout cleanup requirements as they apply to rural areas;
- Rule 8031 bulk materials thresholds;

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- Rule 8021 Dust Control Plan (DCP) requirement thresholds; and
- Other control measures for paved road PM-10 emissions, including stabilizing unpaved shoulders, frequent street sweeping and use of PM-10 efficient street sweepers, etc.

Timeline for Complying with Conditional Approval (RACM) and Limited Approval/Limited Disapproval (BACM) of Regulation VIII:

- On April 1, 2002, EPA stayed sanctions by publishing limited approval/limited disapproval of Regulation VIII
- The 60-day comment period closed June 1, 2002
- EPA conditionally approved Regulation VIII on April 1, 2003. The effective date is March 28, 2003. ;
- The 12-month “clock” starts for providing a RACM Demonstration by March 28, 2004 and the 18-month “clock” to receive EPA approval of Regulation VIII amendments by September 28, 2004;
- EPA encourages delivery of BACM Demonstration to supersede RACM Demonstration within 12-month timeframe (March 2004). The BACM Demonstration would set the groundwork for amending Regulation VIII;
- Failure to provide a RACM Demonstration within 12-month timeframe will result in automatic imposition of both sanctions and a FIP. Failure to provide a BACM Demonstration and receive EPA approval of Reg. VIII amendments within 18-month timeframe will result in automatic imposition of both sanctions and a FIP;

| <b>Source Category</b>         | <b>1999</b> | <b>2002</b> |
|--------------------------------|-------------|-------------|
| Construction and Demolition    | 12.1        | 21.6        |
| Paved Road Dust                | 46.2        | 63.2        |
| Unpaved Road Dust <sup>1</sup> | 34.6        | 35.8        |
| Fugitive Windblown Dust        | 51.13       | 49.6        |

<sup>1</sup> Emissions from this source category will be subject to Regulation VIII and Agricultural Conservation Management Practices Program requirements. The agricultural unpaved road emissions are being updated to reflect crop specific activity level and is expected to be substantially lower than currently stated.

### **Significant Source Determination for Regulation VIII Source Categories**

Based on the inventory provided in Table G-11, fugitive PM<sub>10</sub> from source categories subject to Regulation VIII exceed the de minimis threshold levels determined in Section II. BACM is required for these source categories.

### **Comparative Analysis to Identify Candidate BACM for Regulation VIII Source Categories**

The District staff worked with its consultant, Mel Zeldin to analyze fugitive dust control measures adopted in other areas of the country to identify candidate BACM measures to consider in the 2003 PM<sub>10</sub> Plan. The analysis examined adopted rules and regulations from these other areas in comparison with the current version of District Regulation VIII adopted in 2001. This information illustrates that each control program is different based on local conditions and needs. The analysis provides a starting point for determining whether each provision of Regulation VIII is currently BACM or if other provisions or controls are available that could improve the District' fugitive dust control strategy.

For purposes of evaluating the stringency of existing fugitive dust controls under existing Regulation VIII, it is important to look at other PM<sub>10</sub> Serious Non-Attainment areas which have submitted plans proposing the implementation of BACM. These key areas include Maricopa County (Phoenix area), Clark County (Las Vegas area), South Coast (Los Angeles Basin), and Coachella Valley (Palm Springs area). These locations are all in the west, and have significant impacts from fugitive dust emissions, and hence, BACM on fugitive dust sources are necessary and required.

For each of the key fugitive dust categories, comparisons are made between San Joaquin Valley's Regulation VIII and similar rules or statutes applicable to the other key areas. Approaches often have strong similarities, but subtle differences, such as applicability limits, or threshold limits have bearing on the stringency of the rules. There is no statutory requirement for this Plan to propose that each control measure be the most stringent adopted anywhere else, but the severity of the PM conditions in the San Joaquin Valley warrant strong considerations for measures that at least approach those having the greatest stringency for fugitive dust emission categories which have substantial impact on the overall emissions inventory. One exception of note is windblown fugitive dust. Other areas, such as Clark County and Coachella Valley, are subjected to frequent high wind events, and not surprisingly, are dominated by windblown emissions. On the other hand, the San Joaquin Valley has very few high wind events, and the most severe PM<sub>10</sub> episodes occur under stagnant conditions. Accordingly, stringent windblown dust control measures are not as necessary in the Valley as compared to the other wind-exposed areas. For each of the key source categories, controls implemented in the other key areas are given, along with the citations to the appropriate rule, statute, or referenced guidance. At the end of each segment, a discussion is provided which highlights the area or areas that have implemented the most stringent controls. Where differing approaches toward controls

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are used, the discussion attempts to assess the most effective methods a give a basis for that judgment. From this analysis, a foundation is set for recommended changes to the existing Regulation VIII which would meet BACM limits."

**Table G-12.  
Regulation VIII Source Categories**

| CATEGORY                   | SUB-CATEGORY                     |
|----------------------------|----------------------------------|
| General                    | Visible Dust Emissions           |
| Construction               | Demolition                       |
| Construction               | Pre-Earthmoving                  |
| Construction               | Earthmoving                      |
| General                    | Dust Plan Applicability          |
| General                    | Dust Plan Requirements           |
| Disturbed Land             | Definition of Stabilized Surface |
| Construction               | Inactive Disturbed Land          |
| Bulk Materials             | Handling/Storage                 |
| Bulk Materials             | Transport                        |
| Bulk Materials             | Outdoor Chute/Conveyor           |
| Carryout/Trackout          | Removal                          |
| Carryout/Trackout          | Prevention                       |
| Carryout/Trackout          | Clean-Up Methods                 |
| Disturbed Open Areas       | Applicability                    |
| Disturbed Open Areas       | Control Measures                 |
| Paved Road Dust            | New/Modified Roads               |
| Paved Road Dust            | Erosion Clean-Up                 |
| Paved Road Dust            | Street Sweeping                  |
| Unpaved Road Dust          | Applicability                    |
| Unpaved Road Dust          | Control Requirements             |
| Unpaved Lots/Staging Areas | Applicability                    |
| Unpaved Lots/Staging Areas | Requirements                     |
| Weed Abatement             | Requirements                     |
| Windblown Dust             | Definition                       |
| Windblown Dust             | Construction/Earthmoving         |
| Windblown Dust             | Disturbed Areas                  |
| Windblown Dust             | Bulk Material/Storage Piles      |

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**FUGITIVE DUST CATEGORY:                    GENERAL**

**SUBCATEGORY:                                    VISIBLE DUST EMISSIONS**

### SJV Requirements:

- Limit visible emissions to not more than 20% opacity (Ref: R8021, Sect. 5.0; R8031, Sect 5.0; R8041, Sect. 5.7.2; R8051, Sect. 5.0; R8061, Sect. 5.2; R8071, Sect. 5.1; and 8081, Sect. 5.0)
- Opacity based on six vehicles, two readings per vehicle for unpaved surfaces
- and minimum 12 observations, spaced 15 seconds apart, for other sources. (Ref: R8011, Appendix A, Sections 1 and 2)

### South Coast Requirements:

- No visible emissions across property line. (Ref: R403(d)(1))

### Maricopa County Requirements:

- Limit visible emissions to not more than 20% opacity (Ref R310, Sect. 301)
- Opacity for dust generating activities based on minimum 12 observations, spaced 15 seconds apart (Ref: R310, Section 501.1(a))
- Opacity for unpaved parking lots and unpaved haul/access roads based on six vehicles, two readings per vehicle (Ref: R310, Section 501.1 (a) and (b))

### **Clark County Requirements**

- Limit visible emissions to not more than 20% opacity (Ref: AQR Section 91.2.1.4; AQR Section 92.2.1.3; AQR Section 93.2.1.5; AQR Section 94.5.3)
- Opacity based on six vehicles, two readings per vehicle for unpaved surfaces  
And minimum 12 observations, spaced 15 seconds apart, for other sources. (Ref AQR Section 91.4.1.1 and AQR Section 94      AQR Section 94.5.3)
- Opacity based on six vehicles, two readings per vehicle for unpaved surfaces  
And minimum 12 observations, spaced 15 seconds apart, for other sources. (Ref AQR Section 91.4.1.1 and AQR Section 94.9.1)
- Limit construction visible emissions to not more than 100 yards (Ref: AQR Section 94.5.2(a))
- Proposed: Limit VDE to 100 feet; and not cross property line

### Discussion:

Except for South Coast, other referenced agencies use an opacity limit of 20%. Since this is based on multiple plume measurements over several minutes, and since dust plumes tend to be intermittent under many circumstances, it is difficult to establish whether time averaged opacity measurements or visible emissions across a property is more stringent. There are likely to be situations where opacity may be more stringent

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(especially in large construction sites where heavy dust plumes may no longer be visible by the time they reach the property line) and other circumstances where opacity may be less stringent (especially on smaller dust-producing sites, and with intermittent plumes.) For time-averaged situations (i.e., non-road/vehicle related dust emissions), to assure that most stringent conditions are in place, a combination of the two approaches is warranted. Clark County has moved toward that position by requiring both opacity limits and a 100-yard visible emission distance limit for construction activities. And while it may not seem appropriate for line sources, such as a vehicle traveling on an unpaved road, to have a property line limit (because the property line may be very near to the source), nevertheless, the South Coast provision applies to all dust sources, and hence it is deemed more likely to be the most stringent measure for vehicles traveling on unpaved surfaces close to property lines.

EPA recognizes the limitations in using opacity methods as the standard for assessing compliance with fugitive dust regulations, and for the purposes of vehicle movement, has established a special test which has been incorporated by SJV. To that end, opacity limits for vehicles traveling on unpaved surfaces, or vehicle reentrainment of dust, appears to be an acceptable standard. However, for other types of fugitive dust sources, such as construction, demolition, handling of bulk materials, and similar sources, the time-averaged opacity limit may not be the most appropriate standard. Until a more specific opacity test method is developed and approved by EPA, a combination of opacity with plume distance limits (e.g., 100 yards) is the best standard to use.

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**FUGITIVE DUST CATEGORY: CONSTRUCTION ACTIVITIES**

**SUBCATEGORY: DEMOLITION**

### SJV Requirements:

- Apply water to limit VDE to not more than 20% opacity (Ref: R8021, Table 8021-1, A1)
- Apply dust suppressants to limit VDE to not more than 20% opacity (Ref, ibid, A2)
- Movement/handling must meet requirements for bulk materials (Ref: ibid, A3)
- Trackout prevention must comply with Rule 8041 (Ref: ibid, A4)

### South Coast Requirements:

- Demolition must meet same requirements as other applicable dust-producing operations
  - 1) No visible emissions beyond property line (Ref: R403(d)(1))
  - 2) Must apply one or more BACM (Ref: R403(d)(2))
  - 3) Upwind-downwind PM10 levels must not exceed 50ug/m3 (Ref: R403(d)(4))
  - 4) Must meet trackout requirements (Ref: R403(d)(5))

### Maricopa County Requirements:

- Demolition must meet same requirements as other applicable dust generating operations
  - 1) Visible dust emissions must not exceed 20% opacity (Ref: R310, Sect. 301)
  - 2) Must implement one primary and one contingency control measure (Ref: R310, Sect. 304.3(a))

### **Clark County Requirements**

- For implosion:
  - 1) Limit blasting to time periods when wind direction is away from closest residential areas, occupied buildings, and major roadways.
  - 2) Limit blasting times to between 8:00 am and 4:30 pm
  - 3) Stabilize soils prior to blasting
  - 4) Stabilize soils and debris after blasting
  - 5) Do not blast when wind speeds occur or are forecast to occur
  - 6) Restrict vehicles to paved or stabilized surfaces (Ref: AQR Section 94 Handbook, CST 08)
    - For mechanical/manual demolition:
      - 1) Stabilize erodible surfaces
      - 2) Stabilize surfaces where support equipment will operate
      - 3) Stabilize loose soil and demolition debris (Ref: AQR Section 94

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- 4) Stabilize surfaces where support equipment will operate
- 5) Stabilize loose soil and demolition debris(Ref: AQR Section 94 Handbook, CST 09)

### Discussion:

These requirements vary from general restrictions, such as South Coast and Maricopa County, to specific requirements, as in San Joaquin Valley and Clark County. While the specifics of opacity limits are likely to be equivalent to the general restrictions of South Coast and Maricopa County, the specific measures in the Clark County regulations appear to be more stringent in preventing unintended violations of the opacity limit. For example, it may never be known until after a demolition blast has actually occurred that there is an opacity violation. By specifying actions, such as stabilizing surface before and after blasting, and not allowing blasting when wind speeds exceed 25 miles per hour, there is at least a more proactive effort to minimize dust generation. Limiting the hours and wind direction conditions for approved blasting does not result in lower emissions, but rather is responsive to potential public impacts. As such, from an emissions standpoint, these are not deemed to be more stringent control measures, but from a public health perspective, it could be considered beneficial.

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**FUGITIVE DUST CATEGORY:                    CONSTRUCTION**

**SUBCATEGORY:                                    PRE-EARTHMOVING OPERATIONS**

### SJV Requirements:

- Pre-water in sufficient amount to limit VDE to 20% opacity (Ref: R8021, Table 8021-2, A1)
- Phase work to reduce disturbed surface area (Ref: R8021, Table 8021-2, A2)

### South Coast Requirements:

- Apply water to increase soil moisture content to depth of proposed cut (Ref R403 Handbook, BACM Control Measure A)
- Grade each phase separately to coincide with construction phase (Ref: ibid, BACM A-2(1))
- If full grading, apply chemical stabilizers to graded areas where construction will not begin for more than 60 days after grading (Ref: ibid, BACM A-2(2))

### Maricopa County Requirements:

- Pre-water to depths of cuts (Ref R310, Table 1, 1D)
- Phase work to reduce the amount of disturbed surface areas (Ref: ibid, Table 1, 2D)

### Clark County Requirements:

- Presoak soils to depths of cuts (AQR Section 94 Handbook, CST 07)
- Presoak with water and surfactant mixture in soils with high emission potential (Ref: ibid, CST 07-7)
- Include phasing details as part of Dust Control Permit and Dust Control Mitigation Plan (Ref, ibid, GEN 01)

### Discussion:

SJV is the only agency to set a VDE limit on pre-activity conditions, which is hard to assess effectiveness until the activity actually commences. Requiring pre-watering to the depth of the cut is a more a more specific control measure and therefore is deemed to be more stringent than the current SJV rule. Keeping the VDE limit is good, but needs to be in conjunction with the “depth of cut” specification.

For phased earthmoving or construction, the requirements appear to be equally stringent. Emission reductions can be reduced by limiting the area of disturbed soils to the minimum necessary for the construction project. The success of such limitation is dependent upon the degree of specificity, i.e., it would be difficult to determine if the phasing is actually minimizing the disturbed surface conditions unless such information

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is provided in advance. The Clark County requirements for providing such details are considered more stringent than the SJV requirements because such phasing details are not part of the SJV Dust Control Plan submittals.

The Clark County provision of using a mixture of water and chemical stabilizers for pre-soaking soils with high emissions potential is questionable regarding reducing emissions. Chemical stabilizers tend to help for surface soil crusts which minimize dust emissions from activities on the surface. If grading is done to levels below the surface, there is unknown value as to the ability of such chemicals to have an effect on sub-surface soils. Thus it cannot be determined if such measures have greater dust-reducing capabilities.

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**FUGITIVE DUST CATEGORY:                    CONSTRUCTION**

**SUBCATEGORY:                                    EARTHMOVING OPERATIONS**

### SJV Requirements:

- Apply water or chemical stabilizers/dust suppressants, in conjunction with optional wind barriers, to limit VDE to 20% opacity (Ref: R8021, Table 8021-2, B1 and B2)

### South Coast Requirements:

- General VDE conditions apply (See FD Category, Visible Dust Emissions)
- Maintain soil moisture content (by applicable ASTM Method D-2216) minimum of 12% (Ref: R403, Table 2, 1(a))
- Conduct watering to limit VDE from exceeding 100 feet (Ref, ibid, (1a-1) and (1c))

### Maricopa County Requirements:

- Apply water or dust suppressants to limit VDE to 20% opacity (Ref: R310, Table 1, 3D)
- Apply water to maintain soil moisture at a minimum 12% (by applicable ASTM Method D-2216-98) (Ref: R310, Table 1, 4D)
- Construct 3-5 foot high wind barriers, with 50% or less porosity, adjacent to roadways or urban areas, and meet either VDE or soil moisture limits. (Ref: ibid, 5D)
- For one acre or larger, if water is used, operate water truck or similar water application system on disturbed surfaces (Ref: ibid, 1M)

### Clark County Requirements:

(Note: Clark County does not have a specific section for earthmoving. Two activities which are specified include cut-and-fill operations and backfilling operations. Control measures are summarized from those activities.)

- General VDE conditions apply (See FD Category, Visible Dust Emissions)
- Apply water to maintain soil moisture (Ref: AQR Section 94 Handbook, CST 01)
- Apply water or dust suppressant immediately following activity (Ref, ibid, CST 01-6, CST 07-5 and CST 07-6)
- When loading soils, minimize height from loader bucket, and empty bucket slowly (Ref: ibid, CST 01-7 and CST 01-8)

### Discussion:

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Aside from the stringency of the VDE limits, as discussed in the Fugitive Dust Category on Visible Dust Emissions, there are specific measures which are more proactive than the VDE limit alone. In particular, 12% soil moisture content is deemed more stringent than the VDE limit alone because this is a distinct action to minimize emissions. Using “sufficient water/dust suppressants sufficient to limit VDE” does not assure that such conditions would actually achieve the desired results, especially because of the time-averaged process to determine VDE opacity.

If opacity limits are retained, there should also be visible emissions to not more than 100 feet.

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**FUGITIVE DUST CATEGORY: GENERAL**

**SUBCATEGORY: EARTH MOVING DUST CONTROL  
PLAN: APPLICABILITY**

### SJV Requirements:

- Size: 40 acres or larger
- Earth movement: 2,500 cubic yards or more on at least 3 days (Ref: R8021, Section 6.3.1)

### South Coast Requirements:

- Size: 100 acres or larger; 50 acres or larger under contingency notification
- Earth movement: 10,000 cubic yards or more; 5,000 cubic yards or more under Contingency notification (Ref: R403, (f)(1))

### Maricopa County Requirements:

- Size: 0.10 acres or larger (Ref: R310, Section 303)
- Certain permitted activities which have any dust generating activities (Ref: *ibid*, Section 303.3)

### Clark County Requirements:

- (Dust Control Permit)
  - Size: 0.25 acres or larger
- Demolition projects 1000 square feet or greater
- Trenching operations 100 feet in length or greater
- (Dust Mitigation Plan)
  - Size: 0.25 to 10 acres
- (Site-Specific Dust Control Mitigation Plan)
  - Size: 10 acres or larger
- (Ref: AQR Section 94 Handbook, DCP 01)

### Discussion:

Dust control plans, *per se*, do not reduce emissions. However, to the extent that dust control management efforts on the part of the operator, and oversight and compliance efforts on the part of the agency are substantially enhanced, it can be presumed that a greater degree of dust control implementation and adherence to standards ultimately result in lower fugitive dust emissions. On that basis, dust control plans (permits) can be evaluated as a BACM.

As far as size is concerned, both Maricopa County and Clark County have much more stringent requirements than does SJV. However, the effect of overall emissions

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reductions needs to include the elements of the plan in addition to size. See next section on plan elements for overall evaluation of stringency

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**FUGITIVE DUST CATEGORY:                    GENERAL**

**SUBCATEGORY:                                    EARTH MOVING DUST CONTROL  
PLAN: REQUIREMENTS**

### SJV Requirements:

- Information on owner/operator (Ref: R8021, Section 6.3.6.1)
- A location plot plan (Ref: ibid, Section 6.3.6.2)
- Project size (Ref: ibid, Section 6.3.6.3)
- Start and end dates of soil disturbing activities (Ref: ibid, Section 6.3.6.4)
- Identification of all sources of fugitive dust (Ref: ibid, Section 6.3.6.5)
- Information on dust suppressants to be used (Ref: ibid, Section 6.3.6.6)
- Details of measures to control trackout (Ref: ibid, Section 6.3.6.7)
- Description of all fugitive dust control measures to be implemented before, during, after any dust generating activity (Ref: ibid, Section 6.3.3)

### South Coast Requirements:

- Information on owner/operator (Ref: R403 (f)(3)(A))
- A description of site including a map (Ref: ibid, (f)(3)(B))
- Identification of all sources of fugitive dust (Ref: ibid, (f)(3)(C))
- Description of all fugitive dust BACM to be implemented (Ref: ibid, (f)(3)(D))
- Requires implementation of high wind measures if visible emissions cross property line with BACM implemented (Ref: ibid, (f)(5)(C))
- Allows for a “default” plan in lieu of a plan submittal. Must implement specific actions in Rule 403, Tables 1 and 2, and maintain daily records (Ref: ibid, (f)(1)(A))

### Maricopa County Requirements:

- Information on person conducting dust generating operations (Ref: R310, Section 304.1)
- Project drawing (Ref: ibid, Section 304.2)
- Identification of one primary and one contingency control measure from Table 1 for each source of fugitive dust (Ref: ibid, Section 304.3a)
- Number of vehicles traveling on unpaved haul/access roads (Ref: ibid, Section 304.3c)
- Information on dust suppressants and frequency of application (Ref: ibid, Section 304.4)
- Details of measures to control trackout (Ref: ibid, Section 304.5)

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### Clark County Requirements:

- Complete application for permit
- Provide project vicinity and assessors parcel maps
- Include best management practices as detailed in Section 94 Handbook
- If greater than 50 acres, trained dust control monitor is required
- Key construction project class required to take dust control class
- Signage required
- Dust control plans must be provided to all contractors and subcontractors (Ref: AQR Section 94 Handbook, DCP 01)

### Discussion:

Although there are differences in approaches among the agencies, plan requirements are very similar. Clark County has the most detailed requirements in the sense that their Best Management Practices Handbook provides the most detailed set of dust control options for specified sources of dust generating activities. That is not to say that more options can result in less emissions, but the more options available, the more guidance is provided to dust generating activities in the selection of appropriate combinations of control measures. Without such specificity, should the plan-submitted measures fail, there may not be viable additional measures which could otherwise be implemented. Clark County is also the most progressive in being proactive to control dust emissions by requiring training of key construction personnel and also requiring a trained dust monitor for operations which are larger than 50 acres.

In summary, then, the most stringent requirements for dust control plans are those which apply to operations greater than 0.1 acres of disturbed surfaces (Maricopa County), which provide a greater selection of viable BACM (Clark County), and which provide proactive measures including training of key construction personnel and on-site trained monitors for larger operations (Clark County).

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**FUGITIVE DUST CATEGORY:                   DISTURBED LANDS**

**SUBCATEGORY:                                   DEFINITION OF STABILIZED SURFACE**

### SJV Requirements:

- Any disturbed surface that is resistant to wind blown fugitive dust and meets at least one of the following conditions:
  1. A visible crust
  2. A threshold friction velocity of 100 cm/sec or greater
  3. A vegetative cover of at least 50% that is attached or rooted
  4. Unattached horizontal vegetative cover of at least 50% and wind-movement resistant
  5. Vertical, rooted vegetation with at least 30% cover, or 10% cover where the soil threshold friction velocity is at least 43 cm/sec
  6. A surface that is at least 10% covered with non-erodible materials (Ref: R8011, Section 3.56)

### South Coast Requirements:

- Any disturbed surface which is resistant to wind-driven fugitive dust; (Ref: R403, (C)(27))

### Maricopa County Requirements:

- Must meet at least one of the following standards:
  1. Maintain a visible crust
  2. Maintain a threshold friction velocity of 100 cm/sec or greater
  3. Maintain standing (rooted, vertical) vegetative cover of at least 30%, or 10% cover where the soil threshold friction velocity is at least 43 cm/sec
  4. Maintain flat (rooted or horizontal debris not subject to wind movement) of at least 50%
  5. Maintain a cover of at least 10% with non-erodible materials
  6. Comply with specially-approved alternative method (Ref: R310, Section 302.3)

### Clark County Requirements:

- Stabilization standards:
  1. Establish visible crust
  2. Establish cover of at least 20% with non-erodible materials
  3. Establish soil threshold friction velocity of at least 100 cm/sec
  4. Comply with specially-approved alternative method

### Discussion:

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The specifications for a stabilized surface on disturbed soils are comparably the most stringent in the SJV rules, with the exception that Clark County has established a more stringent requirement for the use of non-erodible materials, namely, that a more restrictive 20% minimum covering is required.

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**FUGITIVE DUST CATEGORY: CONSTRUCTION**

**SUBCATEGORY: INACTIVE DISTURBED LAND**

### SJV Requirements:

- Restrict vehicle access (Ref: R8021, Table 8021-2, C1)
- Apply water/dust suppressants to meet stabilized surface definition; if area is greater than 0.5 acres and inactive more than 7 days, then must comply with definition of stabilized surface (Ref, ibid, C2)

### South Coast Requirements:

- Apply chemical stabilizers within 5 days of completion of grading (Ref: R403, Table 2, (2c))
- Apply water to at least 80% of inactive disturbed area on a daily basis when there is evidence of windblown dust (Ref: ibid, (3a))
- Establish vegetative ground cover within 21 days after active operations cease. Must be of sufficient density within 90 days to expose less than 30% of the disturbed area (Ref: ibid, (3c))

### Maricopa County Requirements:

- For weekends, holidays, and after-hours:
  - Apply water/dust suppressants to maintain stabilized surface (Ref, R310, Table 1, 6D)
  - Establish vegetative ground cover to maintain stabilized surface (Ref: ibid, 7D and 11D)
  - Restrict vehicle access (Ref: ibid, 8D)
- For longer-term stabilization (must be done within 8 months)
  - Restore vegetation similar to natural conditions to maintain stabilized surface (Ref: ibid, 9D)
  - Pave, apply gravel or dust suppressant (presumably to road surfaces) to maintain stabilized surface (Ref: ibid, 10D)

### Clark County Requirements:

- Prevent access to limit soil disturbance (Ref: AQR Section 94 Handbook, CST 11)
- Stabilize soil, using dust palliative or vegetation to maintain stabilized surface (Ref: ibid, CST 11-4 and 11-5)
- Pave or apply surface rock to maintain stabilized surface (Ref: ibid, CST 11-6)

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### Discussion:

Although other approaches may have more specificity in control measures, the effect of maintaining a stabilized surface in the SJV rules is deemed equivalent to other rules. However, Maricopa County does not specify a de minimis acreage, and hence the requirement for longer-term stabilization is deemed more stringent than the SJV rule which establishes a de minimis level of 0.5 acres.

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**FUGITIVE DUST CATEGORY:                    BULK MATERIALS**

**SUBCATEGORY:                                    HANDLING/STORAGE**

### SJV Requirements:

- Water or stabilize to limit VDE to 20% opacity (Ref 8031, 5.3, A1)
- Store in accordance with definition for stabilized surface (Ref, ibid, A2)
- Cover outdoor materials with tarps, plastic, etc (Ref, ibid, A3)
- Use wind barriers to limit VDE to 20% plus water/stabilize (Ref, ibid, A4)

### South Coast Requirements:

- Use chemical stabilizers (Ref R403, Table 2, 5a)
- Water 80% surface area on windy days (Ref, ibid, 5b)
- Use temporary coverings (Ref, ibid, 5c)
- Use 3-sided enclosures, less than 50% porosity to height of pile (Ref, ibid, 5d)
- Fully enclose (Ref R403 Handbook, pg 6-4, (L))
- Alter load-in, load-out procedures (Ref, ibid, (O))

### Maricopa County Requirements:

- Water to limit VDE to 20% opacity (Ref R310, Table 1, 1F)
- Cover with tarps, plastic, etc. (Ref, ibid, 2F)
- Apply water to maintain minimum 12% soil moisture or
  - 70% optimum soil moisture content (Ref, ibid, 3F)
- Meet requirements for stabilized surface (Ref, ibid, 4F)
- Construct wind barriers (with less than 50% porosity), storage silos, or
  - 3-sided enclosures to height of pile and length, distance restrictions (Ref, ibid, 4F)

### Clark County Requirements:

- Must stabilize stockpiles
- Must not be over 8 feet high if within 100 yards of occupied building
- Must have water access to top of pile if higher than 8 feet
- Avoid steep slopes
- Apply water during stocking, loading, unloading (high emission potential soils) (Ref Section 94 Handbook, CST-18)

### Discussion:

These are BACM options for which one or more must be utilized. Potential candidate measures include (a) barrier porosity limits; (b) use of 3-side enclosures to height of pile; (c) use of full enclosures. Other items do not necessarily result in reduced

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emissions, such as Clark County's requirement for limiting pile height near an occupied building. The Maricopa County 12% minimum soil moisture content may be appropriate to include if opacity measurements are difficult to determine due to intermittent nature of dust plumes.

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**FUGITIVE DUST CATEGORY:                    BULK MATERIALS**

**SUBCATEGORY:                                    TRANSPORT**

### SJV Requirements:

- Limit vehicle speed such that VDE does not exceed 20% (Ref: R8031, Table 8031-1, B1)
- Maintain at least 6 inches freeboard when crossing paved public access road (Ref: ibid, B2 and C3)
- Apply water to top of load to limit VDE to 20% opacity (Ref: ibid, B3)
- Cover haul trucks with tarps or other suitable cover (Ref: ibid,)
- Clean interior of truck before leaving site (Ref: R8031, Table 8031-1, C1)
- Prevent spillage from holes and openings in floor, side, or tailgate (Ref: ibid, C2)

### South Coast Requirements:

- Cover haul vehicles (R403 Handbook, BACM, (D))
- Use bottom-dumping vehicles when feasible (Ref: ibid, (E))
- Maintain minimum 6 inches freeboard in high wind conditions (Ref: R403, Table 1, (2E))

### Maricopa County Requirements:

- Maintain at least 3" freeboard (Ref: R310, Table 1, 1G and 7G)
- Prevent spillage from holes and openings in floor, side, or tailgate (Ref: ibid, 2G and 8G)
- Prevent trackout (Ref: ibid, 3G)
- Limit on-site vehicle speed to 15 mph (Ref: ibid, 4G)
- Apply water to top of load to limit VDE to 20% opacity (Ref: ibid, 5G)
- Cover haul trucks with tarps or other suitable closure (Ref: ibid, 6G)
- Clean interior of truck before leaving site (Ref: ibid, 9G)

### Clark County Requirements:

- Use tarps or other suitable enclosures on haul trucks (Ref: AQR Section 94 Handbook, CST 13-1)
- Maintain 3-6 inches of freeboard (Ref: ibid, CST 13-2)
- Check belly-dump truck seals and remove trapped rocks to prevent spillage (Ref: ibid, CST 13-3)
- Clean wheels and undercarriage before leaving site (Ref: ibid, CST 13-4)
- Limit on-site vehicle speeds to 15 mph (Ref: ibid, CST 13-5)
- Keep optimum soil moisture when handling material (Ref: ibid, CST 13-6)
- When loading material:
  - Stabilize to meet VDE requirements (Ref: ibid, CST 22)

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- Empty loader bucket slowly (Ref: ibid, CST 22-1)
- Minimize drop height (Ref: ibid, CST 22-2)

### Discussion:

SJV requirements are very similar to Maricopa County, with the exception that the six-inch freeboard requirement is more stringent than the three-inch requirement of Maricopa County. SJV is considered at least equally or more stringent as other BACM for this category with the exception that Clark County has specified BACM for loading material into the transport trucks.

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**FUGITIVE DUST CATEGORY:                    BULK MATERIALS**

**SUBCATEGORY:                                OUTDOOR CHUTE/CONVEYOR**

### SJV Requirements:

- Fully enclose chute or conveyor (Ref: R8031, Table 8031, D1)
- Operate water spray to wet materials to limit VDE to 20% opacity (Ref: ibid, D2)
- Wash conveyed materials to remove PM10 to limit VDE to 20% opacity (Ref: ibid, D3)

### South Coast Requirements:

(No equivalent requirements under Rule 403)

### Maricopa County Requirements:

(No equivalent requirement under Rule 310)

### Clark County Requirements:

(No equivalent requirement under AQR Section 94)

### Discussion:

Under fugitive dust regulations, SJV is the only agency to specify requirements for conveyor/chute movement of bulk materials.

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**FUGITIVE DUST CATEGORY: CARRYOUT AND TRACKOUT**

**SUBCATEGORY: WHEN TO REMOVE TRACKOUT**

### SJV Requirements:

- Remove trackout at end of workday (non-urban areas and if trackout is less than 50 feet;
- Remove ASAP if trackout exceeds 50 feet. (Ref: R8041, 5.1 & 5.2 & 5.5)

### South Coast Requirements:

- Remove any trackout within one hour (Ref R403(d)(5)(A)) or;
- Select prevention option and
- Remove trackout at end of workday if trackout is less than 50 feet; and
- Remove ASAP if trackout exceeds 50 feet. (Ref R403(d)(5)(B)(i) and (ii))

### Maricopa County Requirements:

- Remove trackout at end of workday
- Remove ASAP if trackout exceeds 50 feet (Ref R308.3(b)(1) and (2))

### Clark County Requirements:

- Clean trackout from streets daily
- Remove ASAP if trackout exceeds 50 feet (Ref Section 94 Handbook, CST 19)

### Discussion:

These requirements are virtually identical in all areas. However, South Coast's Rule 403 requires trackout cleanup every hour, unless the daily cleanup and 50-foot ASAP cleanup is conducted in conjunction with requirements to pave or chemically stabilize the roadway adjacent to the paved road. SJV requires similar provisions, but only for (1) operations of 150 vehicle trips per day (Ref 8041, 5.3); (2) sites with interior roads (Ref 8041, 5.6); and (3) those with required dust control plans (Ref 8041, 5.4). Since the South Coast rule applies to all activities subject to the rule, it should be considered as a candidate measure.

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**FUGITIVE DUST CATEGORY: CARRYOUT AND TRACKOUT**

**SUBCATEGORY: PREVENTION**

### SJV Requirements:

- Install trackout control device at all access points to public roads (Ref: R8041, Section 5.8.1)
- Maintain sufficient length of paved interior road to allow dirt/mud to drop off before leaving site (Ref: ibid, Section 5.8.2)
- Remove mud/dirt from interior paved roads in sufficient frequency to prevent trackout (Ref: ibid, Section 5.8.3)

### South Coast Requirements:

- Pave or chemically stabilize road surface from point of intersection with public paved road to distance of at least 100 feet by 20 feet wide (Ref R403, Table 3, (1))
- Install trackout control device from point of intersection with public paved road to distance of at least 25 feet by 20 feet wide (Ref: ibid, (2))

### Maricopa County Requirements:

- Install grizzly or wheel wash system at all access points (Ref: R310, Table 1, 1J)
- At all access points, install gravel pad at least 50' long, 30' wide, and 6" deep (Ref: ibid, 2J)
- Pave from point of intersection with public paved road to distance of at least 100 feet by 20 feet wide. (Ref: ibid, 3J)

### Clark County Requirements:

- Pave construction roadways as early as possible (Ref: AQR Section 94 Handbook, (CST 19-1))
- Install gravel pads at least 3" deep by 30 feet wide by 50 feet long (or the length of (longest haul truck if greater than 50 feet). Use 1" to 3" rough diameter gravel
  - or crushed rock and maintain effectiveness (Ref: ibid, CST 19-2)
  - Install wheel shakers if gravel pads are not effective (Ref: ibid, CST 19-3)
  - Install wheel washer if gravel pads and wheel shakers not effective (Ref: ibid, CST 19-4)
- All exiting traffic must be routed over selected track out controls (Ref, ibid, CST 19)

### Discussion:

SJV requirements lack specificity found in other agency regulations, and merely require the use of the devices to prevent trackout. Specificity as to paved length and width,

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gravel pad length, width, and depth, provide conditions as to know if the minimal amount of control is being implemented. Without such detail, it would be difficult for both the facility operator and the SJV staff to determine if the level of prevention is adequate. If trackout could be fully prevented, there would not be a need for actions to clean up trackout. It is presumed that specified levels of prevention meeting BACM would eliminate most, but not all, trackout. The requirements of SJV Rule 8041 present unrealistic standards for compliance, and hence would be difficult to determine if BACM is being applied. SJV should consider adding specific conditions for the prevention of trackout in a manner indicated by all three other agencies.

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**FUGITIVE DUST CATEGORY: CARRYOUT AND TRACKOUT**

**SUBCATEGORY: CLEAN-UP METHODS**

### SJV Requirements:

- Manual sweeping (Ref: R8041, Section 5.7.1)
- Rotary brush/broom with sufficient wetting to limit VDE to 20% opacity (Ref: ibid, 5.7.2)
- Operating PM10-efficient street sweeper with 80% efficiency per SCAQMD R1186 (Ref: ibid, 5.7.3)

### South Coast Requirements:

(Itemized clean-up actions not specified)

### Maricopa County Requirements:

- Operate street sweeper or wet broom with sufficient water at speeds recommended by manufacturer (Ref: R310, Table 1, 1H)
- Manual sweeping (Ref: ibid, 2H)

### Clark County Requirements:

(Itemized clean-up actions not specified)

### Discussion:

SJV is one of only two agencies (other, Maricopa County) to specify measures to clean up trackout after it has occurred. Elements are at least as stringent as Maricopa County and therefore it is deemed that SJV has the most stringent requirements for specific methods to clean up trackout.

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**FUGITIVE DUST CATEGORY:                   DISTURBED OPEN AREAS**

**SUBCATEGORY:                                    APPLICABILITY**

SJV Requirements:

- 3 acres or larger (non-ag) which has been unused for 7 days or more (R8051, Section 2.0)

South Coast Requirements:

- One-half acre or larger (non-ag) for residential use; no limit on non-residential (Ref: R403 (h)(1)(C))

Maricopa County Requirements:

Unclear: Rule 310, Section 102 exempts disturbed open areas which are not located at sources requiring “any permit under these rules.” However, most open areas will not have need for permits. Section 303 requires a dust control plan (presumed to be what is referred to in Section 102 as a “permit”), for all sources that involve earthmoving operations of 0.10 acres or greater. Since soil disturbances can occur for reasons other than earthmoving, for example, off-road vehicle traverses, it appears that many disturbed open areas, vacant lots, etc, may be exempt under these rules.

Clark County Requirements:

- 5,000 square feet or larger (non-ag) (Ref: AQR Section 90.1.2 and 90.2.1)

Discussion:

The most stringent applicability is South Coast Rule 403 which has no minimal level for non-residential areas; and Clark County AQR Section 90 which has a 5,000 square foot (approx. 1/9 acre) minimum level for all types of open areas and vacant lots. Therefore, the most stringent applicability would apply to all open areas with disturbed surfaces, and exempt residential lots of less than 5000 square feet.

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**FUGITIVE DUST CATEGORY:                   DISTURBED OPEN AREAS**

**SUBCATEGORY:                                   CONTROL MEASURES**

### SJV Requirements:

- Apply water/dust suppressants to unvegetated areas sufficient to limit VDE to 20% opacity (Ref: R8051, Table 8051-1, A1)
- Establish vegetation to limit VDE to 20% opacity (Ref: ibid, A2)
- Pave, apply gravel, apply stabilizers to limit VDE to 20% opacity (Ref: ibid, A3)
- Upon evidence of trespass, post “no trespass” signs or install barriers to prevent access to area (Ref: ibid, B)

### South Coast Requirements:

- Apply chemical stabilizers (Ref: R403 Handbook, BACM (Q))
- Water with sufficient frequency to establish a surface crust (Ref: ibid, (R))
- Establish (drought-resistant) vegetation as quickly as possible (Ref: ibid, (T))

### Maricopa County Requirements:

- Restore vegetative ground cover and soil characteristics similar to native Conditions (Ref: R310, Table 1, 1E)
- Pave, apply gravel, apply stabilizer to meet stabilized standards (Ref: ibid, 2E)
- Establish vegetation to meet stabilized standards (Ref: ibid, 3E)
- Stabilized standards, one of the following (Ref: R310, Section 302.3):
  - Maintain visible crust
  - Maintain threshold friction velocity of 100 cm/sec or greater
  - Maintain flat vegetation, not subject to wind movement, of at least 50%
  - Maintain standing (rooted, vertical) vegetation of at least 30%
  - Maintain standing (rooted, vertical) vegetation of at least 10% where the soil threshold friction velocity is 43 cm/sec or greater
  - Maintain cover of non-erodible elements of at least 10%

### Clark County Requirements:

- Upon evidence of soil disturbance by motor vehicles, prevent trespass, parking, and access by installing barriers, curbs, fences, gates, posts, signs, shrubs, trees. (Ref: AQR Section 90.2.1.1(a))
- Apply gravel or chemical stabilizers to meet one of stabilization standards (Ref: ibid, (b))
- Stabilization standards (Ref: AQR Section 90.2.1.2)
  - Establish visible crust
  - Establish cover of non-erodible elements of at least 20%
  - Establish threshold friction velocity of 100 cm/sec or higher

### Discussion:

Whereas SJV has used the VDE limit as the basis for determining limits of emissions from disturbed open areas, both Maricopa County and Clark County have established soil stabilization standards for determining the effectiveness of the control measures. In this case, the VDE would be considered a “reaction” type of approach, since the effectiveness of the control measures cannot be determined until visible emissions occurred. Compliance with stabilization standards is more “pro-active” in the sense that conditions must be met which would satisfactorily stabilize soils to limit emissions. Since EPA stresses the importance of preventive measures, the approaches used by both Maricopa County and Clark County are deemed more stringent than SJV.

With respect to the stabilization standards, Maricopa County provides more options than Clark County, but such additional options are deemed neither more or less stringent than the Clark County options. One option, for percent non-erodible cover, is greater (at 20%) in Clark County than in Maricopa County (at 10%) and is therefore considered to be more stringent for that particular stabilized standard.

If SJV elects to continue with a VDE standard, it should be used in conjunction with stabilization standards. Such an approach would assure that proper proactive measures are taken, and would further determine if those measures were insufficient because of the VDE limit.

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**FUGITIVE DUST CATEGORY:                   PAVED ROAD DUST**

**SUBCATEGORY:                               NEW/MODIFIED ROADS**

### SJV Requirements:

- Applies to both public and private paved roads (Ref: R8061, Section 5.1.1)
- Paved shoulders required for all roads with average daily vehicle trips (ADVT) of 500 or more.
- If ADVT is 500-3000, then average width is 4 feet. If ADVT is greater than 3000, then average width is 8 feet. (Ref: R8061, Section 5.1.1.1)
- Curbing adjacent to and contiguous with paved lane or shoulder can be used in lieu of shoulder width requirements (Ref: *ibid*, Section 5.1.1.2)
- Intersections, auxiliary entry and exit lanes may be constructed adjacent to and contiguous with paved roadway in lieu of shoulder requirements (Ref: *ibid*, Section 5.1.1.3)
- If ADVT is 500 or greater, and medians are part of the roadway, then medians are to be constructed with minimum 4-foot shoulder widths adjacent to traffic lanes (Ref: *ibid*, Section 5.1.1.5)
- Where speed limits are below 45 mph, medians are to be constructed with curbing (Ref: *ibid*, Section 5.1.1.5.1)
- Medians are to be landscaped to meet stabilized surface requirements (Ref: *ibid*, Section 5.1.1.5.2)
- As an option to shoulder paving or vegetation requirements, oils or chemical dust suppressants can be used, according to the specified widths, and must be maintained to limit VDE to 20% opacity (Ref: *ibid*, Section 5.1.2)

### South Coast Requirements:

- Applies to both public and private paved roads (Ref R1186(e)(1)):
- In the event of a contingency notification\* (Ref R1186 (e)):
- For ADVT of 500 or more, curbing or paved shoulders required:
  - For ADVT 500-3000, shoulder width of at least 4 feet
  - For ADVT greater than 3000, shoulder width of at least 8 feet
  - (Ref: *ibid*, (e)(1)(A))
- For medians with ADVT of 500 or more, pave median area with typical roadway materials, unless speed limits less than 45 mph; or medians are landscaped with ground cover and there is curbing; or medians are treated with chemical stabilizers to maintain stabilized surface (Ref: *ibid*, (e)(1)(B))

\*Contingency notification pertains to certain findings by EPA regarding lack of attainment or rate of progress.

### Maricopa County Requirements:

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(Note: Maricopa County regulations do not specify requirements for new/modified paved roads; however this element is contained in State Legislation and specific commitments by local jurisdictions.)

- Applicability not specified, but appears to apply to public paved roads:
- A.R.S. 9-500.04(3) and 49-474.01(4), also known as SB1427 (1998) requires cities, towns and counties in a specified area to develop and implement plans to stabilize targeted unpaved roads, alleys, and unpaved shoulders on targeted arterials beginning January 1, 2000. The plans must address performance goals and reporting requirements.
- In addition, Maricopa County and 17 local jurisdictions have committed to additional measures to stabilize unpaved roads, including paving, graveling, curbs and gutters, and vegetation.

### Clark County Requirements:

- Applies to both public and private paved roads (Ref: AQR Section 93.2.1):
- Paved travel section must have 4 feet of paved or stabilized shoulder on each side (Ref: AQR Section 93.2.1.1)
- If shoulder is not paved, it must be stabilized with dust palliative or gravel to prevent trackout onto paved road section (Ref: ibid)
- Adjacent, contiguous curbing can be used in lieu of shoulder requirements (Ref: ibid, 93.2.1.2)
- If medians are used, one of the following apply:
  - curbing
  - solid paving across medial
  - use of dust palliative to meet stabilization standards
  - use of rock or landscaping on median to prevent trackout (Ref: ibid, 93.2.1.4)
- If roads are constructed not in conformance with these requirements, reconstruction must be completed within one calendar year. (Ref: ibid, 93.2.1.6)

### Discussion:

The Maricopa County requirements appear to apply more toward the reduction of unpaved road surfaces than to specifications for construction of new/modified roads to minimize trackout from shoulders and medians. The South Coast provisions are similar to SJV except that the South Coast provisions only apply during a “contingency notification.” Hence, SJV requirements appear to be more stringent than either Maricopa County or South Coast. As for Clark County, shoulder stabilization is set at four feet, whereas SJV has an 8-foot requirement for roads with ADVT greater than 3000. Thus, the SJV requirement is most stringent for paved roads with this level of ADVT. On the other hand, Clark County has no minimum level of ADVT for stabilizing shoulders, thus it is more stringent than the SJV requirements for ADVT levels less than 500. (For ADVT of 500 to 3000, the stringency is equivalent.) Therefore, SJV should consider eliminating the low-end 500 ADVT limit.

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**FUGITIVE DUST CATEGORY:                      PAVED ROAD DUST**

**SUBCATEGORY:                                      EROSION CLEAN-UP**

### SJV Requirements:

(No specific requirements for this category)

### South Coast Requirements:

- Remove material from public paved roads with AVDT greater than 500 by street sweeping within 72 hours of being notified of such accumulation (Ref: R1186(d)(1))

### Maricopa County Requirements:

- Remove deposits from any (public and private) roadway within 24 hours of identification of such condition, by using appropriate control measures to limit VDE to 20% opacity (Ref: R310.01 Section 306.1a and 306.2)
- Material disposal must not result in causing new source of fugitive dust (Ref: *ibid*, 306.1b)

### Clark County Requirements:

(No specific requirements for this category)

### Discussion:

Although the occurrences of either wind erosion or storm water erosion of soils onto paved roadways are rather infrequent in the SJV, nevertheless, the possibility of such occurrences can result in a source of re-entrainable road dust, should the material not be removed in a timely manner. The most stringent requirement (from a time standpoint) was established by Maricopa County with a requirement for treatment of such material on the paved road surface within 24 hours of identification. However, the measures to remove the material are not specified, and tied only to a VDE requirement, which is not the best approach in this case. South Coast's requirement to remove the material by street sweeping at least gives a method for removal. Thus the most stringent requirement would be to remove the material by utilizing street sweepers within 24 hours of identification.

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**FUGITIVE DUST CATEGORY:                      PAVED ROAD DUST**

**SUBCATEGORY:                                      STREET SWEEPING**

### SJV Requirements:

(No specific requirements for this category)

### South Coast Requirements:

- Certified PM10-efficient street sweepers must be used by governmental agencies or their street sweeping contractors where the contract date, purchase date, or lease date is after January 1, 2000. (Ref: R1186(d)(2))
- Certified sweepers are to be used for all routine street sweeping except those with curbs, paved road shoulders greater than 4 feet width, not within 1000 feet of an unpaved road, and provided documentation of such is provided. (Ref: R1186(d)(2) and (i)(3))
- Certified sweepers are to be maintained according to manufacturers specifications (Ref: *ibid*, (d)(3))

### Maricopa County Requirements:

(No specific rule requirements for routine street sweeping, however the Revised Serious Area PM10 SIP [Feb, 2000] contains certain commitments to test the feasibility of using PM10-efficient street sweepers, along with commitments from several local jurisdictions to utilize such sweepers according to a proposed implementation schedule.)

### Clark County Requirements:

- Any operator who utilizes street sweeping equipment or contracts for street sweeping services must, after January 1, 2001, acquire or contact to acquire PM10-efficient street sweeping equipment (Ref: AQR Section 93.2.2)

### Washoe County

(Note: Regulation adopted on Feb 27, 2002)

- Any governmental agency which conducts street sweeping or contract for street sweeping services, must purchase or lease PM10-efficient certified street sweepers on or After February 1, 2002. (Ref: R040.032, Section A2 and C1)
- Certified street sweepers must be operated and maintained according to manufacturer's specifications (Ref: *ibid*, C2)
- Routine street sweeping must be conducted a minimum of once per month (Ref: *ibid*, C4)

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### Discussion:

When utilizing street cleaning equipment for removing crustal materials from paved road surfaces, many street sweepers lack the adequate containment of finer particles, thereby acting as a source of PM10 emissions. New PM10-efficient street sweepers, as determined by South Coast Rule 1186 test method, can capture the finer particles. Since South Coast, Washoe County, and Clark County have rule provisions to employ PM10-efficient street sweepers for routine street sweeping, these are considered to be most stringent.

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**FUGITIVE DUST CATEGORY: UNPAVED ROAD DUST**

**SUBCATEGORY: LIMITS FOR APPLICABILITY**

### SJV Requirements:

- 75 or more vehicle trips per day (Ref: R8061, Section 5.2.1)

### South Coast Requirements:

- For meeting standards of rule:
  - more than 50' wide at all points, or
  - are not within 25' of property line, or
  - more than 20 vehicle trips per day (Ref: R403(h)(2)(B)(iii))
- For treating unpaved roads:
  - All roads greater than the average ADT of all unpaved roads within its jurisdiction (Ref: R1186(d)(4))

### Maricopa County Requirements:

- 150 vehicles or more per day (Ref: R310.01, Section 304)

### Clark County Requirements:

- For new unpaved roads, there is no VDT limit (Ref AQR Section 91.2.1)
- For existing unpaved roads (prior to June 22, 2000), the control measures apply to roads with 150 or more vehicles per day.

### Discussion:

The vehicle trip per day limit of 75 or more is more stringent for SJV than either Maricopa County or Clark County. The provisions of the South Coast rule, tied to average levels of VDT may be more restrictive in some jurisdictions, and less restrictive in other jurisdictions. Clark County has established requirements for all new unpaved roads regardless of VDT, and therefore, for new unpaved roads, this provision is more stringent than SJV and should be considered as a candidate measure.

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**FUGITIVE DUST CATEGORY: UNPAVED ROAD DUST**

**SUBCATEGORY: CONTROL REQUIREMENTS**

### SJV Requirements:

- For days with 75 or more vehicle trips, limit VDE to 20% opacity and implement at least one of the following control measures:
  - a) apply water
  - b) apply uniform layer of washed gravel
  - c) apply chemical/organic dust suppressant
  - d) use vegetative materials
  - e) pave
  - f) use any other method to limit VDE to 20% opacity  
(Ref: R8061, Section 5.2.1)
- For days with 100 or more vehicle trips:
  - a) limit VDE to 20% opacity
  - b) comply with requirements for stabilized surface
  - c) implement at least one of the following control measures:
    - 1) apply water
    - 2) apply chemical/organic dust suppressant
    - 3) apply roadmix
    - 4) pave
    - 5) use any other method that results in stabilized surface  
(Ref: *ibid*, Section 5.2.2)
- As option to above, obtain Fugitive PM10 Management Plan (Ref: *ibid*, Section 5.2.1 and 5.2.2)
  - a) Must achieve at least 50% control efficiency (Ref: R8011, Section 7.0)
  - b) Must specify location, length, and area of unpaved traffic areas (Ref: *ibid*, 7.5.2)
  - c) Description of traffic conditions (vehicle trips per unit time; types of vehicles)  
(Ref: *ibid*, 7.5.3)
  - d) Description of control measures used and application details (Ref: *ibid*, 7.5.4)
  - e) Description of expected resulting road surface condition (Ref: *ibid*, 7.5.5)

### South Coast Requirements:

- Annually treat unpaved public roads beginning in 1998 and continuing for each of 8 years thereafter by implementing one of the following (Ref: R1186(d)(4)):
  - a) Pave at least one mile with typical roadway material (Ref: *ibid*, (d)(4)(A))
  - b) Apply chemical stabilizers to at least two miles to maintain stabilized surface  
(Ref: *ibid*, (B))
  - c) Take at least one of the following on at least three miles of road surface:
    - 1) Install signage at ¼ mile intervals limiting speed to 15 mph
    - 2) Install speed control devices every 500 feet
    - 3) Maintain roadway in a manner which limits speed to 15 mph

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(Ref.: ibid, (C))

- Apply at least one BACM to unpaved roads at active operations (Ref: R403(d)(2))
  - a) Pave (Ref: R403 Handbook, BACM (F))
  - b) Use chemical stabilizers (Ref: ibid, (G))
  - c) Apply water (Ref: ibid, (H))
  - d) Reduce speed limits to 15 mph (Ref: ibid (I))
  - e) Reduce vehicular trips, target at least 60% (Ref: ibid, (J))
  - f) Apply gravel to depth of 4 inches (Ref: ibid, (K))

### Maricopa County Requirements:

- For 150 vehicles or more per day, implement at least one of the following BACM (Ref: R310.01, Section 304):
  - a) Pave
  - b) Apply dust suppressants
  - c) Uniformly apply and maintain surface gravel (Ref: ibid, Section 304.1)
- For existing roads, BACM, as above, must be implemented by:
  - a) June 10, 2000 for more than 250 vehicle trips
  - b) June 10, 2004 for more than 150 vehicle trips (Ref: ibid, 304.2)
- BACM must meet the following standards:
  - a) Limit VDE to 20% opacity
  - b) Do not equal or exceed 0.33 oz/ft<sup>2</sup>, or
  - c) Do not exceed 6% silt content (Ref: ibid, 304.3)

### Clark County Requirements:

- Implement one control measure on 1/3 of unpaved roads with 150+ VT by June 1, 2001 (Ref: AQR Section 91.2.1.1(a))
- Implement one control measure on 2/3 of unpaved roads with 150+ VT by June 1, 2002 (Ref: ibid, (b))
- Implement one control measure on all unpaved roads with 150+ VT by June 1, 2003 (Ref: ibid, (c))
- For any unpaved road with newly found levels of 150+ VT, implement one control measure within 365 days (Ref: ibid, (d))
- For unpaved roads with less than 150 VT, maintain stabilized surface standards within 365 days of determination of non-stabilized surface (Note: this is not a SIP measure, Ref: ibid, (e))
- No new unpaved roads are to be constructed in public thoroughfares after June 22, 2000 (Ref: AQR Section 91.2.1.2)
- Applicable control measures are as follows:
  - a) Pave
  - b) Apply dust palliatives to meet stabilization standards (Ref: ibid, 91.2.1.3)

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- Stabilization standards:
  - a) Limit VDE to 20% opacity
  - d) Do not equal or exceed 0.33 oz/ft<sup>2</sup>, or
  - b) Do not exceed 6% silt content(Ref: ibid, 91.2.1.4)

### Discussion:

The control measures are similar among agencies. What separates the SJV requirements from the other three agencies is that SJV has no phased-in approach. It is presumed that, as of the effective date of the rule (May 15, 2002), all unpaved roads with an average of 75 vehicle trips per day or more would be in violation of Rule 8061 if the application of control measures and compliance with the VDE limits did not occur on every single mile of qualifying unpaved road. If this is the intent, then clearly the SJV requirements are most stringent since none of the other agencies require an immediate expectation of full implementation. Also, Clark County specifically identifies a procedure for what happens when a road is determined to exceed the VT limit (perhaps due to increased traffic which now causes an unpaved road to exceed the threshold whereas before it didn't). Again, the SJV presumption is that action must be taken immediately, and hence it is considered to be more stringent than Clark County.

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**FUGITIVE DUST CATEGORY: UNPAVED PARKING LOTS/STAGING AREAS**

**SUBCATEGORY: APPLICABILITY**

### SJV Requirements:

- Areas greater than 1 acre (Ref: R8071, Section 2.0)
- Areas with ADVT of 75 or more (Ref: ibid, Section 4.1)

### South Coast Requirements:

(Note: South Coast does not have rule language specifying this category. It is presumed that Rule 403 provisions for either unpaved roads, or disturbed surface areas would apply.)

### Maricopa County Requirements:

- Over 100 vehicles entering or parking (Ref: R310.01, Section 303)

### Clark County Requirements:

- No minimum vehicle limit specified for parking lots. (Ref: AQR, Section 92.2.1)
- No minimum vehicle limit specified for staging areas (Ref: AQR Section 94 Handbook, CST 17)

### Discussion:

Clark County specifies neither an area or vehicle limit for the application of dust control measures to unpaved parking lots. Therefore, as far as de minimis levels are concerned, Clark County is deemed to be the most stringent.

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**FUGITIVE DUST CATEGORY:**                      **UNPAVED PARKING LOTS/STAGING AREAS**

**SUBCATEGORY:**                                      **REQUIREMENTS**

### SJV Requirements:

- For days with 75 or more vehicle trips, limit VDE to 20% opacity and implement at least one of the following control measures:
  - apply water
  - apply uniform layer of washed gravel
  - apply chemical/organic dust suppressant
  - use vegetative materials
  - pave
  - use any other method to limit VDE to 20% opacity (Ref: R8071, Section 5.1.1)
- For days with 100 or more vehicle trips:
  - limit VDE to 20% opacity
  - comply with requirements for stabilized surface
  - implement at least one of the following control measures:
    - apply water
    - apply chemical/organic dust suppressant
    - apply roadmix
    - pave
    - use any other method that results in stabilized surface (Ref: ibid, Section 5.1.2)
- As option to above, obtain Fugitive PM10 Management Plan (Ref: ibid, Section 5.2.1 and 5.2.2)
  - Must achieve at least 50% control efficiency (Ref: R8011, Section 7.0)
  - Must specify location, length, and area of unpaved traffic areas (Ref, ibid, 7.5.2)
  - Description of traffic conditions (vehicle trips per unit time; types of vehicles) (Ref: ibid, 7.5.3)
  - Description of control measures used and application details (Ref: ibid, 7.5.4)
  - Description of expected resulting road surface condition (Ref: ibid, 7.5.5)

### South Coast Requirements:

(No specific rule language for this category. See measures for “Unpaved Roads” for presumed applicable BACM.)

### Maricopa County Requirements:

- If utilized less than 35 days per year, use one of following:
  - a) Apply dust suppressants to maintain stabilized surface
  - b) Apply and maintain gravel to maintain stabilized surface

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(Ref: R310.01, Section 303, and 303.1)

- If utilized at least 35 days per year:
  - a) Add option, to above, to pave  
(Ref: *ibid*; also R310, Table 1, 1B,2B,3B)

### Clark County Requirements:

- For unpaved parking lots, use one of following:
  - a) Pave
  - b) Apply dust palliatives to maintain stabilized surface
  - c) Apply dust palliatives to travel lanes, and apply gravel to a depth of two inches in the parking areas to maintain stabilized surface (Ref: AQR Section 92.2.1 and 92.2.1.2)
- If parking lot is used intermittently, less than 35 days per year, and the lot was in existence prior to June 22, then application may be limited to period of use (Ref; *ibid*, 92.2.1 and 92.2.1.1)
- For staging areas:
  - Limit size of staging areas (Ref AQR, Section 94 Handbook, CST 17-1)
  - Apply water (Ref: *ibid*, CST 17-2)
  - Apply dust palliative (Ref: *ibid*, CST 17-3)
  - Limit vehicle speeds to 15 mph (Ref: *ibid*, CST 17-4)
  - Limit ingress and egress points (Ref: *ibid*, CST 17-5)

### Discussion:

The selection of applicable measures by SJV appears to be at least equivalent or more stringent than Maricopa County. Clark County has separated unpaved parking lots from unpaved staging areas, and has added measures for staging areas that reflect traffic movement, such as limiting the size of the staging area and limiting vehicle speeds, though it does not seem likely that speeds greater than 15 mph would be occurring within staging areas. Both Maricopa County and Clark County have recognized the intermittent nature of some unpaved parking lots, perhaps associated with infrequent events such as fairgrounds; and they have limited the application of control measures to the time periods when such parking lots would be used. This contrasts to the SJV de minimis limit of 75 vehicles per day, which in and of itself, is not a good parameter from which to gauge intermittent unpaved parking lot use. As a whole, it appears SJV would meet stringency limits by establishing an infrequent use limit of 35 days per year, and without specifying a de minimum vehicle use limit. Further, adding measures for staging areas, such as limiting the size of the area, as a best management practice, would meet the same level of stringency established by Clark County.

## BACM/BACT Demonstration – Appendix G

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**FUGITIVE DUST CATEGORY: WEED ABATEMENT ACTIVITIES**

**SUBCATEGORY: REQUIREMENTS**

### SJV Requirements:

There are no specific requirements for weed abatement, other than in the definition for “earthmoving activities.” However, in the “applicability” section of Rule 8021, weed abatement actions are not specifically identified. It can be presumed that the following actions apply:

- Pre-activity
  - Pre-water to limit VDE to 20% opacity (Ref 8021, Table 8021-2)
  - Phase work to reduce amount of disturbed surface area (Ref: ibid)
- During Active Operations
  - Apply water to limit VDE to 20% opacity (Ref: ibid)
- Stabilization During Periods of Inactivity
  - Restrict vehicle access to area
  - Apply water or chemical stabilizers to meet conditions of a stabilized surface (Ref: ibid)

### South Coast Requirements:

- Such activities subject to standards of Rule 403, unless:
  - a) Mowing or cutting is used, instead of discing, and maintains stubble at least three inches above the soil (Ref R403(h)(1)(H)(i))
  - b) If discing is used, there is a determination of a potential fire hazard (Ref: ibid, (ii))
- After discing, requirement for taking action on disturbed surface areas apply (Ref: ibid)

### Maricopa County Requirements:

- For weed abatement by discing or blading:
  - Pre-water and take post-discing actions (Ref: R310, Section 308.8 & Table 1, 1K)
  - Apply water during activity and take post-discing actions (Ref: ibid, 2K)
  - Post-discing/blading actions to meet requirement for stabilized surface:
    - a) pave
    - b) apply gravel
    - c) apply water
    - d) apply dust suppressant (Ref: ibid, 3K)
    - e) establish vegetative ground cover (Ref: ibid, 4K)

## BACM/BACT Demonstration – Appendix G

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### Clark County Requirements:

- If discing or blading is used on lots greater than 5000 square feet, then all of the following apply:
    - a) apply water before discing/blading
    - b) apply water during activity
    - c) implement one of the following for stabilized surface:
      - i) pave
      - ii) apply water
      - iii) apply dust palliative
- (Ref: AQR Section 90.2.2 and 90.2.2.1)

### Discussion:

The SJV requirements are somewhat vague in the sense that the only mention of weed abatement is in the definition of “earthmoving activities” without any further specificity for actions specific to weed abatement. In other approaches, Clark County and Maricopa County are very similar, except that Maricopa County does not have a de minimis area, and so it is considered to be more stringent in this case. South Coast goes one extra step in preventing soil disturbance by encouraging cutting or mowing in preference to discing. It would seem to be a better option to encourage such alternatives to soil-disturbing approaches, and would make sense to include this as an optional preferred method. If discing is utilized, the Maricopa County approach appears to be the most stringent and should be considered as a candidate measure.

## **BACM/BACT Demonstration – Appendix G**

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**FUGITIVE DUST CATEGORY:                      WINDBLOWN DUST**

**SUBCATEGORY:                                      DEFINITIONS**

### SJV Requirements:

Reference to wind blown dust is only included within the definition of “stabilized surface: any disturbed surface area or open bulk storage pile that is resistant to wind blown fugitive dust.” (Ref: R8011, Section 3.56)

There is no specific definition of “wind blown fugitive dust.”

### South Coast Requirements:

- Includes a definition for “wind-driven fugitive dust” as being “any visible emissions from any disturbed surface area which is generated by wind action alone.” (Ref: R403(c)(29))
- High wind conditions are specified as wind gusts in excess of 25 mph (Ref: R403(h)(2)(A)) and wind gust defined as maximum instantaneous wind speed (Ref: R403(c)(30))

### Maricopa County Requirements:

- Includes a definition of wind blown dust as being “visible emissions from any disturbed surface area which are generated by wind action alone (Ref: R310, Section 233)
- Includes a definition of wind event: “when the 60-minute average wind speed is greater than 25 mph” (Ref: ibid, 234)

### Clark County Requirements:

No definitions specified

### Discussion:

This section is provided for information purposes, since the “definition” of wind blown dust is not a control measure. It is helpful, though, to compare the existing definitions as specified by South Coast and Maricopa County.

## **BACM/BACT Demonstration – Appendix G**

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**FUGITIVE DUST CATEGORY:                      WINDBLOWN DUST**

**SUBCATEGORY:                                      CONSTRUCTION/EARTH MOVING**

### SJV Requirements:

(No requirements specified.)

### South Coast Requirements:

- For earthmoving:
  - Cease all active operations (Ref R403, Table 1, 1A)
  - Apply water to soil not more than 15 minutes prior to moving such soil (Ref: ibid, 2A)
- For unpaved roads at construction sites:
  - Apply chemical stabilizers prior to wind event (Ref: R403, Table1, 1C)
  - Apply water twice per hour during active operations (Ref: ibid, 2C)
  - Stop all vehicular traffic (Ref: ibid, 3C)

### Maricopa County Requirements:

- Cease dust generating activities for the duration of the wind event. If operation cease for the remainder of the day, stabilization measures must be implemented. (Ref: R310, Table 2, 1A)
- Apply water/dust suppressant once per hour (Ref: ibid, 2A)
- Apply water to maintain minimum 12% soil moisture content (Ref: ibid, 3A)
- Construct fences 3-5 feet high with 50% or less porosity, and must be done in conjunction with another measure, as above (Ref: ibid, 4A)

### Clark County Requirements:

- Cease all construction activities if fugitive dust exceeds 20% opacity and visible plume caused by winds cannot be controlled (Ref: AQR Section 94 Handbook, Gen 03)
- Continue to operate water trucks unless hazardous to do so (Ref: ibid, Gen 03, 2)

### Discussion:

Although high wind conditions are relatively rare in the SJV, having specific measures for such conditions are important when winds do occur. The most stringent measures would require frequent watering of any soil within 15 minutes, or ceasing operations entirely. If operations cease, water or water and dust suppressants should be applied to limit the amount of wind blown dust. Having exceptions under hazardous conditions are appropriate. South Coast is the only agency to have specific requirements for unpaved roads at construction sites, and hence these are the most stringent measures adopted.

## **BACM/BACT Demonstration – Appendix G**

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**FUGITIVE DUST CATEGORY:                      WINDBLOWN DUST**

**SUBCATEGORY:                                      DISTURBED AREAS**

### SJV Requirements:

(No specific requirements)

### South Coast Requirements:

- If operations remain inactive for not more than four consecutive days, apply water and chemical stabilizers in sufficient concentration to maintain a stabilized surface for six months (Ref: R403, Table 1, 0B)
- Apply chemical stabilizers prior to wind event (Ref: ibid, 1B)
- Apply water 3 times per day; if evidence of wind driven fugitive dust, increase watering to 4 times per day (Ref: ibid, 2B)
- Establish vegetative ground cover within 21 days after active operations have ceased (Ref: ibid, 3B)

### Maricopa County Requirements:

- Apply gravel or dust suppressants (Ref: R310, Table 2, 1B)
- Apply water 3 times per day; if evidence of wind driven fugitive dust, increase watering to 4 times per day (Ref: ibid, 2B)

### Clark County Requirements:

(No specific wind requirements, however, the general requirements for disturbed surface areas include provisions which are intended to reduce windblown dust:

- Prevent access to limit soil disturbance (Ref: AQR Section 94 Handbook, CST 11)
- Stabilize soil, using dust palliative or vegetation to maintain stabilized surface (Ref: ibid, CST 11-4 and 11-5)
- Pave or apply surface rock to maintain stabilized surface (Ref: ibid, CST 11-6))

### Discussion:

In preventing windblown emissions from disturbed areas, there are two elements to consider: short-term actions for situations where operations are suspended for a limited period of time; and secondly, for longer-term stabilization. For short-term actions, the most stringent requirements would include provisions for daily watering, with a minimum of three times per day; or use of water and chemical dust suppressants to create a stabilized surface. For longer term actions, use of a gravel covering, or chemical dust suppressants; and or the establishment of sufficient vegetative covering to create a stabilized surface are all appropriate actions. In addition, efforts should be made to restrict access to such disturbed areas.

## BACM/BACT Demonstration – Appendix G

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**FUGITIVE DUST CATEGORY:                      WINDBLOWN DUST**

**SUBCATEGORY:                                      BULK MATERIALS/STORAGE PILES**

SJV Requirements:

(No specific requirements)

South Coast Requirements:

- Apply water twice per hour (Ref: R403, Table 1, 1D)
- Install temporary coverings (Ref: ibid, 2D)

Maricopa County Requirements:

- Apply water twice per hour (Ref: R310, Table 2, 3B)
- Cover with tarps, plastic, or other material to prevent wind from removing coverings (Ref: ibid, 4B)

Clark County Requirements:

(No specific requirements for windblown emissions.)

Discussion:

The measures for both South Coast and Maricopa County are basically identical. Thus the most stringent measures call for watering twice per hour or using appropriate coverings.

### Identification and Justification of BACM Selection

The San Joaquin Valley is classified as a nonattainment area with respect to the National Ambient Air Quality Standards (NAAQS) for fine particulate matter (PM<sub>10</sub>). As the designated regional air quality planning agency for the San Joaquin Valley, the San Joaquin Valley Unified Air Pollution Control District (District) is charged with the responsibility for the analysis and selection of Best Available Control Measures (BACM) that will be implemented to ensure expeditious attainment of the national PM<sub>10</sub> standards. To address this requirement, the District commissioned Sierra Research to evaluate the technological and economic feasibility of implementing the proposed BACM measures for fugitive PM<sub>10</sub> source categories. The complete report is provided as Exhibit A to this appendix. The report presents the analyses and findings of the BACM evaluation.

Candidate BACM measures to be evaluated were selected by the District. These measures were designed to reduce emissions from fugitive PM<sub>10</sub> sources regulated by Regulation VIII. An initial investigation of BACM technologies concluded that while none of the candidate BACM measures were technologically infeasible, the costs of implementation for selected measures could be prohibitive.

To address this concern, an estimate of the cost-effectiveness of each candidate control measure was prepared. This was computed as the ratio of implementation cost to PM<sub>10</sub> emission reduction. Implementation costs included construction, operation, and maintenance costs borne by the source owner or operator. Emission reductions were computed as the products of baseline emissions and emission reduction, or control, efficiencies. The cost-effectiveness of each measure was calculated by dividing the cost of measure implementation by the emission reduction achieved, on the basis of the most appropriate measurement unit of source activity. Cost-effectiveness values vary over wide ranges because they are proportional to emissions reductions, which vary with both baseline emissions and control efficiency. For each candidate BACM, a worst-case scenario was evaluated to determine the upper bound of cost-effectiveness. When the computed worst-case cost-effectiveness value was less than \$5,000 or more than \$500,000 per ton of PM<sub>10</sub> reduced, no further analysis was conducted. For these cases, the range of cost-effectiveness values was expected to be either entirely affordable or entirely economically infeasible, respectively. When the worst-case value fell between these limits, additional scenarios were evaluated in order to present a representative range of outcomes.

**Table G-13.  
Identification and Justification of BACM Selection**

| <b>Control Measure</b>   | <b>What it Does</b>  | <b>Technological Feasibility</b>   | <b>Cost-Effectiveness</b>                               | <b>Accept<sup>2</sup>/Reject/ or Contingency Measure</b> | <b>Emission Reductions</b>  | <b>Discussion/ Justification</b>   |
|--|--|--|---|--|---|--|
| <b>0a: General</b><br>Add visible plume distance limit of 100 feet for construction and bulk materials   | Adds to existing 20% opacity limit to account for short-burst emissions in addition to time-integrated emissions   | Yes. VDE plume distance limits are contained in both South Coast and Clark County regulations.   | Not calculated: lack of data relating emissions to VDE. | <i>Accept</i>  | <i>NA</i>   | The current method for determining opacity of fugitive dust, as defined in Rule 8011, Appendix A, Section 2, is not deemed to be adequate for certain types of fugitive dust emissions, and this deficiency is recognized by EPA. Until a better test method is approved by EPA, a combination of opacity limits and VDE distance limits are needed to assure that excessive emissions do not occur.   |
| <b>1a: Paved Roads</b><br>Require 4-foot paved shoulders on new or modified paved roads  | Eliminates existing exemption for roads with less than 500 ADVT, consistent with EPA BACM guidance.  | Yes. Paving significantly reduces direct emission and trackout/re-suspension potential. There are no technological impediments for paving.   | \$13,800 to \$508,000                                   | <i>Accept</i>  | Minimum case: 1 tpd/67 mile-yr or<br>Typical case: 0.594 tpd/mile-yr. | With the elimination of the exemption, this is equivalent to BACM implemented in Clark County, and is therefore deemed to be an appropriate BACM for San Joaquin Valley. This measure is equivalent to "most stringent" implemented in other PM10 serious non-attainment areas.  |
| <b>1b: Paved Roads</b><br>Obtain commitments from municipalities to construct 4-foot paved shoulders on 50% of highest urban and 25% of highest rural ADT existing paved roads | Identifies those existing paved roads (with unpaved shoulders) with the highest daily vehicle traffic, and eliminates direct and indirect (trackout) emissions from vehicles traveling on these roads. | Yes. Paving significantly reduces direct emission and trackout/re-suspension potential. "Retrofit" actions on highest 50% ADT urban roads and 25% of highest rural ADT roads meets or exceeds current BACM in other areas. | \$7,290 to \$11,300                                     | <i>Accept</i>  | 0.60 tpd/mile-yr.   | "Retrofit" paving of unpaved shoulders on existing paved roadways have been implemented in Coachella Valley as tied to TEA-21 funding, and in Maricopa County commitments to treat 100 miles of shoulders over a 4-year period. Local government commitments for treating unpaved shoulders on the most heavily trafficked roads is an efficient approach, and is deemed to be BACM by comparison to BACM in Maricopa County and Coachella Valley. |
| <b>1c: Paved Roads</b><br>Require municipalities to purchase PM10-efficient street   | Applies to new purchases for city-operated or city-contracted street sweepers.   | Yes. Test procedures for determining certified PM10-efficiency have been developed. Use of such street sweepers is included in   | \$33  | <i>Accept</i>  | 1 tpd/176 mile-yr.  | Use of PM10-efficient street sweepers is an approved BACM in other serious PM10 non-attainment areas, and is determined to be BACM for the San Joaquin Valley.   |

<sup>2</sup> Measures that are accepted will be considered during rule development for amendments to Regulation VIII. The measures ultimately adopted are subject to change based on the public process. Measures rejected will receive no further consideration during rule development.

**BACM/BACT Demonstration – Appendix G**

**Table G-13.  
Identification and Justification of BACM Selection**

| <b>Control Measure</b>  | <b>What it Does</b>  | <b>Technological Feasibility</b>  | <b>Cost-Effectiveness</b> | <b>Accept<sup>2</sup>/Reject/ or Contingency Measure</b>                             | <b>Emission Reductions</b> | <b>Discussion/ Justification</b>  |
|---|--|---|---------------------------|--|----------------------------|---|
| sweepers  |  | regulations in South Coast, Clark County and Washoe County.   |                           |  |                            |   |
| <b>1d: Paved Roads</b><br>Require purchase of at least one PM10- efficient street sweeper within three years  | Assures that the acquisition and use of PM10-efficient street sweepers occurs on a timely basis.   | Yes. PM10 efficient street sweepers are commercially available.   | \$792                     | <i>Accept</i>  | 1 tpd/176 mile-yr.         | Implementation affects local government budget processes. Accordingly a time period of 3 years is considered reasonable to require purchase of such equipment. This does not preclude earlier purchases – it just assures that local governments cannot unreasonably postpone such purchases. This is analogous to the time period allowed by South Coast as part of Rule 1186.   |
| <b>1e: Paved Roads</b><br>Require priority sweeping on dirt-laden roads   | Assures that the use of PM10-efficient street sweepers optimizes reduction of re-entrained road dust   | Marginal Yes. This is predicated on the ability of local government staff to properly identify where the greatest dirt loadings typically occur. This may be based on staff experience or objective parameters, such as proximity to unpaved roads or other intersecting unpaved surfaces. Some local governments may be able to properly make such determinations; some may not. | Not calculated.           | <b><i>Accept as a voluntary measure</i></b><br><br>(OR use as a Contingency Measure) | N/A                        | Requirements for use PM10-efficient street sweepers in other areas focus on routine or event street sweeping. Targeting dirtier roads may yield greater benefits, but there may not be an acceptable method for municipalities to make this determination, or to enforce this. As a result, this should be considered a voluntary measure to be implemented by jurisdictions which have sufficient information on which to base such decisions. |
| <b>1f: Paved Roads</b><br>Require PM10-efficient street sweeping frequency of at least once per month on roads where such street sweepers are used. | Establishes a minimum level of usage of PM10-efficient street sweepers to assure that roadway dirt does not accumulate to unacceptable levels. | Yes. This should be within the typical sweeping frequency of municipalities. Some scheduling adjustments may be necessary to accommodate this measure, but it is not deemed to be unreasonable.   | \$1,070                   | <i>Accept</i>  | 1 tpd/27.7 mile-yr.        | Similar to BACM implemented in Washoe County to assure minimum level of street sweeping frequency. If current scheduled frequencies are equal or greater than once per month, there is no benefit from this measure, so in that regard it is a “backstop” measure for a minimum acceptably level of activity.   |
| <b>1g: Paved Roads</b><br>Require PM10-efficient street   | Assures that the operation of the street sweepers is not degraded due to lack of   | Yes. Operation of equipment according to manufacturer specifications should be the  | Not calculated.           | <i>Accept</i>  | NA                         | This is the same requirement as BACM implemented in South Coast and Washoe County. It assures that the street sweepers  |

**BACM/BACT Demonstration – Appendix G**

**Table G-13.  
Identification and Justification of BACM Selection**

| <b>Control Measure</b>  | <b>What it Does</b>   | <b>Technological Feasibility</b>  | <b>Cost-Effectiveness</b> | <b>Accept<sup>2</sup>/Reject/ or Contingency Measure</b> | <b>Emission Reductions</b>   | <b>Discussion/ Justification</b>  |
|---|---|---|---------------------------|--|--|---|
| sweepers be operated according to manufacturer's specs; including on-site record-keeping  | maintenance or improper operation   | normal course of operation. This requirement is mandated in other PM10 serious areas.   |                           |  |  | do not lose effectiveness due to inappropriate operation or maintenance. It is deemed to be an appropriate condition to meet BACM for street sweeper operation.   |
| <b>1h: Paved Roads</b><br>Require removal of dirt/debris from roadways within 24 hours of identification of such conditions after a wind or rain runoff event | Assures that large deposits of re-entrainable material do not remain on road surfaces for extended periods of time.   | Yes. Would require procedures to be established for detection, notification, and subsequent action regarding event-related accumulations of dirt on roadways, but such procedures should be able to be developed by local government staff. It is not unreasonable to expect this to be done.                                       | \$2,850                   | Accept<br><br>(OR, use as a Contingency Measure)         | 0.225 tpd/spill  | Though wind and heavy rain events are relatively rare in the San Joaquin Valley, event-related erosion of soil and dirt onto public paved roads can be a major source of re-entrainable PM10 if not removed quickly. This measure is similar the most stringent BACM for event cleanup, as implemented in Maricopa County.  |
| <b>1i: Paved Roads</b><br>Require proper procedures be followed in removing wind/rain related dirt deposits from roads  | Minimizes dust emissions which could be caused by improper handling of dirt removal process.  | Yes. Local government staff may need to receive education/training on proper procedures to remove dirt deposits if greater than can be accommodated by a street sweeper alone. It is not unreasonable to expect the District to assist with such training. This meets or exceeds conditions established in other agencies for BACM. | Not calculated.           | Accept   | NA   | Improper handling and disposal of soil/dirt after a wind/rain event can negate many of the emission reduction benefits of rapid removal, since improper methods can mechanically cause emissions. Requirements for proper removal techniques have been implemented as BACM in Maricopa County, and as such, are deemed to be BACM for the San Joaquin Valley.   |
| <b>2a: Trackout</b><br>Under Rule 8041, Section 5.3, add requirements applicable to 20 or with vehicles with more than three axles                            | Assures an equivalency between 150 light duty vehicles and 16 heavy-duty vehicles. (Existing limitation of 150 vehicles does not distinguish between light and heavy duty, which is needed since emissions are a function of vehicle weight.) | Yes. There are no technological impediments to establishing equivalent de minimis levels separately for light duty vehicles and heavy-duty vehicles.  | \$44,100 to \$387,000     | Accept   | Minimum case:0.0045 tpd/yr<br>Typical case: 0.041 tpd/facility-yr. | This measure distinguishes between emissions potential between light and heavier duty vehicles, as related to the number of axles on the vehicle. The de minimis level of 150 vehicles is appropriate, based on work by Sierra Research. However, that estimate was based on a light-duty pick-up truck. More appropriately, an equivalent de minimis level for heavier-duty vehicles is needed to maintain the |

BACM/BACT Demonstration – Appendix G

**Table G-13.  
Identification and Justification of BACM Selection**

| Control Measure   | What it Does   | Technological Feasibility   | Cost-Effectiveness    | Accept <sup>2</sup> /Reject/ or Contingency Measure | Emission Reductions  | Discussion/ Justification   |
|---|--|---|-----------------------|---|--|---|
|   |  |   |                       |   |  | legitimacy of the de minimis level. Based on emissions calculations, 16 vehicle trips per day is the equivalent threshold, and therefore establishes valid thresholds satisfying BACM requirements.   |
| <b>2b: Trackout</b><br>Require trackout control devices to be 25 feet long and full road width    | Establishes minimally acceptable dimensions for the prevention of trackout onto public paved roadways when using trackout control devices          | Yes. Trackout control devices have been shown to prevent trackout by causing dirt/mud to be removed from tires prior to exiting onto a paved road. Establishing these minimum dimensions is approximately equivalent to BACM implemented in South Coast.  | \$13,700 to \$322,000 | Accept  | Minimum case: 0.00496 tpy/facility-yr.<br>or<br>Typical case: 0.058 tpy/facility-yr. | Giving specific minimum dimensions for such devices increases the preventative nature of trackout control, and therefore more directly meets the intent of BACM. Specific dimensions have been implemented as BACM in other PM10 non-attainment areas, and these dimensions are consistent with those implemented elsewhere.  |
| <b>2c: Trackout</b><br>Require paved interior roads to be 100 feet long and full road width       | Establishes minimally acceptable dimensions for paving interior roadways as a means of preventing trackout onto public paved roadways.             | Yes. Interior paved roads prior to exit allow for mud/dirt to be tracked onto the paved apron, thereby substantially reducing or eliminating trackout onto public paved roads. Establishing minimum dimensions is approximately equal to BACM dimensions implemented in Maricopa County and South Coast | \$7,930 to \$186,000  | Accept  | Minimum case: 0.0038 tpy/facility-yr.<br>or<br>Typical case: 0.045 tpy/facility-yr.  | Current rules require a “sufficient length” of paved road to allow mud/dirt to drop off before reaching the public paved roadway. Giving specific minimum dimensions for paving increases the preventative nature of trackout control, and therefore more directly meets the intent of BACM. Specific dimensions have been implemented as BACM in other PM10 non-attainment areas, and these dimensions are consistent with those implemented elsewhere |
| <b>2d: Trackout</b><br>Require gravel pads to be 3 inches deep, 50 feet long, and full road width | Establishes minimally acceptable dimensions for applying gravel to interior roadways as a means of preventing trackout onto public paved roadways. | Yes. Gravel pads allow dirt/mud accumulations to be removed from tires prior to exiting onto public paved roads.  | \$27,500 to \$322,000 | Accept  | Minimum case: 0.00496 tpy/facility-yr.<br>or<br>Typical case: 0.058 tpy/facility-yr  | Current rules do not include gravel pads as a trackout control option. Gravel pads are an additional control method, and specifying dimensions meets the BACM preference for preventative measures. The dimensions are similar to BACM implemented in Clark County and Maricopa County.   |
| <b>2e: Trackout</b><br>Remove trackout onto public paved roads within one hour of such occurrence | Limits the time for re-entrained dust to occur, thereby reducing emissions   | Yes. Various methods exist to remove trackout: street sweeping, broom sweeping; and rapid removal of trackout prevents re-entrainment of dirt as fugitive dust.   | Not calculated.       | Accept<br><br>(OR use as a Contingency Measure)     | N/A  | If preventative measures are not sufficient, then rapid mitigation of trackout is necessary. Current rules require removal if trackout exceeds 50 feet. This provision requires removal within one hour, and is equivalent to the most stringent time-related   |

BACM/BACT Demonstration – Appendix G

**Table G-13.  
Identification and Justification of BACM Selection**

| Control Measure  | What it Does   | Technological Feasibility  | Cost-Effectiveness | Accept <sup>2</sup> /Reject/ or Contingency Measure | Emission Reductions   | Discussion/ Justification   |
|--|--|--|--------------------|---|---|---|
|  |  |  |                    |   |   | trackout removal BACM, as implemented in South Coast.   |
| <b>2f: Trackout</b><br>Eliminate exemption in Rule 8041 for off-field agriculture          | Limits the exemption to on-field agricultural activities only, consistent with other Reg. 8 provisions.                          | Yes. There are no technological impediments related to applying trackout controls to off-field agricultural activities.  | Not calculated.    | Accept with modification                            | N/A   | Trackout would be considered as part of the off-field agricultural Best Management Practices, along with unpaved roads and unpaved staging areas. Exemption would apply conditionally to those off-field ag operations without acceptable BMP's.  |
| <b>3a: Unpaved Roads</b><br>Limit vehicle speeds to 25 mph                                 | Since emissions are proportional to vehicle speed, this reduces emissions by limiting the maximum speed limit on unpaved roads.  | Conditionally Yes. Prima facie speed limits are established by legislation as part of the California Vehicle Code Section 22365. Currently lower speed limits for unpaved roads are applicable only to South Coast. Legislation is required to implement this measure.                             | \$1,080            | Accept  | @100% Comp. = 1 tpy/~5 centerline miles-yr.<br>@25% Comp. = 1tpy/~20 centerline miles-yr. | This measure meets BACM implemented in the Coachella Valley. Implementation would involve a commitment on the part of the San Joaquin Valley District to seek legislative authority for speed limit restrictions within the San Joaquin Valley.   |
| <b>3b: Unpaved Roads</b><br>Require all new non-temporary roads in urban areas to be paved | Prevents new unpaved roads in urban areas thereby preventing new sources of fugitive dust  | Yes. Paving substantially lowers fugitive dust emissions as compared to unpaved roads. Requiring paving of any new unpaved road within urban areas is the most stringent measure that can be applied to potential new unpaved roads.   | \$2,160 to \$5,920 | Accept  | <b>Minimum case: 7.4 tpy/centerline-mile</b><br>or<br>20.43 tpy/centerline-mile           | A ban on any new non-temporary unpaved roads (by requiring that such roads be paved) is the most stringent approach that can be taken to prevent new unpaved roads. As such it meets or exceeds criteria for BACM.  |
| <b>3c: Unpaved Roads</b><br>Require existing unpaved roads in urban areas to be paved      | Establishes a target of paving 20% or up to 5 miles of unpaved roads within each incorporated municipality over a 5-year period. | Marginally Yes. Paving is the most effective way to reduce unpaved road emissions. Reducing the number of unpaved road miles in urban areas will affect local government budgets to do this. Establishing a phased implementation schedule will allow local governments to plan accordingly and to | \$2,160 to \$5,920 | Accept  | NA  | A phased schedule for treating a specified number of miles of unpaved roads to reduce emissions have been implemented in South Coast, Maricopa County, and Clark County. Specifying that such unpaved roads be paved utilizes the most control-efficient of all the options, and is therefore deemed to meet or exceed similar requirements implemented as BACM in these areas. |

**BACM/BACT Demonstration – Appendix G**

**Table G-13.  
Identification and Justification of BACM Selection**

| <b>Control Measure</b>   | <b>What it Does</b>   | <b>Technological Feasibility</b>  | <b>Cost-Effectiveness</b> | <b>Accept<sup>2</sup>/Reject/ or Contingency Measure</b> | <b>Emission Reductions</b>                          | <b>Discussion/ Justification</b>  |
|--|---|---|---------------------------|--|---|---|
|  |   | secure additional funding, i.e., through CMAQ.  |                           |  |   |   |
| <b>3d Unpaved Parking/ Staging Areas</b><br>Require existing Rule 8071, Sec 5.1.2 provisions to apply to a vehicle limit of 75 or more vehicle trips/day | Lowers existing threshold limit of 100 VT per day down to a limit of 75 VT per day  | Yes. Modeling by Sierra Research determined a de minimis level of about 50 vehicle trips per day. This measure lowers the threshold for the most rigorous control options from 100 to 75 VDT. In conjunction with measure 3f, the de minimis level is more than adequately covered. | \$3,510                   | <i>Accept</i>  | 0.036 tpy for a 1.0 acre parking lot                | The lower de minimis level coupled with the control options are consistent with BACM established by South Coast, Maricopa County, and Clark County. As such, this is deemed to meet BACM requirements.  |
| <b>3e Unpaved Parking/ Staging Areas</b><br>Require watering and speed controls on unpaved areas receiving up to 50 VT/day                               | Establishes dust control on lower use parking lots, currently now exempt.   | No. Actions would pertain to activity levels shown to be below de minimis, and air quality benefits would be questionable.  | \$1,960,000               | <i>Reject</i>  | 0.00015 tpd   | This would require actions at levels below those shown to be de minimis. This, coupled with the extraordinarily high cost-effectiveness, is deemed to be justifiable rationale for rejecting this measure.  |
| <b>3f Unpaved Parking/ Staging Areas</b><br>Require existing Rule 8071, Sec 5.1.1 provisions to apply to a vehicle limit of 51-75 vehicle trips/day      | Lowers existing threshold limit of 75 VT/day down to a limit of 51-75 VT/day.   | Yes. (See comments for measure 3d.)   | \$9,420 to \$91,400       | <i>Accept</i>  | Minimum case: 0.0589 tpy or Typical case: 0.425 tpy | Since the lower threshold is about ½ the modeled de minimis level, this exceeds BACM requirements implemented in Maricopa County.   |
| <b>3g Unpaved Parking/ Staging Areas</b><br>Require unpaved parking areas with activity above 100 VT/day to apply specified control options. Watering    | Eliminates watering as an acceptable control option on the higher-use unpaved parking lots. Watering is less effective with heavier travel and can increase trackout onto paved roads upon exiting. | Yes. Eliminating watering as an acceptable option has no technological impediments. There are sufficient alternative methods available. Watering may remain an option if vehicles will operate exclusively within the site thereby eliminating                                      | \$5,230 to \$30,500       | Accept<br><br>(OR use as a Contingency Measure)          | Minimum case: 0.175 tpy or Typical case: 0.766 tpy  | This recognizes the potential for increased trackout resulting from watering in high vehicle activity areas, and requires that other dust control techniques be used. This is deemed to be approximately equivalent to BACM implemented in Maricopa County. |

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**Table G-13.  
Identification and Justification of BACM Selection**

| <b>Control Measure</b>   | <b>What it Does</b>  | <b>Technological Feasibility</b>  | <b>Cost-Effectiveness</b>   | <b>Accept<sup>2</sup>/Reject/ or Contingency Measure</b> | <b>Emission Reductions</b>  | <b>Discussion/ Justification</b>  |
|--|--|---|---|--|---|---|
| allowed if vehicles remain on-site.  |  | potential trackout.   |   |  |   |   |
| <b>3h Unpaved Parking/ Staging Areas</b><br>Require the same options as in 3g for VT/day to apply to vehicles with more than two axles with activity above 35 VT/day | Establishes an equivalency condition between 75 VT/day for light duty vehicles and 35 VT/day for heavy-duty vehicles, since emissions are a function of vehicle weight, and trackout increases with the number of wheels, as related to the number of axles. | Yes. There are no technological impediments to establishing equivalent de minimis levels separately for light duty vehicles and heavy-duty vehicles.  | \$22,800 to \$207,000 (equivalent costs to existing requirements for 100 light duty vehicles) | Accept<br><br>(OR use as a Contingency Measure)          | 0.23 tpy per 100 2-axle vehicles/day or 0.0258 tpy per 10 3-axles vehicles/day. | This measure distinguishes between emissions potential between light and heavier duty vehicles, as related to the number of axles on the vehicle. The de minimis level of 100 vehicles is appropriate, based on work by Sierra Research. However, that estimate was based on a light-duty vehicles. More appropriately, an equivalent de minimis level for heavier-duty vehicles is needed to maintain the legitimacy of the de minimis level. Based on emissions calculations, 35 vehicle trips per day is the equivalent threshold, and therefore establishes valid thresholds satisfying BACM requirements |
| <b>3i Unpaved Parking/ Staging Areas</b><br>Require 48-hr notification to District of special events with parking of more than 1000 vehicles on unpaved surfaces     | Improves District enforcement capability by being advised of large events.   | Yes. There are no technological impediments for notification processes.   | Minor administrative costs.   | Accept   | 0.0167 tpd per event  | Certain administrative requirements, such as dust control plans and on-site record-keeping help ensure proper compliance. Similarly, notification of the occurrence of a large event can assist enforcement and compliance efforts. As such, this is deemed to be a needed component to satisfy BACM requirements.  |
| <b>3j Unpaved Parking/ Staging Areas</b><br>Eliminate the existing one-acre applicability provision  | Establishes a better basis for control based on VT/day, since emissions are based to a much greater extent on vehicle activity level rather than area.   | Yes. Since emissions are related to vehicle activity, an area-based de minimis condition has no technical merit. Elimination of this applicability provision is more technically appropriate. | \$5,980 to \$59,800   | Accept   | Minimum case: 0.777 tpy or Typical case: 7.76 tpy                               | Meets BACM implemented by Clark County and Maricopa County, neither of which have a de minimis area limitation.   |
| <b>4a (See Measure 0a)</b>   |  |   |   |  |   |   |

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| <b>Control Measure</b>  | <b>What it Does</b>   | <b>Technological Feasibility</b>   | <b>Cost-Effectiveness</b> | <b>Accept<sup>2</sup>/Reject/ or Contingency Measure</b> | <b>Emission Reductions</b>  | <b>Discussion/ Justification</b>  |
|---|---|--|---------------------------|--|---|---|
| <b>4b Demolition</b><br>Apply dust suppressants to erodible surfaces within 100 feet of structure.  | Inhibits dust emissions from surfaces upon which debris may fall.                                   | Yes. Reduction of emissions greatest with taller structures, where falling debris can impact a greater surface area around the structure. Technological feasibility questionable for structures three or fewer stories since debris often remains mostly within the structure's initial footprint. | \$129,000 to \$159,000    | Accept with modification                                 | Minimum case: 0.040 tons per demolition or<br>Typical case: 0.032 tons per demolition | Due to the relatively high cost-effectiveness coupled with the technological assessment, it is recommended that this measure be modified to exclude buildings 3 or fewer stories. The approach to require actions prior to demolition is a proactive approach and therefore deemed more appropriate as BACM.                        |
| <b>4c Demolition</b><br>Apply water within 1-hour of demolition to erodible surfaces within 100 feet of structure   | Inhibits dust emissions from surfaces upon which debris may fall. (This is an option to measure 4b) | Yes. (See comments for measure 4b.)  | Not calculated.           | Accept with modification                                 | NA  | Similar to measure 4b, due to the relatively high cost-effectiveness coupled with the technological assessment, it is recommended that this measure be modified to exclude buildings 3 or fewer stories. The approach to require actions prior to demolition is a proactive approach and therefore deemed more appropriate as BACM. |
| <b>4d Demolition</b><br>Apply water or dust suppressants to areas where equipment will operate  | Stabilizes surfaces upon which equipment will travel.   | Yes. Watering and dust suppressants have been shown to reduce emissions. Watering must not be overdone to create mud, which then can increase trackout.  | Not calculated.           | Accept   | NA  | This is a proactive measure approximately equivalent to BACM implemented in Clark County.   |
| <b>4e Demolition</b><br>Apply water or dust suppressants to disturbed soils and debris within one hour after demolition is complete or at the end of each workday | Minimizes the potential for wind derived emissions after activities have ceased                     | Yes. Watering and dust suppressants have been shown to create artificial surface "crusts" which are more resistant to windblown emissions than untreated disturbed soils.  | \$7,220,000               | Reject   | 0.03 pounds per day   | High wind events are rare in the San Joaquin Valley. Under such conditions, emissions from these sources are negligibly small compared to other erodible sources. The cost-effectiveness is over \$7 million per ton. Therefore there are justifiable reasons to reject this measure.   |
| <b>4f Demolition</b>  | Reduces windblown   | Yes. Windy conditions can  | \$847,000                 | Accept   | 0.019 tpd on  | Since wind events are rare, the   |

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**Table G-13.  
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| <b>Control Measure</b>   | <b>What it Does</b>   | <b>Technological Feasibility</b>  | <b>Cost-Effectiveness</b>                   | <b>Accept<sup>2</sup>/Reject/ or Contingency Measure</b>          | <b>Emission Reductions</b>                      | <b>Discussion/ Justification</b>   |
|--|---|---|---|---|---|--|
| Prohibit demolition activities when wind speeds exceed 25 mph  | emissions which otherwise would occur due to equipment operations on disturbed surfaces                                 | exacerbate emissions from demolition activities, and prohibiting such activities on high wind days would reduce emissions and their transport over a large area.  |   | (OR use as a Contingency Measure)                                 | high wind day                                   | implementation of this measure will be rare as well. Although the cost-effectiveness has been determined to be very high, public health considerations for longer distance transport of building debris dust under windy conditions warrants acceptance of this measure, even though the PM10 emissions will be very small as compared to other sources. |
| <b>4g Construction</b><br>Require Dust Control Training Class  | Requires at least one key person from the developer/ builder to receive training within 90 days of Dust Plan submittal. | Yes. Knowledge of dust control prevention and mitigation practices by construction personnel can substantially improve the ability of the responsible operator to comply with dust control regulations.   | Not calculated.<br>(Administrative process) | Accept  | NA  | Education is an important component of proper implementation of dust control practices at construction sites. This is similar to the BACM best management practice implemented by Clark County.  |
| <b>4h Construction</b><br>Require a dust monitor on-site for projects with more than 50 acres of disturbed surface | Requires a builder/developer to have a designated person on site to manage and optimize dust control activities.        | Yes. Larger construction operations have many sources of fugitive dust. A dedicated monitor can direct and coordinate dust control operations more effectively and efficiently, as demonstrated at a large construction site in the Coachella Valley, and also as included as BACM in Clark County. | \$231,000 to \$339,000                      | Accept<br><br>(OR use as a Contingency Measure)                   | 0.032 ton for 50 ac. site during 6 mos. Project | Although the cost-effectiveness is high, this is a measure that has been implemented without undue industry hardship in Clark County. Therefore it is deemed acceptable to implement as BACM in the San Joaquin Valley.  |
| <b>4i Construction</b><br>Require minimum soil moisture content of 12% for earthmoving                             | Establishes an appropriate level of soil moisture to minimize emissions from earthmoving operations                     | Marginally Yes. The greater the soil moisture, the more the soil is able to agglomerate, thereby reducing the potential for dust emissions. In some cases, optimum soil moisture for compaction is less than 12%, in which case an exemption is deemed to be appropriate.                           | \$21,600 to \$56,000                        | Accept with modification<br><br>(OR use as a Contingency Measure) | .0014 ton/ac site<br>or<br>0.056 ton/40 ac site | The 12% soil moisture requirement is included as BACM in South Coast and Maricopa County. It would be appropriate to allow an exemption for lower soil moisture content if it can be demonstrated that such conditions are needed to meet optimum soil moisture for compaction conditions. A similar exemption applies in South Coast                    |

## BACM/BACT Demonstration – Appendix G

**Table G-13.  
Identification and Justification of BACM Selection**

| Control Measure   | What it Does   | Technological Feasibility  | Cost-Effectiveness                      | Accept <sup>2</sup> /Reject/ or Contingency Measure | Emission Reductions   | Discussion/ Justification   |
|---|--|--|---|---|---|---|
| <b>4j Construction</b><br>Limit on site vehicle speeds to 15 mph  | Limits unpaved road emissions since emissions are proportional to vehicle speed.   | Marginally Yes. For larger construction sites, distances of internal unpaved roads may encourage higher speed limits. Controlling speed limits will reduce the potential for increased emissions. Ability to enforce this requirement may be problematic, however, and such limitations may preclude gaining desired emissions reductions. | \$850                                   | <i>Accept</i>                                       | 0.154 ton per project   | A 15-mph speed limit for active operations has been established as BACM in South Coast. Accordingly, this measure is deemed to be equivalent to South Coast, and therefore BACM for the San Joaquin Valley.   |
| <b>4k Construction</b><br>Require speed limit signage at sites greater than 10 acres  | For larger sites, signage serves as a reminder of speed limit requirements, improving compliance.                                | Yes. In conjunction with 4j, this measure will gain a greater level of compliance with constant reminders of speed limits. While enforcement may still be problematic, it is anticipated that signage must be used with measure 4j at larger sites for measure 4j to be effective.   | \$2,490 to \$74,600                     | <i>Accept</i>                                       | Worst case:<br>0.019 ton per project<br>or<br>Typical case:<br>0.289 ton per project                | A signage requirement is deemed to be an appropriate method to accompany measure 4j.  |
| <b>4l Construction</b><br>Clarify Table 8021-2-C2 to "Meet conditions of a stabilized surface" as defined in Rule 8011, Sec 3.56            | Removes ambiguity in existing rule language which seems to suggest there are two different definitions for "stabilized surface." | Yes. There is no change to the existing rule requirements. This merely clarifies ambiguous language.   | Not calculated.<br>(Clarification only) | <i>Accept</i>                                       | NA  | Clarification by removing ambiguities is intended to improve the control effectiveness of the existing rule.  |
| <b>4m Construction</b><br>Require Dust Control Plans for residential projects larger than 10 acres, and for commercial projects larger than | Lowers the existing de minimis level from 40 acres.  | Yes. Dust plans help to improve accountability and enforcement of required dust control actions. Accordingly, lowering the de minimis thresholds will include more operations within the dust planning process.  | \$17,200 to \$31,500                    | <i>Accept</i>                                       | <b>Minimum case: 1.03 tons/10 ac. project</b><br>or<br><b>Typical case: 1.9 tons/10 ac. project</b> | The proposed de minimis level of 10 acres is equivalent to BACM requirements in Clark County, less stringent than Maricopa County, and more stringent than South Coast. Accordingly this is considered an appropriate threshold for acceptable BACM considerations. |

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**Table G-13.  
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| <b>Control Measure</b>  | <b>What it Does</b>   | <b>Technological Feasibility</b>   | <b>Cost-Effectiveness</b>                          | <b>Accept<sup>2</sup>/Reject/ or Contingency Measure</b> | <b>Emission Reductions</b>  | <b>Discussion/ Justification</b>   |
|---|---|--|--|--|---|--|
| 5 acres   |   |  |  |  |   |  |
| <b>4n Construction</b><br>Require notification to District of any earthmoving operations between 1 and 10 acres residential, or 1 and 5 acres commercial projects | Improves enforceability by giving District knowledge of where smaller earthmoving projects are occurring.               | Yes. This is a notification process only with no required actions attached to the notification. As an administrative requirement, this is deemed to be technologically feasible.   | Minor administrative costs                         | <i>Accept</i>  | Minimum case: 0.11 ton/earth-moving phase or<br>Typical case: 0.04 ton/earth-moving | Certain administrative requirements, such as dust control plans and on-site record-keeping help ensure proper compliance. Similarly, notification of the existence of construction operations down to one acre can assist enforcement and compliance efforts. As such, this is deemed to be a needed component to satisfy BACM requirements.   |
| <b>5a Bulk Materials</b><br>Require that visible dust emissions not exceed the property line  | Assures that short-term bursts of emissions from the handling of bulk materials do not go beyond the property line.     | Yes. This is intended to complement measure 0a which adds a distance factor for VDE. Since in some operations where storage of bulk materials is temporary and its location may have some flexibility, the intent is to have operators consider locating such active storage piles at locations away from the property boundaries. If located more than 100 yards from the property line, then measure 0a would prevail. | Not calculated: no data relating emissions to VDE. | <i>Accept</i>  | <i>NA</i>   | The current method for determining opacity of fugitive dust, as defined in Rule 8011, Appendix A, Section 2, is not deemed to be adequate for certain types of fugitive dust emissions, and this deficiency is recognized by EPA. Until a better test method is approved by EPA, a combination of opacity limits and VDE distance limits are needed to assure that excessive emissions do not occur. In this case, a property line limit is justified to assure proper controls if storage piles are located close to property lines.  |
| <b>5b Bulk Materials</b><br>Require wind barriers to be less than 50% porosity  | Clarifies existing requirement for wind barriers by specifying minimum porosity needed for effective emission controls. | Yes. Minimum specified porosity limits assure wind-lowering effectiveness.   | \$659,000  | Accept as voluntary measure                              | 0.33 lbs/yr for a 5 cu. yd. pile  | This is similar to BACM requirements implemented in South Coast and Maricopa County. However, the cost-effectiveness is high, and because wind events are rare, and emissions are related to such wind events, it cannot be concluded in areas with higher wind conditions, such as South Coast and Maricopa County, that there is an equivalent cost-effectiveness implemented without undue hardship. With greater frequency of wind events, cost-effectiveness would be lower than that estimated for the San Joaquin Valley. Therefore, this measure is recommended to be a voluntary measure. |

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**Table G-13.  
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| <b>Control Measure</b>  | <b>What it Does</b>   | <b>Technological Feasibility</b>  | <b>Cost-Effectiveness</b>  | <b>Accept<sup>2</sup>/Reject/ or Contingency Measure</b> | <b>Emission Reductions</b>                       | <b>Discussion/ Justification</b>  |
|---|---|---|--|--|--|---|
| <b>5c Bulk Materials</b><br>Limit exemption in Rule 8031, Sec 4.4 to storage only   | Eliminates the exemption for handling of materials less than 100 cubic yards.   | Marginally Yes. Measures to reduce emissions from handling of bulk materials have been shown to be effective, and are implemented in all serious non-attainment areas. There is a question of whether extremely small storage piles would be feasible, due to enforcement difficulties in locating such conditions which may exist under short duration in localized areas. | \$659,000  | <i>Accept with modification</i>                          | 0.33 lbs/yr for a 5 cu. yd. pile                 | Emissions due to handling of bulk materials are due to the mechanical processes involved, not wind. As such, equivalent measures implemented in other PM10 serious non-attainment areas are deemed to be implemented without undue economic hardship, despite the high cost-effectiveness value calculated for San Joaquin Valley. However, it is recommended that the definition of an open storage pile in Rule 8011 be modified to exclude a de minimis size of "less than 3 feet in height and less than 150 square feet," as defined by South Coast and Maricopa County. |
| <b>5d Bulk Materials</b><br>Add additional option (A5) to Table 8031, Part A, to allow 3-sided enclosure, at least as high as the storage pile, with less than 50% porosity           | Allows for an additional option with specificity necessary to reduce emissions. | Yes. Allowing additional options which have been used in practice in other areas is deemed to be technologically feasible. Implemented as BACM in South Coast and Maricopa County.  | Not calculated.<br>(Optional measure – to be implemented only if regulated party elects to use this measure over other options.) | <i>Accept</i>  | NA   | This is a BACM option provided in both South Coast and Maricopa County regulations. As such, this is deemed as acceptable option to add to existing Rule 8031 options.  |
| <b>6a Disturbed Open Areas</b><br>Change applicability to 0.5 acres in urban areas, or 3 acres in non-urban areas, which contain disturbed surface areas of at least 1000 square feet | Reduces exemption in existing Rule 8051 from 3 acres disturbed surface area.    | Yes. Most single family residential property will still be exempted. Since a 0.5-acre or lower limit has been implemented as part of BACM in South Coast, Clark County, and Maricopa County, this threshold adjustment is deemed technologically feasible.  | \$67,800   | <i>Accept</i><br><br>(OR use as a Contingency Measure)   | 3.01 lb/1000 sq. ft. of area.                    | The current 3-acre exemption is greater than corresponding exemptions in other PM10 serious non-attainment areas. This measure aligns the exemption threshold to one which more closely meets corresponding limits established as BACM in other areas.  |
| <b>6b Disturbed Open Areas</b><br>Imposes Rule 8051 requirements immediately after  | Eliminates existing 7-day exemption period in Rule 8051.                        | Marginally Yes. Since this is a windblown emission measure, the effectiveness of the measure is dependant upon the occurrence of a  | \$6,450 to \$33,600  | <i>Accept</i><br><br>(OR use as a Contingency Measure)   | Worst case:<br>7.54 lbs/3 acres for 7 days<br>or | This is a wind-related measure which could have substantial benefits if wind conditions occur during the existing 7-day exemption period. There is no justifiable basis as to the appropriateness of a 7-day exemption, as  |

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| <b>Control Measure</b>   | <b>What it Does</b>  | <b>Technological Feasibility</b>   | <b>Cost-Effectiveness</b> | <b>Accept<sup>2</sup>/Reject/ or Contingency Measure</b>    | <b>Emission Reductions</b>  | <b>Discussion/ Justification</b>  |
|--|--|--|---------------------------|---|---|---|
| cessation of disturbance   |  | wind event during the 7-day period previously exempted. If there is no wind event during the 7-day period, there is no emissions benefit.  |                           |   | Typical case: 39.30 lbs/3 acres for 7 days  | opposed to 3-days, 6, days, 10 days, etc. Therefore, without justifiable rationale, it is deemed consistent with BACM requirements to eliminate the exemption entirely.   |
| <b>7a Windblown Dust</b><br>Cease construction activities when a wind event is declared. (Wind event defined as any day in which 1-minute wind gust exceeds 25 mph as determined by the District.) | Reduces windblown emissions by removing emissions which otherwise would have been contributed by ongoing operations                                | Marginally Yes. Declarations of wind events in the San Joaquin Valley are expected to be rare due to the infrequency of high winds. However, should high winds be forecast as a wind event, ceasing operations would result in emissions reductions. This is similar to BACM implemented in the Coachella Valley for a high-wind event declaration. Effectiveness of this measure is predicated upon staff ability to correctly predict such days. | \$7,770 to \$12,700       | Accept upon demonstration of ability to predict wind events | <b>Low Control Efficiency Scenario: 0.243 tpd or</b><br>High Control Efficiency Scenario: 0.399 tpd | This could be an effective measure to limit emissions on infrequent wind events based on a predicted wind event. Prior to implementing this measure, the District should commit to developing a predictive high wind advisory program, and if shown to be even moderately accurate, should proceed to implement this measure. (Without a moderate degree of demonstrated accuracy, this measure will not be effective.) |
| <b>7b Windblown Dust</b><br>Cease construction activities when 20% opacity is exceeded and plume distance exceeds 100 yards  | Assures that, in the absence of a declared wind event, activities stop when dust controls are insufficient to contain VDE to meet required limits. | Yes. Requirements for ceasing operations under windy conditions have been implemented as BACM in South Coast, Clark County, and Maricopa County.   | Not calculated.           | <i>Accept</i>   | <i>NA</i>   | When high winds cause emissions to exceed VDE limits despite on-going dust control activities, then the only remaining effective measure is to stop activities. Since this approach has been taken in South Coast, Maricopa County, and Clark County, it is deemed to be an appropriate BACM for the San Joaquin Valley.  |
| <b>7c Windblown Dust</b><br>Require continued operation of water trucks when construction ceases due to wind, unless unsafe to do so   | Increases soil moisture to reduce erodibility of soil from wind action.  | Marginally Yes. Watering has been shown to have temporary effectiveness in reducing windblown dust from disturbed surfaces. Similar to BACM enacted in South Coast and Clark County. Effectiveness of the watering is counterbalanced by potential emissions   | \$0                       | <i>Accept with modification</i>                             | <i>NA</i>   | This is equivalent to BACM requirements implemented in South Coast and Clark County. There should, however, be an exemption that would stop watering activities if VDE from the water truck operations exceed VDE from windblown emissions at the overall site. Contractors, as part of the education process, should be encouraged to employ front-distributing water trucks.  |

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|--|---|--|--|---|--|--|
|  |   | caused by the vehicle moving over the disturbed surface. If watering is spread from the front, rather than the rear of the water truck, emissions from the water truck is minimized.   |  |   |  |  |
| <b>7d Windblown Dust</b><br>For disturbed open areas, requires more than one control method if VDE exceeds 20% opacity due to windblown dust | Increases control effectiveness when existing measure is insufficient to meet VDE limits.                           | No. Since existing regulations require the establishment of a stabilized surface on disturbed open areas, and since only after a 20% VDE exceedance is it determined that an existing measure is insufficient to comply, there may be no advantage to a greater application of one control method as compared to a combination of methods. For example, if vegetation is insufficient to control emissions, then a different vegetation type or a more complete coverage of vegetation may work as well as a combination of methods. | \$15,000 to \$65,600                               | <i>Reject</i>   | Minimum case: 0.098 ton/yr per 3 ac. site<br>or<br>Typical case: 0.073 ton/yr per 3 ac. site | Based on the technological analysis, there is no evidence to show that implementation of more than one control method would achieve greater benefits than greater application of one method.   |
| <b>7e Windblown Dust</b><br>Cease material handling activities when dust plumes cross property line  | Reduces windblown emissions by removing emissions which otherwise would have been contributed by ongoing operations | Yes. If control efforts are not sufficient to limit VDE, then ceasing operations are the only measure left to prevent emissions due to handling activities.  | Not calculated: no data relating emissions to VDE. | <i>Accept</i><br><br>(OR use as a Contingency Measure)      | <i>NA</i>  | When high winds cause emissions to exceed VDE limits despite on-going dust control activities, then the only remaining effective measure is to stop activities. Since this approach has been taken in South Coast, Maricopa County, and Clark County, it is deemed to be an appropriate BACM for the San Joaquin Valley. |
| <b>7f Windblown Dust</b><br>For storage piles, during a wind event, water at   | Prevents or mitigates emissions which otherwise would have been caused by wind action.                              | Marginally Yes. Declarations of wind events in the San Joaquin Valley are expected to be rare due to the infrequency of high winds.  | \$9,240 to \$27,700                                | Accept upon demonstration of ability to predict wind events | Minimum case: 0.00078 ton/high wind day<br>or  | This could be an effective measure to limit emissions on infrequent wind events based on a predicted wind event. Prior to implementing this measure, the District should commit to developing a predictive   |

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|--|---|--|---------------------------|--|---|--|
| least once per hour or cover piles with tarps or similar coverings   |   | However, should high winds be forecast as a wind event, taking preventative action would result in emissions reductions. Effectiveness of this measure is predicated upon staff ability to correctly predict such days.  |                           |  | Typical case: 0.00234 ton/high wind day | high wind advisory program, and if shown to be even moderately accurate, should proceed to implement this measure. (Without a moderate degree of demonstrated accuracy, this measure will not be effective.)   |
| <b>8a Weed Abatement</b><br>Add exemption for mowing and/or cutting which maintains at least 3 inches of stubble | Encourages mowing/cutting of weeds rather than disking<br>Disking disturbs soils which caused fugitive dust, and leaves areas subject to wind erosion. Mowing/cutting does not. | Yes. Cutting and mowing leaves a stubble which is resistant to wind erosion. Exemption is justified. Some field conditions which contain rocks could cause spark-ignited fires, and it needs to be recognized that such conditions may be deemed a fire hazard. Adding an exemption will foster this method where it is feasible and non-hazardous to do so. | Not calculated.           | <i>Accept</i>  | NA                                      | Although this proposed measure is an added EXEMPTION, it will specifically encourage mowing/ cutting as opposed to disking. The more mowing/cutting is used in lieu of disking, the lower the fugitive dust emissions from both the activity itself, and the subsequent potential for windblown emissions from the resulting disturbed surface. Therefore, this exemption is deemed to encourage a process with lower emissions. Similar distinctions between disking and cutting are contained in BACM in South Coast, Clark County, and Maricopa County regulations. |

Notes:

- 1) For the technology assessment of any control measure involving the use of dust suppressants and/or dust palliatives, it should be recognized that there are limitations as to what is acceptable from the water quality standpoint. Any use of such product used to comply with air quality regulations is assumed to meet acceptable water quality conditions or criteria as established by federal, state, or local agencies. Based on current conditions, there are deemed to be sufficient products commercially available to satisfy these conditions, and the technological evaluation accordingly does not consider these factors to be significant impediments for acceptability.
- 2) Because of existing and potential drought conditions, the use of water as a dust suppressant warrants special consideration. Operators responsible for compliance with dust control regulations should be strongly encouraged to use reclaimed water to the maximum extent feasible. In severe drought conditions, watering may no longer be a viable dust control option. However, current and proposed regulations do not require watering as the only means of dust control.

### Regulation VIII RACM Analysis

#### Introduction

The District is required by the EPA to demonstrate that measures adopted to control emissions of fugitive PM<sub>10</sub> satisfy the requirements of reasonably available control measure (RACM) technology. Although the primary purpose of the information contained in this appendix is to demonstrate BACM, this RACM analysis is provided to show that the existing rules satisfy the RACM requirement until the District completely implements all Regulation VIII BACM commitments. And although BACM, once approved by EPA, subsume RACM, it is important, nevertheless, to rectify those deficiencies so that a RACM finding can be completed by EPA in the event EPA's evaluation of the proposed BACM is either untimely or deemed not to be complete. Accordingly, this section provides the analyses, discussions, comparisons, and justifications necessary for EPA to complete the RACM determination for the existing Regulation VIII.

Sierra Research (Sierra) and Mel Zeldin reviewed the EPA requirements in federal regulations and prepared the analysis provided as Exhibit B to this appendix with respect to compliance with those requirements. A summary of Exhibit B is provided below.

#### Requirements for RACM

Sections 172(c)(1) and 189(a)(1)(C) of the Clean Air Act together require that moderate area PM<sub>10</sub> nonattainment plans include reasonably available control measures (RACM) for existing sources of fugitive PM<sub>10</sub>. The methodology for determining RACM is partially described in “General Preamble” regulations published by EPA.<sup>i\*</sup>

In summary, the General Preamble regulations list the available control measures applicable to fugitive PM<sub>10</sub> sources.<sup>ii</sup> The list of candidate RACM applicable to sources regulated by the San Joaquin Valley Air Pollution Control District's (District) Regulation VIII is presented in Table 1 of Exhibit B. Also included in the table are the corresponding Regulation VIII rules that incorporate the candidate RACM. Where candidate RACM do not need to be adopted by the District, for reasons that are explained below, the entry of “Not Applicable” is included in the Regulation VIII column.

Table G-14 summarizes the consultant's findings with respect to how each of the General Preamble candidate measures applicable to fugitive PM<sub>10</sub> sources can be addressed in a demonstration of Regulation VIII as RACM. See Exhibit B to this appendix for the complete document.

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\*Superscripts denote references provided at the end of this document.

| <p align="center"><b>Table G-14.<br/>Recommended Disposition of Candidate RACM</b></p>  |   |   |
|---|---|---|
| Candidate Measure   | Rationale for Exemption   | Rationale for Demonstration as RACM   |
| 1. Pave, vegetate, or chemically stabilize access points where unpaved traffic surfaces adjoin paved roads.   |   | 1. Justified as reasonably less stringent than approved BACM<br>2. Lower thresholds are not cost-effective  |
| 2. Require dust control plans for construction and land clearing projects.  |   | Justified as reasonably less stringent than approved BACM<br>Lower thresholds are not cost-effective  |
| 3. Require haul trucks to be covered.   |   | Rule 8031 is reasonably equivalent to approved RACM/BACM rules  |
| 4. Provide for traffic rerouting or rapid clean up of temporary (and not readily preventable) sources of dust on paved roads (water erosion runoff, mud/dirt carryout areas, material spills, skid control sand). Delineate who is responsible for cleanup. | Water erosion runoff, material spills, and skid control sand are de minimis sources | 1. Justified as reasonably less stringent than approved BACM.<br>2. Lower thresholds are not cost-effective for carryout control                          |
| 5. Require paving, chemically stabilizing, or otherwise stabilizing permanent unpaved haul roads, and parking or staging areas at commercial, municipal, or industrial facilities.  |   | 1. Rule 8061 is more restrictive than approved RACM rules for unpaved haul roads;<br>2. Lower thresholds are not cost-effective for unpaved parking areas |

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| <b>Table G-14.<br/>Recommended Disposition of Candidate RACM</b>  |                                    |  |
|---|------------------------------------|--|
| Candidate Measure   | Rationale for Exemption            | Rationale for Demonstration as RACM  |
| 6. Develop traffic reduction plans for unpaved roads. Use of speed bumps, low speed limits, etc., to encourage use of other (paved) roads.  | Not technologically feasible       |  |
| 7. Limit use of recreational vehicles on open land (e.g., confine operations to specific areas, require use permits, outright ban).   |                                    | 1. Justified as reasonably less stringent than approved BACM<br>2. Lower thresholds are not cost-effective |
| 8. Require improved material specification for and reduction of usage of skid control sand or salt (e.g., require use of coarse, nonfriable material during snow and ice season). | Not applicable to District sources |  |
| 9. Require curbing and pave or stabilize (chemically or with vegetation) shoulders of paved roads.  |                                    | 1. Justified as reasonably less stringent than approved BACM<br>2. Lower thresholds are not cost-effective |
| 10. Pave or chemically stabilize unpaved roads.   |                                    | Rule 8061 is more restrictive than approved RACM rules   |
| 11. Pave, vegetate, or chemically stabilize unpaved parking areas.  |                                    | Lower thresholds are not cost-effective  |
| 12. Establish dust control measures for material storage piles.   | De minimis source category         |  |
| 13. Provide for storm water drainage to prevent water erosion onto paved roads.   | De minimis source                  |  |
| 14. Require vegetation, chemical stabilization, or other abatement of wind erodible soil, including lands subjected to  |                                    | 1. Justified as reasonably less stringent than   |

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| <b>Table G-14.<br/>Recommended Disposition of Candidate RACM</b> |                                |  |
|--|--------------------------------|--|
| <b>Candidate Measure</b>   | <b>Rationale for Exemption</b> | <b>Rationale for Demonstration as RACM</b>                 |
| water mining, abandoned farms, and abandoned construction sites. |                                | approved BACM<br>2.Lower thresholds are not cost-effective |

### VI. BACM Analysis for Agricultural Operations

This source category includes on-field and off-field agricultural practices. It does not include food processing and storage operations that fall under stationary source regulations. Analysis of the emission inventory identified several agricultural sources as significant. They include tilling, harvesting, dust from agricultural lands, cattle feedlot dust, livestock waste, unpaved agricultural roads, and agricultural open burning.

The comparative analysis to identify feasible controls for these sources was relatively simple. Only two other regions have adopted measures for on-field agriculture approved as BACM by EPA. No other areas of the country have been required to pursue controls on agricultural sources as BACM or RACM, although the Columbia River Plateau area of the Pacific Northwest is implementing a program to reduce windblown dust from agricultural lands. The two areas examined are the South Coast Air Quality Management District (SCAQMD) and Maricopa County, Arizona. Both areas rely on agricultural best management practices (BMP) to meet the BACM requirement. Unpaved roads

The District considers that these existing programs are an indication of feasibility and not a mandate for their adoption. The District control strategy for these source categories, Conservation Management Practices (CMP) Program, is being designed to account for differences in commodities grown, farming practices, climate soils, and economics in the San Joaquin Valley. In addition, the District program will also initially address reducing PM10 from Concentrated Animal Feeding Operation (CAFO).

District staff analyzed the technical and economic feasibility of the CMP Program's requirements and also analyzed a preliminary list of practices that may be selected by the growers. The "on-field" section for the program shown in the Table G-15 below examines the program components for on-field activities and unpaved roads and unpaved vehicle/traffic areas. The CAFO section in Table G-16 examines the program components for other agricultural industries such as the dairy, livestock, and poultry. Given the uncertainty in emission reductions for implementing conservation management practices and operations, cost estimates and emissions reduction estimates are limited in detail. However, a preliminary analysis to evaluate the potential cost effectiveness for certain on-field practices was conducted (see Table G-17).

### Comparative Analysis of Agricultural Fugitive Dust Sources

The following analysis was prepared by Mel Zeldin, Environmental Consultant under contract with the District. The analysis provides a detailed comparison of the agricultural fugitive dust control programs adopted by areas designated serious nonattainment for PM10 and therefore subject to the BACM requirement. The references listed for each area refer to the specific rule provision in that areas' fugitive dust rule or regulation. This analysis was completed prior to the development of the District's draft Conservation Management Practice (CMP) Program.

**FUGITIVE DUST CATEGORY:                    WINDBLOWN DUST**

**SUBCATEGORY:                                    AGRICULTURAL OPERATIONS**

SJV Requirements:

(No specific requirements)

South Coast Requirements (for Coachella Valley only):

- When wind speeds exceed 25 mph, cease agricultural tilling or soil mulching activities. (Ref: R403.1(d)(4))
  - Exemptions occur when prohibitions due to wind occur for at least 6 hours on two consecutive days, in which case a one-day exemption is allowed.
  - Also, if prohibitions occur for 60 hours during a calendar month, then an exemption is allowed for the remainder of the calendar month. (Ref: R403.1(h)(4)(A))

Maricopa County Requirements:

(No specific requirements)

Clark County Requirements:

(No specific requirements)

Discussion:

South Coast has implemented the only agricultural restrictions, for the Coachella Valley, to limit tilling/mulching operations under high wind conditions, defined as greater than 25 miles per hour. Hence these are the most stringent in effect.

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**FUGITIVE DUST CATEGORY:                    AGRICULTURAL OPERATIONS**

**SUBCATEGORY:                                    REQUIREMENTS**

### SJV Requirements:

Applies only to off-field activities (which excludes all activities associated with preparing land for growing of crops, or raising of fowl or animals; drying or pre-cleaning of crop material; handling and storage of crop material in the field where harvested or where animals are raised; and disturbances of cultivated land by fallowing, planting, fertilizing or harvesting.)

- Off-field control measures for bulk materials are the same as specified in Rule 8031, (Ref: R8081, Section 5.1)
- Off-field control measures for paved roads are the same as Rule 8061 as applied to construction standards for shoulder width and medians for new/modified paved roads (Ref: *ibid*, 5.2.1)
- Off-field control measures for unpaved road segments are the same as specified in Rule 8061 (Ref: *ibid*, 5.2.2)

### South Coast Requirements:

For agricultural operations within the South Coast Air Basin, with combined disturbed surface area of 10 acres or more, the standards of Rule 403 apply after July 1, 1999 unless Best Management Practices as delineated in the Rule 403 Agricultural Handbook are implemented. (Ref: R403(h)(1))

Best Management Practices as described in the Agricultural Handbook are as follows:

- a) Active conservation practices
  - 1) Ensure adequate soil moisture so that VDE do not exceed 100 feet
  - 2) Irrigate or bed fields as soon as feasible
  - 3) Utilize conservation tillage practices
  - 4) Apply mulch or other materials to help bind soil
- b) Inactive conservation practices
  - 1) Comply with local dust ordinances relating to agricultural operations
  - 2) Establish cover crops that maintain a minimum 60% ground cover
  - 3) Maintain crop residues at a minimum 60% ground cover as determined by line-intersection method
  - 4) Conduct surface roughening by bedding, rough disking, or tillage that leaves stable clods
  - 5) Alternate strips of row crops with wind-resistant crops
  - 6) Establish tree or shrub windbreaks at right angles to prevailing winds
  - 7) Establish ridge plantings by normal tillage and planting equipment at a right angle to the prevailing winds

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- 8) Plant or maintain perennial or annual plants as a vegetative wind barrier by planting throughout a field at a right angle to the prevailing wind
  - c) Farm yard areas
    - 1) Establish or maintain sufficient vegetation to prevent wind driven dust
    - 2) Use water or dust suppressants to bind soils
    - 3) Apply surface improvements (gravel, paving, etc)
    - 4) Reduce disturbed areas by at least 50%
  - d) Trackout conservation practices
    - 1) Pave or apply dust suppressants on unpaved road connections with public paved roads, preferably to a distance of 100 feet from the paved road
    - 2) Use trackout prevention devices
    - 3) Avoid turning tractors and other farm machinery on public paved roads if soil will be dropped on the road. If material is dropped, clean the road at the conclusion of the activity
  - e) Unpaved road conservation practices
    - 1) Reduce vehicle speeds to a maximum of 15 mph
    - 2) Restrict public access to private roads by using signage or obstructions
    - 3) Apply water, dust suppressants, mulch or other materials to unpaved roads prior to heavy use periods
    - 4) Improve heavily used roads by paving, applying gravel or recycled road base material
  - f) Storage pile conservation practices
    - 1) Enclose with a three-sided barrier equal to height of pile
    - 2) Water sufficiently to prevent wind driven fugitive dust
    - 3) Apply chemical stabilizers
    - 4) Cover with tarps, plastic, or other materials
- (Ref: Guide to Agricultural PM10 Dust Control Practices, dated June 1999)
- For livestock operations of 10 acres or larger:
    - Cease hay-grinding activities between 2 and 5 pm if visible emissions extend
      - more than 50 feet from the source (Ref: R1186(d)(5))
    - Treat all unpaved access connections and unpaved feed lane access areas with
      - pavement, gravel to a depth of four inches, or asphaltic road base (Ref: ibid (6))

### Maricopa County Requirements:

For commercial feedlots and commercial livestock areas:

- Apply dust suppressants to limit VDE to 20% opacity (Ref R310.01,
- Section 305.1a), or
- Apply and maintain surface gravel to limit VDE to 20% opacity (Ref: ibid, 305.1b), or
- Install shrubs and/or trees within 50 to 100 feet of animal pens to limit VDE to 20% opacity (Ref: ibid, 305.1c)

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### Clark County Requirements:

(No specific agricultural requirements)

### Discussion:

The South Coast Rule 403 subjects agricultural operations to a long list of best management practices which encompass many of the requirements for non-agricultural sources. Although implementation and documentation of BMP is considered “voluntary,” failure to do so subjects the owners/operators to the basic standards of the rule, which include VDE beyond the property line, implementation of at least one BACM for each fugitive dust source, upwind-downwind limit of 50 ug/m<sup>3</sup> of PM<sub>10</sub>, and trackout control requirements. As such, these BMP are deemed the stringent requirements for agricultural operations

For livestock and feedlots, both South Coast and Maricopa County have taken steps to reduce emissions, mainly from disturbed surfaces. South Coast has a de minimis size of 10 acres, whereas Maricopa County does not specify a minimum size. Hence the application of measures to control dust from unpaved roads and access areas is more stringent in Maricopa County. South Coast has provisions for hay grinding activity which is not contained in Maricopa County and therefore the South Coast provision is most stringent for this source.

### **Comparative Analysis Summary Tables for Agricultural Sources**

The following table provides comparison of the agricultural fugitive PM<sub>10</sub> programs and rules in PM<sub>10</sub> serious nonattainment areas with the District’s proposed Conservation Management Practices (CMP) Program. The conclusions regarding the BACM demonstration are those of District staff.

**Table G-15. BACM Comparative Analysis for “On-Field Activities”**

| ON-FIELD ACTIVITIES             |  |   |   |   |
|---------------------------------|--|---|---|---|
| <b>Program/Rule Features</b>    | <b>SCAQMD: Rule 403 conservation practices</b>   | <b>Maricopa County: Agricultural PM10 General Permit</b>  | <b>San Joaquin Valley APCD: Proposed Agricultural Conservation Management Program</b>   | <b>BACM Justification Discussion</b>  |
| General Applicability           | Agricultural Operations that have more than 10 contiguous acres of land located within the South Coast Air Basin   | 10 or more contiguous acres of land used for agricultural purposes located within the Maricopa County PM10 Nonattainment area | All agricultural operations located within the San Joaquin Valley Air Basin   | Proposed portion of the Program contains the most stringent measure.  |
| Approach or rule requirements   | Voluntary implementation of the listed conservation practices to maintain exemption from all Rule 403 requirements   | General permit by rule requires implementation of a minimum of three best management practices                                | Implementation based on selection of conservation management practice (CMP) for each identified category  | Proposed portion of the Program contains the most stringent measure.  |
| Exempt Categories or exemptions | Orchards, vine crops, nurseries, range land, and irrigated pasture, and agricultural operations of raisin of fowls or animals                                    | None, but growing certain crops is considered implementation of the required BMP for that category.                           | Growers with farm size equal to or less than 100 acres will not be subject to reporting requirements, but will be provided with information regarding the practices to encourage participation.                                       | The effect of the exemption on emission reductions is minimal, but it provides a greatly reduced administrative burden. By limiting the reporting requirement to farms under 100 acres 91 percent of the land area would still be covered and about 28% of the farms would be required to submit reports. |
| Technical justification waiver  | If a farmer cannot apply the required conservation practices or verifiable alternatives, he may be able to submit a technical justification statement for waiver | None  | Growers may use other practices than those included in the Program by submitting justification for NRCS/District approval. Growers unable to identify measures must provide justification based on technical or economic feasibility. | This program administrative provision is roughly equivalent in SCAQMD and SJVAPCD.  |

**Table G-15. BACM Comparative Analysis for “On-Field Activities”**

| ON-FIELD ACTIVITIES   |  |   |  |   |
|-----------------------|--|---|--|---|
| Program/Rule Features | SCAQMD: Rule 403 conservation practices                      | Maricopa County: Agricultural PM10 General Permit | San Joaquin Valley APCD: Proposed Agricultural Conservation Management Program | BACM Justification Discussion   |
| Categories            | Active   | Tillage and harvest                               | Land preparation<br>Harvesting   | --  |
|                       | Inactive   | Cropland  | Other  | The SJVAB does not have a windblown dust problem to anywhere near the extent of the other nonattainment areas. The SJVAB has some of the lowest average windspeeds in the country. No wind related exceedances have been recorded in the basin during the last three years. Wind speeds are highest during the spring when PM10 levels are at their lowest. The majority of the fugitive dust emissions are generated from earth disturbing activities. Certain soil types and crops are more prone to windblown dust problems. The “Other” category will give the farmers with the potential to experience wind blown dust emissions the flexibility to address this issue with a CMP. |
|                       | Farm Yard Area<br>Storage Piles<br>Unpaved Roads<br>Trackout | Non-Cropland                                      | Unpaved roads<br>Unpaved traffic areas   | Regulation VIII addresses all sources/conservation practices listed under South Coast AQMD Rule 403. However, growers with lower activity rates than require action under Regulation VIII will be required to implement a CMP for these listed categories. The combination of Regulation VIII and the CMP Program make this measure at least as stringent as those adopted by other areas.  |

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**Table G-15. BACM Comparative Analysis for “On-Field Activities”**

| ON-FIELD ACTIVITIES  |   |   |  |  |
|--|---|---|--|--|
| <b>Program/Rule Features</b>   | <b>SCAQMD: Rule 403 conservation practices</b>  | <b>Maricopa County: Agricultural PM10 General Permit</b>  | <b>San Joaquin Valley APCD: Proposed Agricultural Conservation Management Program</b>  | <b>BACM Justification Discussion</b>   |
| Minimum Number of practices required to be implemented for each category | Active – 1 in addition to cessation of tilling and soil preparation when winds are over 25 mph. | Tillage and harvest –1  | Land preparation --1<br>Harvesting –1  | See justification above.   |
|  | Inactive – 3  | Cropland – 1  | Other --1  |  |
|  | Farm yard area – 1<br>Trackout – 1<br>Unpaved Roads – 1<br>Storage Piles – 1                    | Non cropland – 1  | Unpaved roads --1<br>Unpaved vehicle/equipment traffic areas --1   |  |
| Recordkeeping  | Self monitoring form  | Maintain a record detailing the BMPs implemented for each category – must provide to ADEQ within 2 business days of request | Maintain a CMP Plan on-site, and submit a copy to Resource Conservation District (RCD) annually  | The SJV program is similar to the other areas, but requires annual reporting to RCD. This makes the SJV Program the most stringent.  |
| Compliance Assurance   | Conduct routine inspections on farms and conduct inspections on a complaint basis               | Conduct routine inspections on farms near urban interfaces, and conduct inspections on a complaint basis                    | Conduct inspections on a complaint basis, and employ an independent auditing agency to conduct a random audit to determine extent of implementation of CMP plans | The SJV program is likely to be the most effective because it requires a field check to ensure that growers are implementing the measures claimed on their CMP Plans where other areas require on investigation of complaints. |
| Backstop   | Rule 403 Fugitive Dust  | N/A   | Implementation of District reporting and enforcement actions and potential for additional CMP requirement  | Although the SJV approach is different, the effect on compliance is the same. The SJV survey requirement will ensure that program effectiveness is achieved.   |

**Table G-15. BACM Comparative Analysis for “On-Field Activities”**

| ON-FIELD ACTIVITIES          |  |  |   |  |
|------------------------------|--|--|---|--|
| <b>Program/Rule Features</b> | <b>SCAQMD: Rule 403 conservation practices</b> | <b>Maricopa County: Agricultural PM10 General Permit</b> | <b>San Joaquin Valley APCD: Proposed Agricultural Conservation Management Program</b> | <b>BACM Justification Discussion</b>   |
|                              |  |  |   |  |
| Compliance Date              | June 30, 1999                                  | December 31, 2001  | January 1, 2004   | --   |
| Cost effectiveness           | N/A  | N/A  | The cost effectiveness for selected practices and crop type is found in Table 3.      | SJV growers are allowed to reject measures based on technical and economic feasibility upon approval of NRCS and the District consistent with EPA BACM guidance. |

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**Table G-16: BACM Comparative Analysis for Concentrated Animal Feeding Operations**

FOR CONCENTRATED ANIMAL FEEDING OPERATION (CAFO)

| <b>Program/Rule Features</b>    | <b>Imperial County APCD: Rule 420 Livestock Feed Yards</b>   | <b>Antelope Valley AQMD: Rule 1186-PM10 Emissions from Paved and Unpaved Roads, and Livestock Operations</b>   | <b>South Coast AQMD: Rule 1186-PM10 Emissions From Paved and Unpaved Roads, and Livestock Operations</b>   | <b>San Joaquin Valley APCD: Agricultural Conservation Management Practices Program</b>  | <b>BACM Justification Discussion</b>   |
|---------------------------------|--|--|--|---|--|
| General Applicability           | Any person using or operating a livestock feed yard  | Vehicular travel on paved and unpaved roads, and at livestock operations   | Vehicular travel on paved and unpaved roads, and at livestock operations   | All CAFO located within the San Joaquin Valley Air Basin  | Proposed portion of the SJV Program contains the most stringent measure  |
| Approach or rule requirements   | Shall acquire and maintain a “Livestock Feed Yard Certificate”, including a plan designed to control dust.   | Regarding livestock: cease all hay grinding activities between 2 and 5 pm if visible emissions extend more than 50 feet from a hay grinding source, AND treat all unpaved access connection and unpaved feed access areas with either pavement, gravel, or asphaltic road-base | Regarding livestock: cease all hay grinding activities between 2 and 5 pm if visible emissions extend more than 50 feet from a hay grinding source, AND treat all unpaved access connection and unpaved feed access areas with either pavement, gravel, or asphaltic road-base | Implementation based on selection of conservation management practices (CMP) for each identified category. CAFO will also need to implement on-field practices if applicable. | The CAFO portion of the CMP Program is under development. There is no evidence that hay grinding is a PM10 problem in the SJV. |
| Exempt Categories or exemptions | A minimum 20% moisture content limit for up to 60 days when submitting an alternative dust plan, and a minimum 40% moisture content limit during rainy periods | Not applicable to livestock operations whose contiguous bounded areas include less than ten acres  | Not applicable to livestock operations whose contiguous bounded areas include less than ten acres  | To be determined  | No exemption levels have been determined for the SJV CAFO CMP Program.   |
| Technical justification waiver  | N/A  | N/A  | N/A  | Operators may use other practices than those included in the Program by submitting justification for District’s and NRCS approval   | The SJV program recognizes that growers will identify innovative measures not listed in the program guidance document. CMPs    |

**BACM/BACT Demonstration – Appendix G**

**Table G-16: BACM Comparative Analysis for Concentrated Animal Feeding Operations**

FOR CONCENTRATED ANIMAL FEEDING OPERATION (CAFO)

| Program/Rule Features | Imperial County APCD: Rule 420 Livestock Feed Yards | Antelope Valley AQMD: Rule 1186-PM10 Emissions from Paved and Unpaved Roads, and Livestock Operations | South Coast AQMD: Rule 1186-PM10 Emissions From Paved and Unpaved Roads, and Livestock Operations | San Joaquin Valley APCD: Agricultural Conservation Management Practices Program   | BACM Justification Discussion   |
|-----------------------|---|---|---|---|---|
|                       |   |   |   |   | suggested by growers as alternatives to listed measures will be reviewed by the District's AgTech Committee for use in the next update of the CMP Handbook.   |
| Categories            | N/A   | N/A   | N/A   | Preliminary suggestions: <ul style="list-style-type: none"> <li>• Entrained dust from animal movement</li> <li>• Manure and waste handling</li> <li>• Unpaved roads</li> <li>• Unpaved vehicle/equipment traffic area</li> <li>• Other</li> </ul> | Program for CAFOs is under development, but no other area has rules or BMPs in place on this source. SCAQMD dairy rules are currently under development, but there is no assurance that the current provisions will be adopted as the final rule. |

**BACM/BACT Demonstration – Appendix G**

**Table G-16: BACM Comparative Analysis for Concentrated Animal Feeding Operations**

FOR CONCENTRATED ANIMAL FEEDING OPERATION (CAFO)

| Program/Rule Features  | Imperial County APCD: Rule 420 Livestock Feed Yards        | Antelope Valley AQMD: Rule 1186-PM10 Emissions from Paved and Unpaved Roads, and Livestock Operations | South Coast AQMD: Rule 1186-PM10 Emissions From Paved and Unpaved Roads, and Livestock Operations | San Joaquin Valley APCD: Agricultural Conservation Management Practices Program   | BACM Justification Discussion   |
|--|--|---|---|---|---|
| Minimum Number of practices required to be implemented for each category | N/A  | N/A   | N/A   | Preliminary proposal: <ul style="list-style-type: none"> <li>• Entrained dust from animal movement --1</li> <li>• Manure and waste handling --1</li> <li>• Unpaved roads --1</li> <li>• Unpaved vehicle/equipment traffic area --1</li> </ul> | SJV most stringent measure  |
| Record-keeping   | Accomplished through the "Livestock Feed Yard Certificate" | None  | None  | Maintain a CMP Plan on-site, and submit a copy to RCD annually.   | During development of the CMP Program, the District will examine feedlot issues and potential controls to determine if special recordkeeping is appropriate.  |
| Compliance Assurance   | Accomplished through District's compliance procedures      | Accomplished through District's compliance procedures   | Accomplished through District's compliance procedures   | An independent auditing agency to conduct a random audit of grower operations to verify CMPs are accomplished.<br><br>Conduct inspections on a complaint basis  | The SJV program is likely to be the most effective because it requires a field check to ensure that growers are implementing the measures claimed on their CMP Plans where other areas require investigation of complaints. |
| Backstop   | N/A  | N/A   | N/A   | Implementation of District  | SJV most stringent  |

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**Table G-16: BACM Comparative Analysis for Concentrated Animal Feeding Operations**

FOR CONCENTRATED ANIMAL FEEDING OPERATION (CAFO)

| Program/Rule Features | Imperial County APCD: Rule 420 Livestock Feed Yards | Antelope Valley AQMD: Rule 1186-PM10 Emissions from Paved and Unpaved Roads, and Livestock Operations | South Coast AQMD: Rule 1186-PM10 Emissions From Paved and Unpaved Roads, and Livestock Operations | San Joaquin Valley APCD: Agricultural Conservation Management Practices Program | BACM Justification Discussion  |
|-----------------------|---|---|---|---|--|
|                       |   |   |   | reporting and enforcement actions and potential for additional CMP requirement. |  |
| Compliance Date       | Adopted 08/13/02                                    | Adopted 02/14/97<br><br>Livestock Provisions on unpaved areas: No later than January 1, 1998          | Amended 09/10/99<br><br>Livestock Provisions on unpaved areas: No later than January 1, 1998      | January 1, 2004   | NA   |
| Cost Effectiveness    | --  | --  | --  | To be determined  | Economic feasibility will differ from operation to operation, and growers can reject measures based on economic infeasibility upon approval by NRCS and the District based on EPA BACM guidance. |

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| <b>Table G-17:<br/>Cost Effectiveness for selected CMPs</b> |   |   |  |
|---|---|---|--|
| <b>CMP</b>  | <b>DEFINITION</b>   | <b>Cost Effectiveness<br/>(\$/ton of PM10<br/>reduced/yr)</b> | <b>Comments</b>  |
| Bed size  | Increase the size of the planting bed   | (30)  | Analysis is based on the cotton bed size of 30 inches versus 40 inches.  |
| Biomass   | Utilize grindings, chips, and crop residue for generating electricity                           | 11  | Analysis is based on disposition of almonds pruning waste.   |
| Conservation tillage  | Use a type of tillage that reduces loss of soil and water in comparison to conventional tillage | 19  | Analysis is based on crop rotation of cotton and tomatoes.   |
| Cover Crops/Native vegetation                               | Use of seeding or natural vegetation/regrowth   | (132)   | Analysis is based on cover crops used in Table grapes production.  |
| Overhead systems  | Decrease the row spacing thus allowing the plants to create an overhead or canopy coverage      | 1908  | Analysis is based on switching from the standard trellis system for grapes production to another overhead systems. |
| Precision farming   | Use of satellite navigation to calculate position in field, e.g.: GPS                           | (0.04)  | Analysis is based on the use of GPS instead of traditional foam marker method for corn.                            |
| Reduced Pruning   | Reduce frequency of pruning   | (1808)  | Analysis is based on the cost of pruning for almonds orchard.  |
| Row spacing   | Decrease the row spacing thus allowing the plants to create an overhead or canopy coverage      | (217)   | Analysis is based on decreasing row spacing for tomatoes by 18%.   |

Note: Parentheses indicate a cost saving.

Cost estimates were derived from the cost analyses performed by the University of CA Cooperative Extension.

## **BACM/BACT Demonstration – Appendix G**

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### **RACM Analysis for Agricultural Operations**

The District's 1991 Moderate Area PM10 Attainment Plan indicated that further research was needed to improve emission factors for agricultural emissions and to identify management techniques that reduce PM10 emissions. Therefore, no RACM for this source category was feasible at that time. The District embarked on an ambitious research program that continues to this day.

EPA RACM guidance calls reliance on the soil conservation management provisions of the Food Security Act to reduce emissions from agricultural sources. Although the District does not have a significant soil erosion problem due to various climatic and geographic reasons, the United States Department of Agriculture, Natural Resources Conservation Service (NRCS) maintains a strong program reflective of the importance of agriculture to this region. The NRCS actively assisted growers in identifying appropriate conservation practices that protect the soil and limit PM10 emissions. In 1996, the District entered into a Memorandum of Understanding with the NRCS, California Department of Food and Agriculture (CDFA) to cooperate on the development of a Resource Conservation Plan program that was intended to meet the BACM requirement. This program also emphasized additional research to identify feasible measures. This program is now becoming the Agricultural Conservation Management Practices (CMP) Program commitment in the 2003 PM10 Plan.

The two other regions previously mentioned that have adopted measures for agricultural sources and approved as BACM by EPA are the South Coast Air Quality Management District (SCAQMD), and Maricopa County, Arizona. For SCAQMD, BACM was incorporated in early 1997 into Rule 403 (Fugitive Dust) as amendments and into the then-proposed Rule 1186 (PM10 Emissions from Paved and Unpaved Roads and Livestock Operations). Agricultural operations that were previously exempted under Rule 403 must now submit and file a soil erosion control plan containing conservation practices with NRCS and which is to be forwarded to SCAQMD in order to remain exempt. Rule 1186 is now adopted and applies to certain livestock operations. For Maricopa County, as a result of a Federal Implementation Plan (FIP) in early 1998 to address moderate area RACM requirements, EPA additionally included a commitment to ensure that RACM for agricultural sources be proposed and implemented by June 2000.

Recognizing that the agricultural sources needed to be addressed, Arizona Governor Hull signed Senate Bill 1427 establishing an agricultural best management practices committee who was mandated to adopt a rule for an agricultural general permit. EPA afterward approved the general permit rule as meeting the RACM requirements. The best managements practices (BMP) were then developed for Maricopa County's agricultural general permit with the intent of meeting both RACM and BACM. Rule 310.01 (Fugitive Dust from Open Areas, Vacant Lots, Unpaved Parking Lots, and Unpaved Roadways) was also strengthened and includes applicability to certain livestock operations.

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The 1991, 1994 and 1997 attainment plans for the San Joaquin Valley Air Basin addressed RACM for fugitive dust under Regulation VIII. No controls were developed for PM<sub>10</sub> from agricultural operations and livestock due to a lack of specific control measures and emissions quantification. The earlier effort to study PM<sub>10</sub> from agricultural operations was the initial step to increase the District's understanding of the unique sources in the Valley. The strategies outlined in the previous plans focused on research to identify agricultural activities that significantly contribute to the PM<sub>10</sub> problem and then to develop feasible control methods prior to implementation. The District has over the past year, with assistance from NRCS, developed candidate conservation practices for many of the agricultural sources. Research and development of conservation practices for both on-field agricultural sources and livestock are still being pursued and will be incorporated into the development of the agricultural CMP program.

Currently, controls for agricultural operations and livestock are being addressed through the CMP Program as BACM for fugitive dust, but also may cover emissions of the ozone precursors VOC and NO<sub>x</sub>.

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### VII. BACM Demonstration for Residential Wood Combustion

#### Significant Source Discussion

Residential wood combustion is a significant source of PM10 emissions during the winter in the San Joaquin Valley; therefore, the District must implement Best Available Control Measures (BACM) for this source category. PM10 monitoring sites in the Valley urban areas record the largest amounts of PM10 attributed to wood combustion in areas with high development density and a large concentration of wood burning devices. The chemical mass balance (CMB) analysis attributed 50.2  $\mu\text{g}/\text{m}^3$  to wood combustion at the worst site (Fresno), most of which can be attributed to residential wood combustion since the episode occurred after a series of agricultural no-burn days. The annual emission inventory for this source category is 12.3 tons per day.

**Table G-18.  
Emission Inventory for Residential Wood Combustion  
PM10 in 2001**

|                         | <b>No. of Units<br/>Installed</b> | <b>Annual Inventory<br/>Tons/day</b> | <b>Winter Inventory<br/>Tons/day</b> |
|-------------------------|-----------------------------------|--------------------------------------|--------------------------------------|
| Conventional fireplaces | 280,978                           | 3.89                                 | 7.40                                 |
| Fireplace inserts       | 84,294                            | 5.10                                 | 9.70                                 |
| Wood stoves             | 41,843                            | 3.23                                 | 6.15                                 |
| Pellet stoves           | 5,437                             | .09                                  | .16                                  |
| Total                   | 328,866                           | 12.31                                | 23.42                                |

Based on the CMB analysis and the de minimis methodology provided in Section II, wood smoke from residential wood combustion exceeds the significant source criteria. Therefore, the District is required to implement BACM to reduce, minimize or eliminate PM10 from wood burning.

#### **Background Information on EPA Action on Rule 4901**

The District adopted Rule 4901 (Residential Wood Combustion) on July 15, 1993. On February 7, 2002, EPA published in the Federal Register a final simultaneous "limited approval/limited disapproval" of the previously adopted version of Rule 4901 for inclusion into the State Implementation Plan (SIP). EPA proposed a "limited approval" because they determined that Rule 4901 improves the SIP and is "largely consistent" with relevant Federal Clean Air Act (CAA) requirements. The EPA based its "limited disapproval" on several rule

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deficiencies that they believe are not consistent with the requirements of the CAA with regards to best available control measures (BACM) standards for the control of PM10 from residential wood combustion sources.

EPA specifically noted that Rule 4901 is deficient in three areas, 1) the lack of mandatory curtailment on high pollution days (also called “episodic” days); 2) the lack of a requirement to limit the number of fireplaces and wood burning devices per acre in new residential developments; and 3) the lack of a requirement for fireplaces or woodstoves to have EPA-certified Phase II standards upon property sale or transfer. The EPA “limited disapproval” started a sanction clock that will expire September 11, 2003.

District staff began the process of strengthening Rule 4901 with a scoping meeting in April 2002. District staff held public workshops on the proposed amendments to Rule 4901 (Residential Wood Burning) on December 3,4,and 5, 2002. Approximately 180 people attended the meetings and over 80 people provided testimony. The comment period for the first round of workshops closed on December 20, 2002. A second draft of the rule, and the socio-economic impact analysis will be released in late March with a second round of workshops in April 2003. Staff anticipates that the rule will be brought before the Governing Board for action at the June 2003 meeting.

The draft amendments to Rule 4901 build on the current requirements, satisfy the deficiencies that EPA identified, and expand the public education program. The following is a summary of draft amendments to Rule 4901:

- Change the title of Rule 4901 to “Wood Burning Fireplaces and Heaters” replacing the old title “Residential Wood Burning.”
- Change from voluntary curtailment to a two-tiered curtailment program. Level I would entail “limited” curtailment and Level II entail curtailment for all wood burning devices.
- Incorporate density limits (devices installed per acre) on the number of wood stoves, wood heaters and fireplaces in new construction and require EPA-Certified Phase-II standards on those being installed.
- Require removal or rendering inoperable of non-EPA-Certified woodstoves or fireplace inserts or replacement with EPA-Certified Phase II standards upon sale or transfer of property. This requirement does not apply to open-hearth fireplaces.

### BACM Demonstration

Although EPA has indicated that correcting the three deficiencies listed above will bring Rule 4901 up to BACM level, the District conducted additional analysis to further document that BACM has been achieved. Table G-19 summarizes the results of the analysis of technical and economic feasibility for residential wood combustion control measures.

The EPA Guidance Document for Residential Wood Combustion Emission Control Measures (1989), served as the starting point for developing the list of candidate control measures. The document lists measures ranging in stringency from reasonably available control measures to most stringent control measures. The District's analysis concentrated on the most stringent measures, since measures less stringent than the current version of Rule 4901 would not be pursued. Economical and technological feasibility were determined for each candidate BACM measure. The investigation of BACM technologies concluded that only two of the candidate BACM measures were technologically infeasible. One candidate measure was eliminated from further consideration due to excessively high cost-effectiveness.

The cost-effectiveness of each candidate measure was calculated by dividing the cost of measure implementation by the potential emission reduction achieved. Implementation costs included equipment, installation, and maintenance costs borne by the source owner or operator. Details regarding the cost-effectiveness calculations are provided in Table G-20.

Measures that reduce emissions from residential wood combustion may be divided into two categories - integral measures and those that improve burning performance. Integral measures include public education programs, curtailment programs, and regulations on new installations of woodburning devices. Measures that improve burning performance include such things as wood moisture content requirements on the sale of wood, changeout of old devices to new EPA Phase II certified or natural gas burning devices, and density limits on new installations.

A wide variety of programs to reduce residential wood combustion emissions have been adopted around the country. None are exactly the same. They are designed to meet local conditions. Programs that are in place have all gone through a public process to identify what is acceptable in that city or region. The San Joaquin Valley is by far the largest region required to implement BACM on this source category and it has several important differences that must be considered when comparing measures. First, the San Joaquin Valley has a mild climate. Temperatures seldom drop below freezing and the wood burning season is short. This means that measures adopted in areas with colder

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climates such as Denver and Reno may be cost-effective there, but not cost-effective here due to lower rates of burning. Some of the most stringent measures are adopted in mountain resort areas like Mammoth Lakes, California. Comparison with this type of area should also be considered carefully. The San Joaquin Valley is an urbanized area primarily developed with tract homes on 6,000-10,000 square foot suburban lots. Most houses built during the last decade include a zero clearance fireplace intended for ambience and not heat. A small fraction of the homes rely on wood combustion for heat as was shown in Table G-1. Communities like Mammoth Lakes, on the other hand, rely extensively on wood combustion and are also much colder than the San Joaquin Valley.

Rule 4901 contains an exemption for areas above 3,000 feet in elevation. The San Joaquin Valley has a large flat floor near sea level where the urban areas are located and is surrounded on three sides by mountains between 4,000 feet and 14,000 feet high. The Valley experiences its highest PM10 pollution levels during periods dominated by high pressure and subsidence inversions. The top of the inversion layer during these mid-winter periods is nearly always below 3,000 feet. Locations above the inversion layer experience favorable dispersion characteristics that prevent wood smoke from building to unhealthy levels. In addition, there are no significant concentrations of development above 3,000 feet in the San Joaquin Valley Air Basin. This leads to the conclusion that there is no need to implement controls above 3,000 feet.

Table G-2 provides the results of the technical and economic feasibility analysis for the candidate BACM measures. The analysis provides justification for retaining the District's current rule provisions when those measures have been found to meet the BACM level of stringency. In some cases, the analysis compares exemption levels for measures in the District's existing rule and proposed rule amendments with those adopted in other areas.

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| <p align="center"><b>Table G-19.</b><br/> <b>Technical and Economic Feasibility Analysis for Residential Wood Combustion Candidate BACM</b></p> |  |                           |  |                |   |  |
|---|--|---------------------------|--|----------------|---|--|
| Candidate Control Measures  | What it does   | Technological Feasibility | Economical Feasibility (\$/ton reduced) <sup>1</sup> | Accept /Reject | Discussion/ Justification   | Description of other areas most stringent measures   |
| <b>INTEGRAL MEASURES</b>  |  |                           |  |                |   |  |
| 1a. Public awareness program  | Informs the public about the RWC control program, including operational details and public responsibility. The program must cover three areas: Program effectiveness and tracking; key program elements; and communication strategy. The goals of a Public Education program is to inform the public of the potential health hazards of wood smoke and to encourage better wood burning practices or use of heating devices. | Y                         | Y/\$0  | Accept         | The District's current program is essentially equivalent to those found in other areas. Cannot claim emissions reductions, but essential to RWC program. The District currently has a voluntary curtailment program, Please don't light tonight. With Please Don't Light Tonight, the Valley Air District asks the public to refrain from burning wood on nights when air quality is unhealthy. The District intends to retain the basic structure of the public awareness program, but increase various aspects that have proven successful. | Maricopa established a Public Information Program and brochure to inform the public about pollution from RWC   |
| 2a. Mandatory curtailment during predicted periods of high PM10 concentrations  | Restrict wood burning during periods when atmospheric conditions and the level of wood burning activity are predicted to result in exceeding the PM10 NAAQS.   | Y                         | Y/\$0  | Accept         | The District proposes to implement a mandatory curtailment program. Economically feasible. Reduction est. at 16% per year. Includes exemptions for sole source of heat and above 3,000ft. AQI based on PM2.5.   | Washoe County, SEC.050.005 has a two-stage curtailment program. The first stage is a green light day, meaning it is OK to light. On days when the AQI is between 80 and 100, a yellow light voluntary day is called. When the AQI exceeds 100, a red light day is called. AQI based on PM10. |
| 2b. Mandatory curtailment: Exemption curtailment at 3,000 ft.   | Areas above 3,000 ft. would be exempt from mandatory curtailment.  | N                         | Y/\$0  | Reject         | This exemption is retained by the District because it has little or no impact in areas of the SJVAB with wood smoke problems. The size of the   | N/A  |

**BACM/BACT Demonstration – Appendix G**

**Table G-19.  
Technical and Economic Feasibility Analysis for Residential Wood Combustion Candidate BACM**

| Candidate Control Measures   | What it does   | Technological Feasibility | Economical Feasibility (\$/ton reduced) <sup>1</sup> | Accept /Reject | Discussion/ Justification   | Description of other areas most stringent measures  |
|--|--|---------------------------|--|----------------|---|---|
|  |  |                           |  |                | District is much larger than other nonattainment areas and covers lightly developed mountain areas. Due to unavailability of natural gas service to rural areas above 3,000 ft., eliminating this exemption would be technologically infeasible.  |   |
| 2c. Mandatory curtailment for individuals who depend on wood burning as sole source of heat. | Exempts households that use wood as their primary sole source of heat and are economically unable to convert to an alternative fuel.   | N/A                       | Y/\$0  | Reject         | This exemption is retained by the District. There are a small number of homes in the valley that are heated exclusively by wood burning devices; therefore, retaining this exemption has an insignificant impact on emission reductions. Some of these households are low income and are economically unable to convert to an alternative fuel and do not have access to natural gas service. | Most agencies with curtailment programs include exemption for those who rely on wood burning as their primary source and due to financial hardship cannot afford to change over to alternative fuel.  |
| Potential Control Measure  | What it does   | Technological Feasibility | Economical Feasibility (\$/ton reduced) <sup>1</sup> | Accept /Reject | Discussion/ Justification   | Description of other areas most stringent measures  |
| 3a. All new stove installations EPA-certified, Phase II stoves or equivalent                 | This measure prevents the installation of wood stove that are not EPA-certified or equivalent. Phase II devices are designed to achieve more efficient combustion and lower particulate emissions than conventional devices. | Y                         | Y/\$0  | Accept         | The District will maintain its current rule provision. Under the current rule no wood stove or fireplace inserts can be installed unless it is EPA-certified. This includes new and used wood burning devices. The District's enforcement program will be expanded to ensure that   | Oregon has a state rule making it illegal to sell an uncertified stove at a retail establishment. Jackson County, Oregon has a complementary ordinance that restricts the installation of an uncertified wood stove in a residence. This rule restricts the sale of used Wood |

**BACM/BACT Demonstration – Appendix G**

| <p align="center"><b>Table G-19.</b><br/> <b>Technical and Economic Feasibility Analysis for Residential Wood Combustion Candidate BACM</b></p> |  |                           |  |                |  |   |
|---|--|---------------------------|--|----------------|--|---|
| Candidate Control Measures  | What it does                                   | Technological Feasibility | Economical Feasibility (\$/ton reduced) <sup>1</sup> | Accept /Reject | Discussion/ Justification  | Description of other areas most stringent measures  |
|   |  |                           |  |                | sellers are complying.   | burning devices in the county, as well as the sale or installation of used, uncertified residential wood burning devices from out of state.   |
| <b><u>MEASURES TO IMPROVE WOOD-BURNING PERFORMANCE</u></b>  |  |                           |  |                |  |   |
| 4a. Control of wood moisture content  | Burning dry wood increased heating performance | Y                         | Y/\$0  | Accept         | The District will maintain its current rule provision. The current rule includes advertising requirements, prohibiting the advertisement of "seasoned wood" unless the wood has a moisture content of 20% or less by weight. This, in combination with a public education program, will promote the use of more efficient and cleaner burning wood. There is no data that demonstrates that an alternative approach would result in lower emissions than the current rule. | The King County, Wa. Board of Health's woodstove program requires proper storage of firewood. It requires firewood be allowed to season and be protected from moisture. Firewood dealers are required to obtain annual license from the King County Department of Public Health and must alert buyers if the moisture content of the wood exceeds 20%. Additionally, fuel for all woodstoves shall be only untreated wood or lumber with a moisture content of 20%. |

**BACM/BACT Demonstration – Appendix G**

**Table G-19.  
Technical and Economic Feasibility Analysis for Residential Wood Combustion Candidate BACM**

| Candidate Control Measures                  | What it does   | Technological Feasibility | Economical Feasibility (\$/ton reduced) <sup>1</sup> | Accept /Reject | Discussion/ Justification  | Description of other areas most stringent measures  |
|---|--|---------------------------|--|----------------|--|---|
| 5a. Weatherization of homes with woodstoves | Reduces the quantity of fuel used in the wood-burning device by reducing the heating requirement for the home. | Y                         | Y/\$0  | Reject         | <p>The District rejects this measure based on potential for environmental issues related to implementation of this type of program and due to the implementation of alternative measures that reduce the same emissions. Weatherization has the potential to aggravate indoor air quality problems in the residence. If the home is weatherized to the point that ventilation is overly restricted, the residents may be subject to chronic exposure to indoor air pollutants. The District's rule revision will require change out at time of sale, which will remove most non-EPA wood heaters and fireplaces inserts in approximately ten years. The District's Public Education program will make the public aware of steps they can take to reduce the amount of fuel used in their wood-burning device. Weatherization programs operated by the electric and gas utilities can be used by homeowners with wood stoves.</p> | <p>Oregon communities have incentive programs to replace uncertified woodstoves. The Klamath County Department of Health Services runs a home weatherization and uncertified woodstove replacement program called PURE.</p> |

**BACM/BACT Demonstration – Appendix G**

**Table G-19.  
Technical and Economic Feasibility Analysis for Residential Wood Combustion Candidate BACM**

| Candidate Control Measures                                    | What it does   | Technological Feasibility | Economical Feasibility (\$/ton reduced) <sup>1</sup> | Accept /Reject | Discussion/ Justification  | Description of other areas most stringent measures  |
|---|--|---------------------------|--|----------------|--|---|
| 6a. Opacity program   | Opacity standards allow agency staff to recognize devices that are out of compliance. Opacity standards are measurable indicators of PM10 emissions that can be used to determine a violation of an emission standard or permit level. High opacity levels also indicate when there may be a malfunction or problem, with the wood-burning device. | N                         | Y/\$0  | Reject         | The District rejects this measure based on technical feasibility. A survey conducted for the District by JB Franz Research concluded that the majority of wood burning fireplace and woodstove usage takes place between 6:00pm and 10:00pm. During the late evening hours, opacity readings would not be accurate or impossible to conduct. The District will be enforcing mandatory curtailments based on visible emissions, and not on opacity. | Mammoth Lakes has a 20% opacity limit for wood burning emissions. No person shall cause or permit emissions from a solid fuel device to be readily visible, for a period or periods aggregating more than three minutes in any one-hour period, excluding a 15-minute startup period. |
| <b>EXISTING INSTALLATIONS</b>                                 |  |                           |  |                |  |   |
| 7a. Conversion of existing wood-burning fireplace to gas logs | Eliminates wood smoke emissions from existing fireplaces by requiring conversion to gas logs.  | Y                         | N/\$363,200.   | Reject         | This measure is rejected to due to high cost-effectiveness. The cost to retrofit the wood burning fireplace to a gas fireplace would be very significant considering fireplaces are used only occasionally and primarily for aesthetic purposes.   | This measure is listed in EPA Guidance Document as suggested BACM. No area is currently requiring this measure.   |
| 7b. Change over to EPA-certified, Phase II woodstoves.        | This measure reduces emissions from existing woodstoves by accelerating the replacement of conventional stoves with EPA-certified Phase II stoves or RWC devices that emit lower emissions.  | Y                         | Y/\$8,680-\$12,060.                                  | Accept         | The District accepts this measure and will include it in Rule 4901 amendments. Through change out at time of sale, the District will remove most conventional wood burning devices in approximately 10.5 years.  | The Telluride, County RWC change over program applies to existing devices as well as new devices.   |

**BACM/BACT Demonstration – Appendix G**

| <p align="center"><b>Table G-19.</b><br/> <b>Technical and Economic Feasibility Analysis for Residential Wood Combustion Candidate BACM</b></p> |  |                           |  |                |   |   |
|---|--|---------------------------|--|----------------|---|---|
| Candidate Control Measures  | What it does   | Technological Feasibility | Economical Feasibility (\$/ton reduced) <sup>1</sup> | Accept /Reject | Discussion/ Justification   | Description of other areas most stringent measures  |
| <b>NEW INSTALLATIONS</b>  |  |                           |  |                |   |   |
| 8a. Restriction on number and density of new wood burning stoves and/or fireplace installations.  | Limit RWC emissions growth by restricting the number and density of new RWC installations in new and existing homes. | Y                         | Y/\$0-\$1,719.                                       | Accept         | The District accepts this measure and will include it in Rule 4901 amendments.  | Washoe County, sec 040.0514 limits the number of certified wood burning devices in single family and multifamily or commercial dwellings. |
| 8b. Require gas fireplaces or gas logs in new wood burning fireplace installations.   | To eliminate wood smoke emissions from new wood burning fireplace installations by requiring an alternate fuel.      | Y                         | Y/\$1,719.   | Accept         | The District accepts this measure and will include it in Rule 4901 amendments. The District will implement a program that limits the installation of woodstoves or fireplaces in new residential dwellings with a density greater than two dwellings per acre. Natural gas and electric devices would be exempt from any density limits. Residential wood smoke is primarily an urban problem. Limits in rural areas would not be effective | This measure is listed in EPA Guidance Document as suggested BACM   |
| <b>NEW AND EXISTING INSTALLATIONS</b>   |  |                           |  |                |   |   |

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**Table G-19.  
Technical and Economic Feasibility Analysis for Residential Wood Combustion Candidate BACM**

| Candidate Control Measures                     | What it does   | Technological Feasibility | Economical Feasibility (\$/ton reduced) <sup>1</sup> | Accept /Reject | Discussion/ Justification  | Description of other areas most stringent measures  |
|--|--|---------------------------|--|----------------|--|---|
| 9a. Require device offset and upgrade offsets. | Device offsets are intended to result in an emission reduction due to retiring conventional stoves that are greater than the emissions increase caused by new stove installations. Upgrades are intended to achieve emission reduction from new stove installations by upgrading enough stoves to adequately offset any increase in emissions resulting from the installation of a new EPA-certified Phase II stove. | Y                         | Y/NA   | Reject         | The District rejects this measure based on lack of a funding source to pay for the offsets. The District would consider offsets if funding were to become available. A potential source of funding is the Indirect Source Review Program; however, the cost-effectiveness of upgrades may not be competitive with other measures, depending on the amount of incentive required. | A.R.S 43-107 allows for a total reduction of up to \$500 for the conversion of an existing wood burning fireplace to a clean burning wood stove or gas fireplace. |

1. Calculations for economical feasibility were done using EPA's Technical Information Document for Residential Wood Combustion Best Available control measures. EPA September 1992.

| <b>Table G-20.<br/>Candidate BACM Cost-Effectiveness</b>                                     |   |   |
|--|---|---|
| <b>Measure</b>   | <b>Cost-Effectiveness<br/>\$/ton PM10</b> | <b>Cost-Effectiveness Calculations</b>  |
| Integral measures  |   |   |
| 1a. Public Awareness   | \$0                                       | No cost is estimated to the user to establish a Public Awareness program.   |
| 2a. Mandatory Curtailment  | \$0                                       | <p>No cost to fireplace users are estimated, since fireplaces are not intended to be used as a source of heat.</p> <p><math>L_o</math>=Average annual cost to each nonexempt stove user for the curtailment period. \$/year<br/> <math>M</math>=Average cost to stove user per curtailment day. \$/day<br/> <math>K</math>= estimated number of curtailment days<br/> <math>M=(DHR \times AEC)-FCD</math><br/>                     DHR= Daily heating requirement for alternative heat source, BTU/day<br/>                     AEC= Alternative energy cost, \$/day<br/>                     FCD= Fuel cost per curtailment day, \$/day<br/> <math>M=(.92-2.24)-2.23=-1.31</math><br/> <math>L_o=M \times K=-1.31 \times 25=-\\$32.75</math><br/>                     No cost to woodstove and insert users.</p> |
| 2b. Mandatory curtailment: Exemption curtailment at 3,000 ft.                                | \$0                                       | No cost to user   |
| 2c. Mandatory curtailment for individuals who depend on wood burning as sole source of heat. | \$0                                       | No cost to user   |

| <b>Table G-20.<br/>Candidate BACM Cost-Effectiveness</b>                                |   |   |
|---|---|---|
| <b>Measure</b>  | <b>Cost-Effectiveness<br/>\$/ton PM10</b> | <b>Cost-Effectiveness Calculations</b>  |
| 3a. All new Stoves installation EPA-certified, phase II stoves or equivalent.           | \$0                                       | All new stoves must meet EPA Phase II standards according to the 40 CFR 60 subpart AAA. This measure will accrue no new cost to the consumer.   |
| <b>MEASURES TO IMPROVE WOOD-BURNING PERFORMANCE</b>                                     |   |   |
| 4a. Control of moisture content   | \$0                                       | A version of this measure was included in our original Rule 4901. No new cost would be imposed to the district or the wood burning device user.   |
| 5a. Weatherization of homes with woodstoves   | \$0                                       | There is no user cost assumed for this measure since it is intended to target low- income households.   |
| 6a. Opacity limits.   | \$0                                       | No cost would be imposed to the public to implement this measure.   |
| <b>EXISTING INSTALLATIONS</b>   |   |   |
| 7a. Conversion of existing wood burning fireplace to gas logs. Accelerated change over. | \$318,791.92                              | <p>The cost to the fireplace user is based on two components. First component is the conversion cost of a conventional fireplace to gas logs, and the second component is the difference in annual energy cost between wood and natural gas. The annual cost of the user is then the difference of these two costs. The cost is then converted to dollars per ton.</p> <p>B=Annual number of fireplaces converting to gas logs in accelerated change out. <math>B=141542.817/2 \text{ years}=70771 \text{ fireplaces per year.}</math><br/> <math>70771*17.3*.28*1400/(454.*2000)=528.569</math><br/>                     G= annual emission reduction, tons/year=528.569<br/>                     L=Fireplace usage, hours/year=94.00 <math>L*M= N.</math> M=natural gas fireplace consumption rate BTU/hour. N= energy consumption of</p> |

| <b>Table G-20.<br/>Candidate BACM Cost-Effectiveness</b>            |   |  |
|---|---|--|
| <b>Measure</b>  | <b>Cost-Effectiveness<br/>\$/ton PM10</b> | <b>Cost-Effectiveness Calculations</b>   |
|   |   | natural gas fireplace, BTU's /year.<br>$N=27000*94.00=2,538\text{BTU'S per year.}$<br>$Q= \text{annual cost difference between natural gas and wood, \$, year. (E*O)-(N*P)=Q.}$<br>$(.28*200)-(2538130*.89/100000)=56-22..59=33.41$<br>$R-Q=Co$<br>$Co=\text{Annual user cost \$/year.}$<br>$2000-33.41=1,966.59 \text{ per unit}$<br>$70,771\text{units}*\$7966.59/\text{unit}=139,177,540.9$<br>$\$1,966.59/\text{year} / 94.00 \text{ hr/year}=\$20.92/\text{hr}$<br>$\$20.92\text{hr}/59.6\text{g/hr}=\$.35/\text{gram}$<br>$59.6\text{g/hr}*94.00\text{hrs}=5602.4\text{g}$<br>$\$.35/\text{gram} *454=\$159.36/\text{lb}$<br>$159.36*2000=\$318791.92/\text{ton.}$ |
| 7b. Change over to EPA-certified Phase II woodstoves or equivalent. | \$8,680-\$12,060                          | Calculating change out at time of sale.<br>$C/E= (\text{Annualized Installed Equipment Cost of Certified Wood Heater}-\text{Annual Fuel Cost for Conventional Wood Heaters}-\text{Annual Maintenance})$<br>Wood stove to EPA certified catalytic=<br>$C/E=( \frac{678}{\text{yr}} - \frac{270}{\text{yr}} - \frac{179}{\text{yr}} ) / \frac{37.96 \text{ lb}}{\text{yr}} = \frac{\$}{\text{Lb}} \underline{\underline{\$6.03}}$ $6.033 \text{ X } 2000 = 12060./\text{ton}$  |

EPA-certified wood stove non catalytic=

| <b>Table G-20.<br/>Candidate BACM Cost-Effectiveness</b>                    |   |  |
|---|---|--|
| <b>Measure</b>  | <b>Cost-Effectiveness<br/>\$/ton PM10</b> | <b>Cost-Effectiveness Calculations</b>   |
|   |   | $C/E = \left( \frac{678}{\text{yr}} - \frac{270}{\text{yr}} - \frac{179}{\text{yr}} \right) / \frac{40.50 \text{ lb}}{\text{yr}} = \frac{\$ \quad \$5.65}{\text{lb}}$ <p style="text-align: right;">5.65 X 2000 11300./ton</p> <p>Non-certified fireplace insert to EPA-certified insert</p> $C/E = \left( \frac{629}{\text{yr}} - \frac{270}{\text{yr}} - \frac{179}{\text{yr}} \right) / \frac{40.50 \text{ lb}}{\text{yr}} = \frac{\$ \quad \$4.45}{\text{lb}}$ <p style="text-align: right;">4.45 X 2000 8900./ton</p>   |
| New installations   |   |  |
| 8a. Gas fireplaces or gas logs in new wood burning fireplace installations. | \$22,423.                                 | <p>Cost difference between wood fireplace and gas fireplace=1100-500=600. CFR=capital recovery cost=.00632068</p> <p>600*.00632068=2.792408=monthly payment \$/year. Monthly payment *12=annual cost differential between gas and wood fireplace, \$/year.</p> <p>Energy cost difference on annual Basis. E=Ave. wood used in fireplace, cords/year. T=cost of a cord of wood. S= natural gas fireplace consumption rate, BTU's/ hour. Cost of natural gas, \$/BTU. <math>(E*T) - (S*U)=V</math></p> <p><math>V = (.28*200) - (2538000*.89/100000) = 33.41</math></p> <p><math>O-V = C_o = \text{user cost per year } 12.09 \text{ annual cost } \\$/\text{year.}</math></p> <p><math>12.09/4,8914\text{g/device} = 12.09/10.781\text{lbs} = \\$12.09/.0054\text{tons/device} = 185.5 \text{ devices/ton} = 12.09*185.5 = \\$2,242.695. \text{ per ton}</math></p> |

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| <b>Table G-20.<br/>Candidate BACM Cost-Effectiveness</b>                                       |   |   |
|--|---|---|
| <b>Measure</b>   | <b>Cost-Effectiveness<br/>\$/ton PM10</b> | <b>Cost-Effectiveness Calculations</b>  |
| 8b. Restriction on number and density of new wood-burning stove and/or fireplace installation. | \$0-\$2,242.                              | <p>No cost to homes that are built without a wood-burning device. Those who choose to build a gas burning fireplace the following cost could apply: Cost difference between wood fireplace and gas fireplace=1100-500=600. CFR=capital recovery cost=. 00632068 600*. 00632068=2.792408=monthly payment \$/year. Monthly payment *12=annual cost differential between gas and wood fireplace, \$/year.</p> <p>Energy cost difference on annual Basis. E=Ave. wood used in fireplace, cords/year. T=cost of a cord of wood. S= natural gas fireplace consumption rate, BTU's/ hour. Cost of natural gas, \$/BTU. <math>(E*T)-(S*U)=V</math>. <math>V= (.28*200)-(2538000*.89/100000)=33.41</math></p> <p><math>O-V=Co</math>=user cost per year 12.09 annual cost \$/year.</p> <p><math>12.09/4,8914g/device=12.09/10.781lbs=\\$12.09/</math>. <math>0054tons/device=185.5</math> devices/ton=<math>12.09*185.5=\\$2,242.695</math>. Per ton</p> |
| Require that new stove installations be low emitting.  | \$3,983.18                                | Purchase and installation cost of device*capital recovery factor*12=2500*.01322*12=\$396.6/device=annual cost to user.  |
| New and Existing Installations   |   |   |
| 9a. Device offsets and upgrade offsets   | N/A                                       | It is not possible to accurately quantify this cost before a program has been adopted.  |

### **RACM Demonstration for Residential Wood Combustion**

The District was required to implement RACM on residential wood combustion sources to comply with the requirements of its previous classification as a moderate PM10 nonattainment area. The District adopted Rule 4901 – Residential Wood Combustion on July 15, 1993 to meet the RACM requirement. As was mentioned in the previous section's discussion of EPA actions on Rule 4901, on February 7, 2002 EPA identified three deficiencies that needed to be corrected to meet the BACM requirement of the District's current serious area classification. Therefore, the District concluded that all other provisions of the rule must meet the BACM requirement and also the previous RACM requirement.

Although EPA specified that three provisions were deficient for BACM, it left the question unanswered whether these provisions met RACM. EPA had never acted on the Moderate Area Plan designed to meet RACM nor Rule 4901 to determine if it met RACM. This led to a citizen lawsuit demanding EPA prepare a Federal Implementation Plan (FIP) to ensure that RACM was implemented. Ordinarily, at this late date RACM would not be of concern because a District would not be required to upgrade a rule to RACM when they must also simultaneously upgrade the same rule to the more stringent BACM level. The amount of time needed to implement a RACM change, if one were needed, is no longer than a BACM change. To satisfy the parties of the lawsuit, the District prepared the following analysis to demonstrate that the existing provisions of Rule 4901 meet RACM.

### **Comparative Analysis of EPA RACM and Rule 4901 Provisions**

The District conducted a comparative analysis of the measures recommended by the General Preamble to the Clean Air Act and EPA guidance documents for RACM with Rule 4901. The measures listed by EPA are intended to: 1) reduce emissions from current stoves through inspection, education and shifting to cleaner stoves or fuel; 2) curtail the use of woodstoves or fireplaces during adverse meteorological conditions; and 3) limit future growth in emissions. RACM include the following:

- An Episode Curtailment Program, including: a curtailment plan; a communication strategy to implement the plan; and a surveillance plan (e.g., windshield survey, opacity trigger; and enforcement provisions including procedures, penalties, and exemptions).
- A Public Information Program to inform and educate citizens about stove sizing installation, proper operation and maintenance, general health risks of woodsmoke, new technology stoves, and alternatives to wood heating.
- Improved performance of wood burning devices by:
  - Establishing a program to identify, through opacity observation, deficiencies in stove operation and maintenance. (Under such a

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program, advice and assistance should be provided to the identified households to help reduce visible emissions from their devices).

-Providing voluntary dryness certification programs for dealers and / or making free or inexpensive wood moisture checks available to burners.

-Evaluating and encouraging, as appropriate, the accelerated changeover of existing devices to new source performance standards or other new technology stoves (e.g., hybrid design, pellet stoves) by such approaches as subsidized stove purchases tax credits or other incentives.

- Inducements that would lead to reduction in the stove and fireplace population (or use) by:
  - Slowing the growth of wood burning devices in new housing units by taxes, installations permit fees, or other disincentives.
    - Encouraging a reduction in the number of wood burning devices (i.e., removing or disabling the devices) through tax credits or other incentives.
    - Discouraging the resale of used stoves through taxes, fees, or other disincentives.
    - Discouraging the availability of free (or very inexpensive) firewood by increasing cutting fees or limiting the cutting season.

The following summarizes the provisions of District Rule 4901. It describes the current measures and provides justification for considering them RACM:

1. The District's episodic curtailment program contains all of the basic provisions EPA recommends for consideration as RACM. The District's existing program has the following components:

-A public notification program which notifies the public of curtailment periods through the written, oral, recorded messages or any other media the District determines appropriate.

-A curtailment program; the District has established a two-tiered (Level I and Level II) program. Thresholds are determined for each level, through meteorological forecasting and real-time data.

-Exemptions provisions, which include sole source of heat, no natural gas service, and residents above 3000 feet, mean sea level for level

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one and level two. An exemption for EPA-phase II wood burning devices for Level I episodic curtailment.

The District curtailment program contains all required elements to meet the qualifications of RACM. Public notification is a key component of this measure. The District has obtained excellent cooperation with local media outlets. This has allowed the District to reach most people living in the Valley. The District's Please Don't Light Tonight program developed innovative and persuasive advertising spots that educated and informed the public on effects from wood smoke. Surveys conducted to determine effectiveness of the program found high levels of public recognition of this program and willingness to follow the curtailment recommendations. Other aspects of the Public Education Program encourage people to reduce or restrict the use of wood burning devices and suggest alternative heating devices. The District proposed rule amendments for Rule 4901 propose a mandatory curtailment program as BACM.

2. The District's public education program covers the full range of wood burning issues. It is designed to educate and inform the public on general health risks associated with wood smoke, the availability of new technology and alternative heating devices and the proper operation of a wood-burning device. Retailers selling or offering for sale new solid fuel burning devices are required to supply public awareness information with each sale of a solid fuel burning device in the form of pamphlets, brochures, or fact sheets on the following topics:

- Proper installation
- Operation and maintenance of solid fuel burning devices,
- Proper fuel selection and use,
- Health effects from wood smoke,
- Weatherization methods for the home,
- Proper sizing of wood heaters.

The District offers informational material to the public to promote good burning habits and alternatives to wood burning. The District's Public Education staff also conducts annual media events to reach the public and educate them on various issues regarding wood burning and wood burning devices. The District's Public Education Program is a crucial part of comprehensive emissions reduction effort. The District has concluded in the previous BACM analysis that our public education program qualifies as BACM; therefore it meets and exceeds RACM requirements.

3. The District has implemented the following measures to improve performance of wood burning devices:

-The District prohibits the sale, offer of sale, or supply of wood through oral or written advertisement that is described or in represented to be

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“seasoned wood” unless the wood has a moisture content of 20 percent or less. This measure is intended to discourage the sale of unseasoned wood. The District may delegate to another person or agency the authority to test wood for moisture content and determine compliance. Moisture content of wood shall be determined by ASTM test method D 2016-74, or by such other method as the District shall specify.

-Prohibition of fuel types. The following measure prohibits the burning of the following fuels in solid fuel burning devices: Garbage, treated wood, plastic products, rubber products, waste petroleum products, paints and paint solvents, coal or any other material not intended by the manufacturer for use as fuel in a solid fuel burning device. This measure in conjunction with public education efforts is intended to accustom the public to burning dry wood and to explicitly prohibit the burning of potentially hazardous and toxic materials.

-The District participated in a program called the Great Stove change out. It was designed to encourage the change out of older model conventional wood stoves to newer EPA-approved clean-burning wood stoves, pellet stoves or gas units. The District provided a substantial rebate on the purchase price on EPA-certified wood burning devices. At the time of exchanging an old stove or fireplace insert, the consumer would be granted a discount of between 5 percent and 25 percent on the purchase price of a new, approved unit. The amount of the discount depended upon the model and brand purchased and on the degree of dealer participation. Because the District anticipated the adoption of change-out at time of sale program to meet BACM, the District ended its participation in the program. The District believes that the proposed change-out provision will capture most of those who would be willing to voluntarily participate in the change out to EPA-certified or equivalent devices over time.

### **Reasoned Justification for Measures not Included in Rule 4901**

**Episode Curtailment Provisions.** EPA recommends voluntary curtailment programs such as the District’s as a RACM option. Rule 4901 does not contain an opacity limit for excessive smoke. A survey conducted for the District by JB Franz Research concluded that the majority of wood burning fireplace and woodstove usage takes place between 6:00 pm and 10:00 pm. During the late evening hours, opacity readings would not be accurate or would be impossible to conduct. The proposed BACM amendments to Rule 4901 will rely on visible emissions and not opacity as evidence of violating burning restrictions, so the opacity issue is moot.

**Public Education Provisions.** The District’s extensive program contains all provisions recommended by the EPA for RACM.

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**Improved Wood Burning Performance.** The District's program contains several provisions to encourage improved wood burning performance. The Public Education Program informs burners of appropriate fuel and maintenance considerations. The mandatory provisions regarding wood dryness promote cleaner burning practices.

**Inducements to Encourage Changeout of Old Stoves and Less Burning.** The District has adopted the following measures that would lead to the reduction of stove and fireplace emissions:

The District participated in the Great Stove Change Out, a program designed to encourage the retirement of older conventional stoves and replace them with newer EPA-certified stoves.

To halt the resale of used conventional woodstoves, after January 15, 1994 no person shall advertise, sell, offer for sale, supply, install, or transfer a used wood heater unless it has been rendered permanently inoperable, or unless it is either; EPA-phase II certified or Oregon-certified or a Pellet-fueled wood heater.

-The District's Public Education Program has provided information through pamphlets brochures, public meetings, media events on the types of wood best to use for wood burning purposes. Partnering with local retailers the District will inform the public on wood species with the best overall quality, proper storage of wood and best moisture content.

### **Conclusion**

Based on the analysis provided above, the current RWC Rule (1993 version) meets or exceeds RACM requirement. In summary, the Rule:

- Addresses a need for public education,
- Includes a curtailment program,
- Encourages improved performance of wood burning devices and
- Provides inducements that would lead to the reduction of wood burning devices.

In order to provide the "best fit" for the needs of the San Joaquin Valley, the District, adopted and implemented the measures with input from the public.

### **VIII. Stationary Source BACT Demonstration**

#### **BACT Analysis Procedure**

The CAA Addendum to the General Preamble<sup>3</sup> provides guidance for identifying BACT for stationary sources of PM10 and PM10 precursor emissions. The basic steps are listed below.

- Develop inventory of PM10 and PM10 precursor source categories
- Identify significant source categories requiring BACT
- Identify control technology options
- Analyze control technology for technical and economic feasibility and potential environmental impacts
- Select and implement BACT on significant sources

The EPA guidance is primarily intended for areas that are preparing their first Serious Area PM10 Plan that required BACM/BACT. Since the District has already implemented controls related to previous BACM/BACT plan submittals, federal ozone requirements, and California air quality regulations, many decisions regarding control technology selection have already been made. Therefore, this analysis is less focused on identifying new measures and more focused on demonstrating that District regulations currently in place are BACT. Where the District is unable to demonstrate that BACT has been implemented for a source category or additional emission reductions are identified, a new control measures has been added to the PM10 Plan as a State Implementation Plan (SIP) commitment.

EPA's standard for determining that a particular control system is BACT is that it provides the maximum degree of emission reduction taking into account energy, environmental, and economic impacts and other costs. BACT must be justified by a comparison of the candidate control systems considering these factors and be supported by the record. This analysis is intended to fulfill this requirement.

#### **California Clean Air Act Requirements**

The California Clean Air Act (CAAA) is state legislation designed to address the severe air pollution problems experienced in California. The CCAA has several provisions related to stationary sources that are more stringent than the federal CAA. These provisions include all feasible measures requirements, BACT thresholds, and retrofit requirements. The District's Rule 2201 – New Source Review sets the BACT thresholds, offset thresholds, and distance ratios used in the San Joaquin Valley Air Basin (SJVAB). The CCAA requires areas with the District's state severe ozone designation to develop a stationary source control program designed to achieve no net increase in emissions of nonattainment pollutants or their precursors from all new or

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<sup>3</sup> Addendum to the General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990, Federal Register August 16, 1994

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modified stationary sources which emit, or have the potential to emit, 10 tons or more per year. The District's program must require the use of best available control technology for any new or modified stationary source which has the potential to emit 10 pounds per day or more of any nonattainment pollutant or its precursors. District Rule 2201 requires BACT for sources with a potential to emit two pounds per day. Severe areas are required to implement best available retrofit control technology (BARCT), as defined in Health and Safety Code Section 40406, for all existing permitted stationary sources.

The significance of CCAA requirements to the federal BACT requirement for PM10 is that it ensures that sources of PM10 precursors have a level of control that meets or exceeds federal BACT on more sources than would be required under the federal CAA. For example, under the District's federal Serious Nonattainment designation for PM10, emission offsets for PM10 and PM10 precursors would only be required for new sources over 70 tons per year. Under the CCAA and Rule 2201, PM10 emissions and SOx emissions over 15 tons per year must be offset and the PM10 precursors NOx and VOC emissions over 10 tons per year must be offset. In addition, offset distance thresholds of up to 1.5 to 1 ensure that new and modified sources offset more emissions than would be required if only the federal new source review (NSR) provisions were enforced. The CCAA was enacted in 1988. Therefore, any new or modified source constructed during the last 15 years would have implemented BACT or if they met the higher federal thresholds, the more stringent lowest achievable emission rate (LAER). The District estimates that the majority of stationary sources in the SJVAB have been subject to Rule 2201 BACT/LAER requirements.

### **Ozone RACT Rules and BARCT**

The District is currently classified as a severe nonattainment area for both federal and state air quality standards for ozone. The federal CAA requires all ozone nonattainment areas to implement reasonably available control technology (RACT) on existing stationary sources. The State of California requirement is to implement best available retrofit technology (BARCT) on existing stationary sources. The District adopted a state ozone attainment plan in 1991 and began developing rules that would implement BARCT. The District developed a federal serious area ozone attainment plan in 1994 that included new commitments to adopt rules meeting the RACT requirement for sources where the existing rule could be strengthened. The District attempts to harmonize its state and federal planning requirements, so rules adopted are intended to meet both mandates by complying with the more stringent state mandate.

The District's Rule Development Section staff is responsible for tracking stationary source emission control technology on a day-to-day basis. When a new plan is being prepared, staff begins a more intensive effort to identify all feasible control measures. Over the last two years the District has been working on a Severe Area Ozone Attainment Demonstration Plan. Because the modeling conducted for the planning effort identified the need for an additional 30 percent reduction in NOx and VOC to attain the one-hour federal ozone standard, staff conducted a top to bottom review of

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the emission source categories to identify additional controls. The review examined not only BACT but also technology forcing measures. The results of this effort were presented in the 2002 and 2005 Rate of Progress Plan. The proposed control measures cover sources that had recently been subject to retrofit requirements and measures applicable to very small source categories. The measures were approved by the District Governing Board and submitted to EPA as a SIP commitment that will be implemented between 2003 and 2005. Additional measures were identified that may be feasible for implementation between 2004 and 2010. Some of these measures will become commitments in the 2003 PM10 Plan.

The District consults a number of sources to identify new potential controls. The ARB's *Identification of Achievable Performance Standards and Emerging Technologies for Stationary Sources: A Draft Resources Document* is an excellent resource that is provided to help Districts identify new measures. The District also reviews control measures committed to or successfully implemented in other regions. The areas that have the most advanced controls include the South Coast Air Quality Management District, the Bay Area Air Quality Management District, and the Houston-Galveston, Texas area.

### **Technical and Economic Feasibility Analysis for Stationary Sources**

The technical and economic feasibility of measures is determined on a case-by-case basis. Control measures in plans are necessarily more general than specific emission limits and control technologies contained in District rules and regulations. If a control measure is based upon a rule that has already been implemented in another area, more detail is known, but local factors are likely to be less well known. During the rule development process, the District works with control technology manufacturers, affected industry, and other stakeholders to identify the local factors affecting control technology implementation in this region. Factors such as process rates, seasonality of use, raw material differences, and many others impact the technical feasibility of the proposed control. This information is typically not obtained until the rule has gone through scoping meetings, stakeholder meetings, and public workshops. Therefore, in cases where the District has an adopted rule, the supporting documentation for the rule fulfills the BACT demonstration. Re-analyzing those rules in comparison to new candidate BACT measures would not be appropriate since the level of detail and input cannot be duplicated for a general control measure. The applicable rule development documentation data for adopted rules is incorporated by reference.

Each rule submitted by the District is subject to a state mandated socio-economic impact analysis. Therefore, all of the significant rules adopted by the District have undergone an economic feasibility analysis. Rules with poor cost-effectiveness or that cause other economic impacts may be modified based on this information to make them economically feasible. The socio-economic impact analysis should also be considered part of the record documenting the BACT demonstration.

### **BACT Analysis for Stationary Sources of Directly Emitted PM10 and SOx**

The District's previous PM10 plans concluded that directly emitted PM10 and SOx from stationary sources were insignificant sources. This assumption was based on the size of the inventory in comparison to other sources of PM10 and precursors. The entire directly emitted stationary source PM10 inventory is only 26.3 tons out of a 355.1 ton inventory. The stationary SOx inventory is 28.5 tons/day compared to the 528.54 ton/day NOx inventory. Using the methodology described in section II to determine the de minimis level leads to the conclusion that several source categories may be significant for PM10 and SOx.

The largest sources of stationary PM10 and SOx emissions are large combustion sources. Source categories above the de minimis level include "glass melting furnaces", "boilers, steam generators, and process heaters", and "other manufacturing and industrial fuel combustion." These sources are also large sources of NOx. As described earlier, NOx sources have been subject to all feasible measure requirements and are either controlled to BACT or LAER or are already the subject of a control measure commitment in the Ozone Rate of Progress Plan. SOx and PM10 are usually produced by the same combustion process as NOx and are subject to the same stringent NSR requirements as NOx, but they generally have not been the targets of recent SOx and PM10 specific retrofit rule requirements.

The District conducted a detailed BACT analysis for the significant source categories for SOx and PM10. In some cases, the NOx control also reduces SOx, especially when the control technology involves a fuel change and would be considered BACT for SOx. In other cases, the existing PM10 control, although not recently updated, is still considered BACT since no other option is available. In other cases, the District identified new control technology that should be implemented to bring the existing control technology from RACT to BACT levels. A significant number of SOx and PM10 stationary sources have been subject to Rule 2201 NSR requirements and have implemented BACT or LAER. Detailed analysis of the significant source categories is provided in the following tables.

The District's previous plans submitted in 1994 and 1997 were intended to fulfill the requirement for demonstrating BACT for stationary sources. At that time there were no examples of approved BACT demonstrations for PM10 planning purposes. BACT analyses were conducted on a source-by-source basis as part of New Source Review, but not on a comprehensive basis. The stationary source control strategy in the 1997 Plan relied on the measures developed for the 1994 Ozone Attainment Demonstration Plan. The District's 1997 Plan asserted that the District's more stringent permitting program and BARCT rules fulfilled the PM10 BACT requirement. This new analysis concurs with that conclusion and offers additional comprehensive analysis of each significant stationary source category.

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### Significant Source Categories

The following table lists the significant stationary source categories that require a BACT demonstration.

**Table G-21.  
List of Significant Stationary and Aggregated Area Source Emissions**

|  |
|--|
| 4403-Components at Oil and Gas Fac.              |
| 4601-Architectural Coatings                      |
| 4661-Organic Solvents                            |
| 4662-Degreasing                                  |
| 4692-Charbroiling                                |
| 4701-IC Engines                                  |
| 4703-Stationary Gas Turbines                     |
| Ag Crop Processing Losses                        |
| Ag Equip   |
| Ag Pesticides                                    |
| Ag Products Processing Losses                    |
| Ag. Irrigation I.C. Engines                      |
| Ind. Equip                                       |
| Consumer Products                                |
| Fuel Combustion - Space Heating                  |
| Gasoline Cans                                    |
| 4305-Boilers, Steam Gen & Proc. Htrs.            |
| 4352-Solid Fueled Boilers, SG & Proc. Htrs       |
| 4354-Glass Melting Furnaces                      |
| 4401-Steam Enhanced Oil Well Vents               |
| Oil Drilling And Workover                        |
| Other Manufacturing & Industrial Fuel Combustion |
| Other Mineral Processes                          |
| Other Svc & Comm Fuel Combustion                 |
| 4902 Residential Water Heaters                   |
| Construction & Mining Equip                      |
| 4623 Storage of Organic Liquids                  |

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| <b>Table G-22.<br/>Significant Stationary Source Categories Within District's Regulatory Authority</b> |                      |  |            |            |             |   |
|--|----------------------|--|------------|------------|-------------|---|
| <b>Source Category</b>   | <b>Rule (if any)</b> | <b>1999 Emissions of Qualifying Pollutant(s) (tpd)</b> |            |            |             | <b>Status</b>   |
|  |                      | <b>VOC</b>   | <b>NOX</b> | <b>SOX</b> | <b>PM10</b> |   |
| Agricultural Irrigation IC Engines   | Incentive Program    |  | 17.4       |            | 1.2         | State law currently prohibits air districts from requiring permits on agricultural emission sources. Since no other area currently regulates this source, the District's Heavy-Duty Engine Program is the most stringent measure and qualifies as BACM. |
| Architectural Coatings   | 4601                 | 11.8   |            |            |             | The current rule is BACM.   |
| Can & Coil Coatings  | 4604                 | 4.6  |            |            |             | This rule is currently under development.   |
| Charbroiling   | 4692                 |  |            |            | 1.3         | The current rule is BACT.   |
| Components at Oil and Gas Facilities   | 4403                 | 10.4   |            |            |             | Currently under development.  |
| Cotton Gins  |                      |  |            |            | 2.7         | Rule adoption is necessary. Not all cotton gins are equipped with BACT  |
| Degreasing   | 4662                 | 11.3   |            |            |             | The current rule is BACT.   |
| IC Engines, stationary   | 4701                 |  | 47.0       |            |             | This current rule is BACT and amendments are currently under development to obtain more reductions.   |
| Glass Manufacturing  | 4354                 |  | 12.3       | 4.0        |             | The current rule is BACT for NOx. Rule revision is necessary for SOx.   |
| Manufacturing and Industrial Fuel Combustion   |                      |  | 24.3       | 5.2        |             | Rule adoption is necessary.   |
| Natural Gas Boilers  | 4305                 |  | 3.7        |            |             | Rule 4305 is currently under development for NOx.   |
| Natural Gas Fired Oilfield Steam Generators  | 4305, 4406           |  | 6.4        | 6.9        | 1.4         | Rule 4305 is currently under development for NOx. Rule revision is necessary for SOx. An investigation revealed that there are no available controls for PM10.  |

## BACM/BACT Demonstration – Appendix G

| <b>Table G-22.<br/>Significant Stationary Source Categories Within District's Regulatory Authority</b> |                      |  |            |            |             |   |
|--|----------------------|--|------------|------------|-------------|---|
| <b>Source Category</b>   | <b>Rule (if any)</b> | <b>1999 Emissions of Qualifying Pollutant(s) (tpd)</b> |            |            |             | <b>Status</b>   |
|  |                      | <b>VOC</b>   | <b>NOX</b> | <b>SOX</b> | <b>PM10</b> |   |
| Oil Drilling and Workover  | 2280                 |  | 10.8       |            |             |   |
| Organic Solvents   | 4661                 | 7.6  |            |            |             | The current rule is BACM.   |
| Plastic and Plastic Products Manufacturing   |                      |  |            |            | 1.5         | Emissions for 1999 totaled 1.5 tpd. However, since emissions for 2000 totaled 0.1 tpd as well as future years, this category will be considered de minimis. |
| Residential Space Heating  |                      |  | 2.7        |            |             | Rule adoption is necessary.   |
| Residential Water Heaters  | 4902                 |  | 1.6        |            |             | The current rule is BACM. Please see BACM Analyses for existing rules in Appendix M.  |
| Service and Commercial-Other Fuel Combustion   |                      |  | 25.7       |            | 1.0         | Rule adoption is necessary.   |
| Solid-Fueled Boilers, Steam Generators and Process Heaters   | 4352                 |  | 3.5        |            |             | Rule revision may be necessary.   |
| Stationary Gas Turbines  | 4703                 |  | 10.2       |            |             | The current rule is BACT.   |
| Steam Enhanced Crude Oil Production Well Vents   | 4401                 | 14.0   |            |            |             | The current rule is BACT.   |
| Storage of Organic Liquids   | 4623                 | 6.9  |            |            |             | The current rule is BACT.   |
| Wineries   |                      | 7.0  |            |            |             | Rule adoption is necessary.   |

### **BACT Documentation for Existing District Rules**

The following section provides the District's reasoning for concluding that its adopted rules meet the BACM/BACT requirement. It describes when the rule was adopted, and the source of the control technology, and emission limits when applicable.

## **BACM/BACT Demonstration – Appendix G**

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### **Rule 4601 (Architectural Coatings) April 26, 2000**

Date submitted into the SIP – November 26, 2001

The amendments to Rule 4601 satisfies BACM for architectural coatings. The California Air Resources Board (ARB), in cooperation with California air pollution control districts and EPA, recently updated their Suggested Control Measure (SCM) for architectural coatings to reflect developments in coatings technology that have occurred since the last SCM revision in 1989. District staff has used both the SCM and SMAQMD Rule 442 as templates for proposed amendments to Rule 4601. The amendments to Rule 4601 reflect the VOC limits adopted by ARB on June 22, 2000.

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### **Rule 4692 (Commercial Charbroiling) March 21, 2002**

Date submitted into the SIP - April 8, 2002

The Rule 4692 satisfies BACT for commercial charbroiling. For this source category, South Coast Air Quality Management District's (SCAQMD) Rule 1138 (Control of Emissions from Restaurants) adopted in 1997 and implemented in November 1999, is the most effective regulatory standard in effect. In keeping with the District's commitments to reduce emissions from this source category, District staff used the SCAQMD rule as guidance in developing Rule 4692. District Rule 4692 reflects the limits in SCAQMD Rule 1138.

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### **Rule 4662 (Organic Solvent Degreasing Operations) December 20, 2001**

SIP Approved 9/20/2002 – Fed. Reg., Vol. 67, No. 140 dated July 22, 2002

The Rule 4662 satisfies BACT for organic solvent degreasing operations. For this source category, South Coast Air Quality Management District's (SCAQMD) Rule 1122 (Solvent Degreasers) and Rule 1171 (Solvent Cleaning Operations) adopted in 1997 and implemented January 1, 1999, were the most effective and feasible regulatory standards in effect. District staff used the SCAQMD rules as guidance in developing the amendments to Rule 4662 and currently Rule 4662 is considered the most stringent rule for this source category.

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### **Rule 4623 (Storage Of Organic Liquids) December 20, 2001**

Date Submitted into the SIP - January 2, 2002

The Rule 4623 satisfies BACT for the storage of organic liquids. For this source category, the amendments to Rule 4623 implemented both BARCT and satisfy BACM by requiring an appropriate type VOC control system to comply with the rule based on the

## **BACM/BACT Demonstration – Appendix G**

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likelihood that the true vapor pressure (TVP) of the stored organic liquids in the tanks would be at least 0.5 psia.

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### **Rule 4401 (Steam-Enhanced Crude Oil Production Well Vents) January 15, 1998**

SIP Approved 7/22/1998 – Fed. Reg., Vol. 63, No. 60 dated March 30, 1998

The Rule 4401 satisfies BACT for steam-enhanced crude oil production well vents. The District submitted the rule to USEPA in January 1992 for inclusion in the SIP, and in August 1996, USEPA published a Notice of Final Rulemaking for Rule 4401 in the Federal Register. USEPA incorporated the rule in the SIP, but identified several rule provisions in Rule 4401 that needed correction. Consequently, Rule 4401 was amended on January 15, 1998 to be fully SIP approved. Staff addressed all of USEPA's concerns during the rule development process and incorporated their recommendations.

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### **RULE 4902 (Residential Water Heaters) June 17, 1993**

Rule was not submitted into the SIP

The Rule 4902 satisfies BACM for residential water heaters. The District's rule is similar to the residential water heater rules adopted by the South Coast Air Quality Management District, the Ventura County Air Pollution Control District and the Bay Area Air Quality Management District which do not require change-out of existing units, but requires new natural gas-fired water heaters less than or equal to 75,000 Btu/hr to meet a NOx emission standard of 40 nanograms per Joule of heat output. The improved thermal efficiency of these water heaters helps reduce NOx emissions by burning less fuel. District Rule 4902 also prohibits the sale, the installation, or the offer for sale of any natural gas-fired water heater that do not meet the rule requirements.

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### **RULE 4354 (Glass Melting Furnaces – Container & Flat Glass) June 17, 1993**

SIP Approved 1/6/2003 – Fed. Reg., Vol. 67, No. 235 dated December 6, 2002

The Rule 4354 satisfies BACT for the control of NOx, CO and VOC in glass melting operations. The amendments to Rule 4354 is the District's implementation of BARCT for glass melting furnaces, which in addition satisfies BACT. The amendments to Rule 4354 would lower the current NOx emission limits, and establish carbon monoxide (CO) and VOC limits. The proposed limits are achievable through the use of one or more NOx control techniques and are the most stringent limits in the nation for glass melting furnaces.

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### **RULE 2280 (Portable Equipment) to address Oil Drilling and Work-over Rigs**

**May 16, 1996**

Date Submitted into the SIP – July 1, 1996

## **BACM/BACT Demonstration – Appendix G**

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The Rule 2280 satisfies BACT for portable equipment such as oil drilling and work-over rigs. Rule 2280 is part of a statewide effort to establish a multi-district system allowing for the operators of certain portable equipment to register in one district and then to operate in that district and other participating districts without the need to obtain site-specific permits. Rule 2280 (Portable Equipment Registration) provides owners and operators of portable equipment with the opportunity to register certain portable equipment as an alternative to permitting. It is estimated that over 95% of the portable equipment units throughout the State reside or operate in the districts participating in the statewide multi-district system and that District Rule 2280 meets the statewide commitment. Oil drilling and work-over rigs are considered portable equipment, which falls under the requirements of Rule 2280.

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### **RULE 4703 (Stationary Gas Turbines) April 25, 2002**

Date Submitted into the SIP – May 10, 2002

The Rule 4703 satisfies BACT for the control of NO<sub>x</sub> in stationary gas turbines. The 1994 version of this rule was passed to satisfy the federal Clean Air Act requirements and the California Clean Air Act Best Available Retrofit Control Technology (BARCT) requirement. Since that time there have been significant advances in NO<sub>x</sub> emission control technologies. The current amendments to the rule lower the maximum allowable NO<sub>x</sub> emission levels of existing stationary gas turbines. The rule reduces additional emissions of nitrogen oxides (NO<sub>x</sub> a precursor for both ozone and particulate matter). This amendment to Rule 4703 reduced NO<sub>x</sub> emissions from stationary gas turbines by approximately 57% of their current baseline when fully implemented. The NO<sub>x</sub> controls in Rule 4703 are one of the largest of the control measures identified in the draft ozone plan in terms of potential emission reductions.

### **BACT Analysis Conclusions**

The analysis identified a number of source categories that are probably not at the BACT level. Those source categories indicating the rule adoption is needed fall under three possible situations. First, several rules are currently under development by the District's Rule Development Section. The rules are at various stages of the rule development process, but are due for adoption in the near term. The second situation is rules that were identified as commitments in the recently adopted Ozone Rate of Progress Plan. These rules are scheduled to be adopted over the next several years. The third category is sources that do not currently have a rule adopted and are not currently commitments. These source categories will have control measure commitments in the 2003 PM<sub>10</sub> Plan. All control measure commitments falling in these three categories can be found in Chapter 4.

## BACM/BACT Demonstration – Appendix G

### Stationary Source RACT Demonstration

The District was required to implement reasonably available control technology (RACT) on all significant sources of emissions due to its previous classification as a moderate nonattainment area for PM10. For source categories that are already covered by a District rule or regulation that meets the best available control measure (BACT) level of stringency, no further analysis is required. For source categories that were identified in the BACT analysis as needing a new or amended District rule, additional analysis was conducted to determine if the existing level of control would meet the RACT definition.

The source categories identified as needing a new or amended District rule are provided in the following table:

| <b>Source Category</b>                       | <b>Rule No.</b> | <b>Rule Status</b>   |
|--|-----------------|--|
| Can & Coil Coatings                          | 4604            | This rule is currently being amended.  |
| Cotton Gins                                  |                 | Rule adoption is necessary. Not all cotton gins are equipped with BACM   |
| Diesel IC Engines                            | 4701            | This rule is currently under development. Existing rule is BARCT   |
| Manufacturing and Industrial Fuel Combustion |                 | Rule adoption is necessary.  |
| Components at Oil and Gas Facilities         | 4403            | .This rule is currently being amended.   |
| Natural Gas Boilers                          | 4305            | Rule 4305 is currently being amended for NOx.  |
| Residential Space Heating                    |                 | Rule adoption is necessary.  |
| Service and Commercial-Other Fuel Combustion |                 | Rule adoption is necessary. This source category contains a wide variety of combustion sources that may need more than one rule or emission limit. |
| Wineries                                     |                 | Rule adoption is necessary.  |

## BACM/BACT Demonstration – Appendix G

**Table G-24.  
Stationary Source RACT Analysis**

| <b>Source Category</b>                                    | <b>Rule</b>                                   | <b>Discussion</b>   | <b>Finding</b>             |
|---|---|---|----------------------------|
| Can & Coil Coatings                                       | 4604  | VOC rule last amended December 17, 1992. Lower emission limits are now demonstrated in other areas to meet BACT. Current rule is RACT. Rule development underway to upgrade the rule to BACT.   | RACT                       |
| Components at Oil and Gas Production Facilities           | 4403  | Last amended February 16, 1995. Implements RACT for ozone which is at least as stringent as PM10 BACT.  | BACT                       |
| Valves, et al at Refineries and Chemical Plants           | 4451  | VOC rule last amended December 17, 1992. Requires tests and inspections to identify leaks using standard EPA and ASTM test methods. Since this rule implements reasonable control approaches for this source compared to similar sources nationally, it is deemed to meet the RACM standard.                      | RACT                       |
| Pump & Compressor Seals at Refineries and Chemical Plants | 4452  | VOC rule last amended December 17, 1992. Requires tests and inspections to identify leaks using standard EPA and ASTM test methods. Since this rule implements reasonable control approaches for this source compared to similar sources nationally, it is deemed to meet the RACM standard.                      | RACT                       |
| Stationary Internal Combustion Engines                    | 4701  | <u>Engines</u> (Rule 4701) was adopted by the Kern County APCD in 1988 to implement RACT. The 1994 amendments to Rule 4701 expanded the applicability of RACT to engines in the other counties in the SJVAB, and addressed all fuel types. In 1996, the rule was further amended to establish BARCT requirements. | Currently BARCT            |
| Cotton Gins   | Not currently regulated under a specific rule | This source is regulated under 4101(Visible Emissions), Rule 4201 (Particulate Matter Concentration), and Rule 4202 (PM Emission Rate). The District has relied upon Rule 4101 and New Source Review to limit PM10 emissions from cotton gins.  | RACT                       |
| Glass Melting Furnaces                                    | 4354  | NOx rule last amended February 22, 2002. There is no control technology available that specifically regulates SOx emissions from glass melting furnaces. Potential regulation on sulfur   | BACT for NOx. RACT for SOx |

**BACM/BACT Demonstration – Appendix G**

**Table G-24.  
Stationary Source RACT Analysis**

| <b>Source Category</b>                      | <b>Rule</b>                                   | <b>Discussion</b>  | <b>Finding</b>                 |
|---|---|--|--------------------------------|
|   |   | content of fuel being investigated as BACT amendment for SOx.  |                                |
| Small Boilers                               | Not currently regulated under a rule          | A portion of the small boilers have been controlled through the Title V permitting process. While the District has information regarding permitted boilers, there is not sufficient data about non-permitted boilers available. The emissions inventory for this category is in need of improvement.   | Not reasonable for the SJVAB.  |
| Residential Water Heaters                   | 4902  | Rule 4902 was last updated June 17, 1993. The emission limits are equivalent to SCAQMD, Ventura County APCD, and BAAQMD.   | BACT                           |
| Dryers                                      | Not currently regulated under a rule          | Dryers are exempt from Rule 4305. The emissions inventory for this category is in need of improvement. Dryers used in agricultural operations are often only used seasonally, resulting in poor cost-effectiveness of control.   | Further Study Measure          |
| Boilers                                     | 4305/4306                                     | Last amended December 19, 2002. Ozone RACT rule that is at least as stringent as PM10 BACT.  | BACT                           |
| Natural Gas Fired Oilfield Steam Generators |   |  |                                |
| Residential Space Heating                   | Not currently regulated under a District rule | The District has not pursued this category because of economic infeasibility. Only three districts in affluent portions of the state (Bay Area, San Luis Obispo, and Santa Barbara) have regulations on residential space heating. The requirements of the available rules would pass on a cost to the consumer. While consumers in other portions of state have been able to absorb the cost, it is anticipated that the consumers in the SJVAB would not, especially given the economic environment at the current time. This measure would be more appropriate for a state or federal measure, so that manufacturers would only comply with one emission limit. | Rule development is necessary. |
| Solid Fuel Fired Boilers                    | 4352  | Rule 4352 was adopted in 1994 to establish Ozone RACT limits on solid-fuel fired boilers and is considered PM10 BACT;  | BACT                           |

## BACM/BACT Demonstration – Appendix G

**Table G-24.  
Stationary Source RACT Analysis**

| <b>Source Category</b> | <b>Rule</b>                                   | <b>Discussion</b>   | <b>Finding</b>        |
|------------------------|---|---|-----------------------|
| Wineries               | Not currently regulated under a District rule | There are currently no available measures in the state. The District is committing to investigate emission inventory and technologies suitable for this industry. | No measures available |
|                        |   |   |                       |

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- i. State Implementation Plans; General Preamble for the Implementation of Title 1 of the Clean Air Act Amendments of 1990, 57 FR 13498, April 16, 1992, and 57 FR 18070, April 28, 1992 (General Preamble)
  - ii. 57 FR 18072, U.S. Environmental Protection Agency, April 28, 1992

**Exhibit A**

**BACM Technological and Economic Feasibility Analysis**

**Exhibit B**

**Regulation VIII RACM**