# Appendix I

# Candidate Control Measures

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# Appendix I: Candidate Control Measures

The San Joaquin Valley Unified Air Pollution Control District (District) conducted an exhaustive search for emissions reductions to use in meeting federal Clean Air Act requirements for this *2008 PM2.5 Plan*. Chapter 6 details the District's process for developing control measures for reducing emissions of primary PM2.5 and PM2.5 precursors. This Appendix presents the product of this process: a master list of all candidate control measure ideas identified and evaluated for this plan. After assembling Appendix I, the District then screened the candidate measures into several categories: high priority measures to be implemented in the years immediately following plan adoption; measures that might be implemented in future years to allow for expected technology development; and those measures that require further study to identify when they could be implemented and what reductions they could achieve.

Candidate control measure descriptions in Appendix I have the following major components:

- Title and Number
- Source Category Affected
- Emissions Inventory
- Current Control
- Future Control Options
- Future Incentive Options
- Discussion
- Recommendations
- Potential Projected Reductions (not applicable to feasibility study measures)

Not all of the candidate control measures in this appendix result in control measure commitments or feasibility study measures. Chapter 6 presents a schedule for control measure adoption and implementation commitments, as well as expected emissions reductions. Chapter 6 also includes the District's list of feasibility study measures. Study measures that point toward possible emission reduction opportunities will be included in future plan updates as control measure commitments.

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# Appendix I - Table of Contents


| Control Measure Title | Reference Number * | Page |
|---|---|---|
| Open Burning | S-AGR-1 | I-6 |
| Conservation Management Practices | S-AGR-2 | I-9 |
| Boilers, Steam Generators & Process Heaters >5 MM Btu/hr | S-COM-1 | I-12 |
| Boilers, Steam Generators & Process Heaters 2-5 MM Btu/hr | S-COM-2 | I-16 |
| Boilers, Steam Generators & Process Heaters > 0.075 MM Btu/hr | S-COM-3 | I-19 |
| Solid Fuel Boilers, Steam Generators, Process Heaters | S-COM-4 | I-22 |
| Stationary Gas Turbines | S-COM-5 | I-24 |
| Reciprocating Internal Combustion Engines | S-COM-6 | I-27 |
| Small Spark-Ignited Engines and Agricultural Spark-Ignited Engines | S-COM-6A | I-30 |
| Glass Melting Furnaces | S-COM-7 | I-33 |
| Lime Kilns | S-COM-8 | I-35 |
| Residential Water Heaters | S-COM-9 | I-37 |
| Natural Gas-Fired, Fan Type Residential Central Furnace | S-COM-10 | I-39 |
| Dryers | S-COM-11 | I-41 |
| Wood Burning Fireplaces and Wood Burning Heaters | S-COM-14 | I-43 |
| Prescribed Burning and Hazard Reduction Burning | S-GOV-6 | I-45 |
| Cotton Gins | S-IND-8 | I-47 |
| Commercial Charbroiling | S-IND-9 | I-49 |
| Fugitive PM10 Prohibitions (Regulation VIII) | S-IND-10 | I-51 |
| Flares | S-IND-21 | I-74 |
| Indirect Source Review (ISR) Enhancement | M-OTH-8 | I-76 |
| Healthy Air Living | M-OTH-9 | I-78 |
| Fireworks | M-OTH-10 | I-81 |
| Employer Based Trip Reduction Programs | M-TRAN-1 | I-83 |

## Open Burning (S-AGR-1)

(Managed Burning and Disposal)

**Source Category:**
This category includes the open burning of materials such as agricultural waste, diseased materials, and contraband materials, as well as fires set for fire department training purposes.

**Emissions Inventory:**
Data reflects current controls and regulations, but not reductions from the June 2007 controls.

| Pollutant | 2005 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | | |
| NOx | 8.16 | 8.03 | 8.00 | 7.97 | 7.94 | 7.91 | 7.88 |
| PM2.5 | 10.70 | 10.54 | 10.50 | 10.46 | 10.42 | 10.38 | 10.34 |
| $SO_2$ | 0.19 | 0.19 | 0.19 | 0.19 | 0.19 | 0.19 | 0.19 |
| Tons per day – annual average | | | | | | | |
| NOx | 5.37 | 5.29 | 5.27 | 5.25 | 5.23 | 5.21 | 5.19 |
| PM2.5 | 7.07 | 6.96 | 6.94 | 6.91 | 6.89 | 6.86 | 6.83 |
| $SO_2$ | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 |

- Emission Inventory Code **(EIC) Affected:** 670-660-0262, 670-662-0262, 670-668-0000.
- The emission inventory will be further refined to ensure that it fully captures the reductions achieved by the recent 2007 amendments to existing Rule 4103.

**Current Control:**
Rule 4103 has limitations on the amount and the types of material that can be burned and restricts when such burning can occur. The rule provides exemptions for fires that serve a ceremonial purpose, and when the District determines there would be an imminent and substantial economic loss if burning were to be prohibited. This rule reduces NOx emissions from between 58% and 100%, depending on the type of material burned.

**Future Control Options:**
- The District will gather information on economically feasible alternative methods to burning agricultural waste. District staff will report the findings to the California Air Resources Board in second quarter of 2008.
- District staff is committed to working with agricultural industry stakeholders to identify feasible alternative methods to burning agricultural waste.
- District staff will conduct a feasibility study on biomass incentives for fourth quarter of 2008.
- Staff will address the burn prohibition requirements of California State Senate Bill 705 (SB 705) according to the schedule detailed below.

Open Burning
(Continued)

**Discussion:**

- The District has legal authority to regulate air emissions from burning conducted at stationary sources.
- On September 22, 2003, Governor Gray Davis signed SB 705. This action amended the California Health and Safety Code (CH&SC) Sections 41855.5 and 41855.6 to require the District to revise rules that regulate emissions from open burning of waste produced by agricultural operations. The bill divided the agricultural wastes burn prohibitions into four phase:
  - Phase I: Diseased Crops (June 1, 2005)
  - Phase II: Field Crops, Prunings, and Weed Abatement (June 1, 2005); and Best Management Practices for Weed Abatement (June 1, 2006)
  - Phase III: Orchard Removals (June 1, 2007)
  - Phase IV: Other Materials, Vineyard Removals, and Prunings from Surface-Harvested Crops (June 1, 2010)
- The District's Governing Board adopted rule amendments to District Rule 4103 for Phase I, Phase II, and Phase III in 2004, 2005,and 2007, respectively. The next rulemaking project in 2010 will focus on Phase IV - the prohibition on the burning of Other Materials, Vineyard Removals, and Prunings from Surface-Harvested Crops. In addition, the postponement until 2010 for certain types of orchard removal and the phase down schedule for the burning of rice stubble that were created in 2007, will also be reconsidered under Phase IV.
- The District may postpone the burn prohibition commencement dates set forth in the CH&SC but cannot provide a permanent allowance for burning. Each of the following criteria must apply for the District to postpone the burn prohibition commencement dates:
  - The District determines that there is no economically feasible alternative of eliminating the waste.
  - The District determines that there is no long-term federal or state commitment for the continued operation of biomass facilities in the San Joaquin Valley or the development of alternatives to burning.
  - The District determines that the continued issuance of permits for that specific category or crop will not cause, or substantially contribute to a violation of an applicable federal ambient air quality standard.
  - The California Air Resources Board concurs with the District's determinations.

**Recommendation:**

- District staff recommends that the District continue to meet its legal obligation under the CH&SC (SB 705) through its rulemaking projects addressing the burning of agricultural waste.
- Currently this source category is not a candidate for incentive funding, but further analysis and study is necessary to determine if this source category may garner cost effective reductions in the future provided funding sources are available.

Open Burning
(Continued)

**Projected Reductions:**
Provided the technical and economic limitations of the alternatives to open burning, District staff anticipates that the recommended controls will yield the emissions reductions listed below.

| Pollutant | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | |
| NOx | 1.84 | 2.96 | 4.07 | 4.05 | 4.04 | 4.02 |
| PM2.5 | 2.41 | 3.88 | 5.34 | 5.32 | 5.30 | 5.28 |
| $SO_2$ | 0.04 | 0.07 | 0.10 | 0.10 | 0.10 | 0.10 |
| Tons per day – annual average | | | | | | |
| NOx | 1.21 | 1.95 | 2.68 | 2.67 | 2.66 | 2.65 |
| PM2.5 | 1.60 | 2.57 | 3.53 | 3.52 | 3.50 | 3.49 |
| $SO_2$ | 0.03 | 0.05 | 0.07 | 0.06 | 0.06 | 0.06 |

The baseline inventory does not reflect regulations adopted after December 2006, therefore, the indicated reductions include those resulting from both the completed June 2007 Phase III rule making and the proposed June 2010 Phase IV rule making.

## Conservation Management Practices (S-AGR-2)

(Agriculture)

**Source Category:**

This source category includes on-field farming operations.

**Emissions Inventory:**

Data includes current controls and regulations but does not reflect reductions from proposed controls.

| Pollutant | 2005 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | | |
| NOx | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PM2.5 | 13.22 | 13.60 | 13.69 | 13.82 | 13.95 | 14.08 | 14.21 |
| $SO_2$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Tons per day – annual average | | | | | | | |
| NOx | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PM2.5 | 14.79 | 15.15 | 15.23 | 15.36 | 15.48 | 15.60 | 15.73 |
| $SO_2$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

- **EIC Affected:** The source category shares EIC inventory with Rule 8081, which covers off-field farming operations. The emission inventory for the operations in this control measure will be evaluated during the Feasibility Study, but are not quantifiable at this time.

**Current Control:**

- Existing Rule 4550 requires agriculture growers and animal feeding operation producers to implement at least one method of Conservation Management Practice (CMP) for each of the applicable CMP categories for their operations. The CMP selected by the growers and producers must be specified in their CMP Plan and approved by the District.
- The 18 categories in the CMP are:
  - Cropland – Land Preparation/Cultivation
  - Cropland – Harvest
  - Cropland –Other
  - Cropland – Unpaved Roads
  - Cropland – Unpaved Vehicle/Equipment Traffic Areas
  - Poultry Operation – Manure Handling and Storage
  - Poultry Operation – Feeding
  - Poultry Operation – Open Areas
  - Poultry Operation – Unpaved Roads
  - Poultry Operation – Unpaved Vehicle/Equipment Traffic Areas
  - Dairy Operations – Corral/Manure Handling
  - Dairy Operations – Overall Management/Feeding

(Continued)

- o Dairy Operations – Unpaved Roads
- o Dairy Operations – Unpaved Vehicle/Equipment Traffic Areas
- o Feedlot Operations – Pens/Manure Handling
- o Feedlot Operations – Overall Management/Feeding
- o Feedlot Operations – Unpaved Roads
- o Feedlot Operations – Unpaved Vehicle/Equipment Traffic Areas

The list of CMP (published in a handbook) is quite extensive, containing more than 100 practices. For example, CMPs that reduce emissions include, but are not limited, to the following:

- o Practices that reduce or eliminate the need to disturb the soil or manure;
- o Practices that protect the soil from wind erosion;
- o Equipment modifications to physically produce less PM10;
- o Applying water or dust suppressants to reduce emissions entrained by moving vehicles and equipment;
- o Reducing speed or access on unpaved roads and parking areas;
- o Other practices that reduce pesticide use and emissions from stationary agricultural internal combustion engines; and
- o Alternative practices to agricultural waste burning.

- Growers and producers that are subject to the unpaved road and unpaved equipment traffic area provisions of Rule 8081 (Agricultural Sources) can comply with Rule 8081 requirements through their CMP Plans.
- Current Exemptions
  - o Agriculture operation sites with less than 100 contiguous acres.
  - o Animal feeding operations with less than 500 mature dairy cows, 190 beef cattle or heifers, 82,000 laying hens, 125,000 chickens (except layers), and 55,000 turkeys
  - o Animal feeding operations, other than for mature dairy cows, cattle, turkeys, chickens, and laying hens
  - o Woodland and wasteland not actually in cultivation or used for pasture
  - o Land placed in the Conservation Reserve Program meeting the definition criteria set by NRCS.
  - o Agricultural parcels that are 3,000 feet or more above mean sea level.
  - o Agricultural operation parcel used for propagating young trees, shrubs or other crops for transplanting and exhibiting plants inside a building, providing grazing rangeland or pasture, and forestry.

**Control Options:**

- Lower the current exemption thresholds for agricultural operation sites, number of cows, cattle, chickens, and turkeys. Evaluate feasibility of applying similar thresholds specified in Rule 4570 (Confined Animal Feeding Operation)
- Remove the existing exemption category for certain Animal Feeding Operations.
- Increase the number of required CMP for each applicable CMP categories.

Conservation Management Practices

(Continued)

**Discussion:**

- These source categories are located at stationary sources for which the District has legal authority to regulate air emissions.
- At this time, PM2.5 emission factors are not well defined and it is not known if controls for PM10 are effective for producing PM2.5 emissions reductions.

**Recommendation:**

District staff recommends a Feasibility Study be conducted and completed by 2010 to determine PM2.5 emission factors and assess PM10 control effectiveness for PM2.5.

**Projected Reductions:**

Emission reductions will be calculated based on the information derived from the Feasibility Study, but are not quantifiable at this time.

| Pollutant | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | |
| NOx | 0 | 0 | 0 | 0 | 0 | 0 |
| PM2.5 | NQ | NQ | NQ | NQ | NQ | NQ |
| $SO_2$ | 0 | 0 | 0 | 0 | 0 | 0 |
| Tons per day – annual average | | | | | | |
| NOx | 0 | 0 | 0 | 0 | 0 | 0 |
| PM2.5 | NQ | NQ | NQ | NQ | NQ | NQ |
| $SO_2$ | 0 | 0 | 0 | 0 | 0 | 0 |

## Boilers, Steam Generators, and Process Heaters >5 MMBtu/hr (S-COM-1)

(Electrical Utilities, Cogeneration, Oil & Gas Production – Combustion, Petroleum Refining – Combustion, Manufacturing & Industrial, Food & Ag Processing, Service & Commercial)

**Source Category:**
This source category includes a wide range of industries including but not limited to those listed above.

**Emissions Inventory:**
Data reflects current controls and regulations, but does not include any reductions from proposed controls.

| Pollutant | 2005 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | | |
| NOx | 5.68 | 3.21 | 3.20 | 3.23 | 3.25 | 3.28 | 3.31 |
| PM2.5 | 1.15 | 1.15 | 1.15 | 1.15 | 1.16 | 1.16 | 1.17 |
| $SO_2$ | 2.56 | 2.56 | 2.56 | 2.57 | 2.58 | 2.59 | 2.60 |
| Tons per day – annual average | | | | | | | |
| NOx | 5.97 | 3.34 | 3.34 | 3.36 | 3.39 | 3.42 | 3.44 |
| PM2.5 | 1.21 | 1.21 | 1.21 | 1.21 | 1.22 | 1.23 | 1.23 |
| $SO_2$ | 2.57 | 2.58 | 2.57 | 2.59 | 2.60 | 2.61 | 2.62 |

- **EIC Affected:** 010-005-0110; 010-005-1220; 030-005-0110; 030-005-0124; 030-005-0130; 030-005-1220; 030-005-1530; 030-010-0110; 030-010-1600; 030-015-0110; 030-015-0130; 040-005-0110; 040-005-0130; 040-010-0100; 040-010-0110; 040-010-1000; 050-005-0110; 050-005-0122; 050-005-0124; 050-005-0300; 050-005-1220; 050-010-1220; 050-010-1224; 052-005-0110; 052-005-0122; 052-005-0124; 052-005-1220; 052-005-1510; 052-005-1520; 052-010-0110; 052-010-0120; 052-010-1224; 060-005-0110; 060-005-0122; 060-005-0124; 060-005-0144; 060-005-0320; 060-005-1220; 060-005-1520; 060-010-1220

**Current Control:**
- Rule 4306 is currently the most stringent control measure in the state and requires the most effective controls.
- Rule 4306 sets NOx limits, effective in 2007, of 9 ppmv for units greater than 20 MMBtu/hr and 15 ppmv for units less than 20 MMBtu/hr. For large refinery units >110 MMBtu/hr the limit is 5 ppmv.
- The rule has an optional, enhanced NOx limit of 6 ppmv for units greater than 20 MMBtu/hr, which becomes effective in 2008.
- Low-use units with an annual heat input of 9 billion Btu or less are only required to perform periodic tune-up or to limit exhaust oxygen to 3% or less.
- The current limits in Rule 4306 achieve 45% reduction from the previously required emissions limit of 30 ppmv.

Boilers, Steam Generators, and Process Heaters, >5 MMBtu/hr
(Continued)

**Future Control Options:**

- Lower NOx limits are achievable by using selective catalytic reduction (SCR) or selective non-catalytic reduction (SNCR). Both technologies reduce NOx by injecting ammonia to the exhaust gas to convert NOx to elemental nitrogen and oxygen.
- Ultra Low NOx burner technology at this time is technologically capable of achieving 9 ppmv NOx, with some burners achieving 6 ppmv or lower.
- Low temperature oxidation may be technologically feasible for 5 ppmv, but its application on boilers is not considered to be achieved in practice or established as BACT for this source category.

**Discussion:**

- The District has legal authority to regulate air emissions from units in this source category located at stationary sources.
- There are approximately 1,600 permitted units currently operated by various types of industry in the District. Emissions reduction could be achieved by lowering the current emission limits based on burner replacement of exhaust control system retrofits.
- Lowering the current NOx limit of 9 ppmv to 5 ppmv for units greater than 20 MMBtu/hr would result to about 44% reduction from current baseline emissions for units in this size category. The 5 ppmv limit is achievable by retrofitting existing units with selective catalytic reduction technology (SCR). In fact, about 12 units in the District have been operating SCR and source testing results show that the 5 ppmv limit can be met. Data also shows that some units operating Ultra Low NOx Burner with flue gas recirculation could achieve the proposed NOx limit.
- Lowering the current standard option NOx limit of 15 ppmv to 9 ppmv for units equal to or less than 20 MMBtu would result to about 40% reduction from current emissions level for units in this size category can be achieved by retrofitting with Ultra Low NOx Burner (ULNB) technology. Some units, in the District, rated less than 20 MMBtu/hr, are already operating ULNB with flue gas recirculation that can meet the proposed 9 ppmv NOx limit.
- Older units, nearing the end of their useful life expectancy, may not be economical able to retrofit with SCR and it may be more cost effective to for operators to install complete replacement package with integral SCR or ULNB.
- Currently, there are no known units that operate with both PM2.5 and SO2 control devices for gaseous-fired or liquid-fired external combustion equipment. A few steam generators operating in crude oil production facilities in the District fire on mixture of natural gas, field gas, and vapor recovery gas with $SO_2$ scrubbers or desulfurization equipment. However, most permitted units are firing on natural gas or back-up distillate oil fuel without PM2.5 or $SO_2$ control devices.

Boilers, Steam Generators, and Process Heaters >5 MMBtu/hr
(Continued)

- PM control devices such as baghouse, electrostatic precipitators, and scrubbers are available, but they have not yet been demonstrated or achieved-in-practice for gaseous or liquid-fired units. Units firing on natural gas, propane, liquefied petroleum gas, or low sulfur diesel tend to emit very low levels of PM2.5 and $SO_2$. AP-42 indicates that the uncontrolled total PM (condensable and filterable) is 0.007 pound per million Btu and uncontrolled $SO_2$ is 0.0006 pound per million Btu for natural gas-fired boilers. The PM and $SO_2$ emissions are less than 4% and 0.3%, respectively, of the AP-42 uncontrolled NOx emission factor of 0.186 pound per million Btu from natural gas-fired boilers.
- Rule 4306 amendments currently under rule development to fulfill the commitment in the Ozone Plan. The focus of the amendments would be to lower the existing NOx limits and establish PM and $SO_2$ standards.
- Physical space where the units are located is often limited and could impede installation of NOx, PM and $SO_2$ controls, which can be almost as large as the combustion units.
- Other constraints, not known at this time, may have to be considered when deciding the implementation schedule for this control measure. Constraints such as lead-time to design, manufacture, deliver and install the technology could affect early implementation of lower limits. Availability of trained installation and source testing personnel will also be considered during rule development.

**Recommendation:**

- Staff recommends this source category be controlled through regulatory method with implementation starting in 2012, due to the constraints discussed above.
- An estimated 44% reduction from current emissions level could be achieved by lowering the NOx emission limit to 5 ppmv for units greater than 20 MMBtu/hr and by lowering the limit from 15 ppmv to 9 ppmv for units rated from 5 MMBtu/hr to 20 MMBtu/hr.
- Control of PM and $SO_2$ could be achieved by requiring units to be fired exclusively on PUC-quality natural gas, propane, or liquefied petroleum gas (LPG), except firing on liquid fuel would be allowed only during PUC-quality natural gas curtailment periods, provided the sulfur content of liquid fuel does not exceed 15 ppm. Gaseous fuel other than specified above could be used provided the exhaust gas is controlled by a $SO_2$ and PM10 emission control system. Staff estimates about 38% of existing permitted units are currently firing on mixture of PUC-quality natural gas, field gas, vapor recovery gas, and refinery gas. The estimated reduction in PM and SO2 is about 50% of the emissions from the units not fired exclusively with PUC-quality natural gas.
- Staff will consider inclusion of an Advanced Emission Control Options to mitigate the potentially high cost effectiveness of this control measure for certain units.

Boilers, Steam Generators, and Process Heaters >5 MMBtu/hr
(Continued)

**Projected Reductions:**
Calculated reductions assuming the recommended emission limits described below:

| Pollutant | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | |
| NOx | 0 | 0 | 0 | 1.43 | 1.44 | 1.46 |
| PM2.5 | 0 | 0 | 0 | 0.22 | 0.22 | 0.22 |
| $SO_2$ | 0 | 0 | 0 | 0.50 | 0.50 | 0.50 |
| Tons per day – annual average | | | | | | |
| NOx | 0 | 0 | 0 | 1.49 | 1.50 | 1.52 |
| PM2.5 | 0 | 0 | 0 | 0.23 | 0.24 | 0.24 |
| $SO_2$ | 0 | 0 | 0 | 0.50 | 0.50 | 0.50 |

- An estimated 44% reduction from current emissions level could be achieved by lowering the NOx emission limit to 5 ppmv for units greater than 20 MMBtu/hr and by lowering the limit from 15 ppmv to 9 ppmv for units rated from 5 MMBtu/hr to 20 MMBtu/hr.
- Staff estimates about 38% of existing permitted units are currently firing on mixture of PUC-quality natural gas, field gas, vapor recovery gas, and refinery gas. The estimated reduction in PM and SO2 is about 50% of the emissions from the units not fired exclusively with PUC-quality natural gas.

## Boilers, Steam Generators, and Process Heaters, 2 - 5 MMBtu/hr (S-COM-2)

(Electrical Utilities, Cogeneration, Oil & Gas Production – Combustion, Petroleum Refining – Combustion, Manufacturing & Industrial, Food & Agricultural Products Processing, Service & Commercial, Other – Fuel Combustion)

**Source Category:**

This source category includes a wide range of industries including but not limited to medical facilities, educational institutions, office buildings, prisons, military facilities, hotels and industrial industries.

**Emissions Inventory:**

Data reflects current controls and regulations, but does not include any reductions from proposed controls.

| Pollutant | 2005 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | | |
| NOx | 3.66 | 3.78 | 3.84 | 3.89 | 3.94 | 3.99 | 4.05 |
| PM2.5 | 0.35 | 0.36 | 0.37 | 0.37 | 0.38 | 0.38 | 0.39 |
| $SO_2$ | 3.17 | 3.30 | 3.37 | 3.43 | 3.49 | 3.55 | 3.61 |
| Tons per day – annual average | | | | | | | |
| NOx | 3.47 | 3.59 | 3.65 | 3.70 | 3.75 | 3.80 | 3.86 |
| PM2.5 | 0.32 | 0.33 | 0.34 | 0.35 | 0.35 | 0.36 | 0.36 |
| $SO_2$ | 3.17 | 3.30 | 3.37 | 3.43 | 3.49 | 3.55 | 3.61 |

- **EIC Affected:** 020-005-0110-0000; 050-070-0110-0000; 050-995-0110-0000; 050-995-0120-0000; 050-995-1500-0000; 052-070-0110-0000; 060-010-0110-0000; 060-995-0110-0000; 060-995-0120-0000; 060-995-1500-0000; 099-995-0000-0000; 310-356-0110-0000; 310-995-1600-0000; 410-400-2036-0000
- The EIC include emissions from all units rated less than 5 MMBtu/hr. To more accurately assess control measure reductions, half of the emissions in these EIC will be assumed to be controlled by S-COM-2 (2 to 5 MMBtu/hr) and half are controlled by S-COM-3 (0.075 to 2 MMBtu/hr).
- Current Rule 4307 requires registration of small units pursuant to District Rule 2250. When registration is completed within the next 3 years and the total number of medium size units has been determined, the District will re-calculate the emissions and then update the emissions inventory for this source category.

**Current Control:**

- District Rule 4307 sets NOx limits at 30 ppmv effective in 2009. This is approximately 70% NOx control from uncontrolled levels.
- Natural draft units operating in oil fields or refineries, glycol reboilers, and units that operate no more than 5 billion Btu per year are not required to meet the emission limits of the rule. Such units are required to be tuned up twice a year, or be operated in such a manner that the exhaust oxygen does not exceed 3% by volume (dry basis) or comply with the emission limits.

Boilers, Steam Generators, and Process Heaters, 2 - 5 MMBtu/hr
(Continued)

**Future Control Options:**

- Mandate NOx limits for school boilers, natural draft units operating in oil fields or refineries, glycol reboilers, and units that operate no more than 5 billion Btu per year. (currently undergoing rule amendment development process).
- Replacing with electric heaters is also an option since almost all facilities are in areas connected to existing commercial electric grid system.

**Future Incentive Options**

- Additional reductions can be achieved by providing incentives for replacement or retrofit of school boilers. Staff estimated there are at least 380 school boilers with uncontrolled emissions of about 0.8 tons per day of NOx.
- Electric heaters may also be feasible for some application, but have increased operational costs for electricity compared to using natural gas as a fuel source. Availability of higher-Btu electrical heaters also limits feasibility of that option.

| Incentive Option | # of Units | MMBtu/hr | Capacity Factor | Emissions (tons per day) | Emission Reductions (tons per day) | Total Cost | Capital Cost | Cost Effectiveness (dollars per ton) |
|---|---|---|---|---|---|---|---|---|
| Low NOx Retrofit (30 ppm) | 380 | 3.5 | 0.5 | 0.798 | 0.511 | $17,733,460 | $46,667 | $11,124 |
| Low NOx Replacement (30 ppm) | 380 | 3.5 | 0.5 | 0.798 | 0.511 | $24,553,700 | $64,615 | $15,402 |
| Ultra Low Nox Replacement (15 ppm) | 380 | 3.5 | 0.5 | 0.798 | 0.694 | $57,000,000 | $150,000 | $26,327 |

**Discussion:**

- The District has legal authority to regulate air emissions units located at stationary sources.
- Except for the school boilers exemption, current Rule 4307 is as stringent as other air district rules.
- Emission control devices such as baghouse, electrostatic precipitators, and scrubbers (wet or dry) are commercially available to reduce PM and $SO_2$ emissions. Units firing on natural gas, propane, liquefied petroleum gas, or low sulfur diesel tend to emit very low levels of PM2.5 and $SO_2$. AP-42 indicates that the uncontrolled total PM (condensable and filterable) is 0.007 pound per million Btu and uncontrolled $SO_2$ is 0.0006 pound per million Btu for natural gas-fired boilers. The PM and $SO_2$ emissions are less than 4% and 0.3%, respectively, of the AP-42 uncontrolled NOx emission factor of 0.186 pound per million Btu from natural gas-fired boilers.

Boilers, Steam Generators, and Process Heaters, 2 - 5 MMBtu/hr
(Continued)

- Physical space where the units are located could be limited and impede installation of NOx, PM and $SO_2$ controls, which can be almost as large as the combustion units.
- Other constraints not known at this time may have to be considered when deciding the implementation schedule for this control measure.
- Constraints such as longer lead-time to design, manufacture, deliver and install the technology could affect early implementation of lower limits.

**Recommendation:**

- Rule 4307 is currently undergoing rule development process to implement the control measure in the Ozone Plan. The draft amendments would include removing the exemption for school boilers, glycol reboilers, and natural draft units located in the oilfields and refineries. The Ozone Plan calls for adoption of rule amendments by third quarter of 2008.
- Due to limited state funding, school districts may need financial assistance to retrofit or replace aging equipment. Staff recommends initially controlling this source category through an incentive program and will explore opportunities for incentive funding to achieve additional emission reductions from this source category.
- Control of PM and $SO_2$ can be achieved by specifying that be units be fired exclusively on PUC-quality natural gas, propane, or liquefied petroleum gas (LPG). The use of liquid fuel with a sulfur content of 15 ppm or less would be allowed only during PUC-quality natural gas curtailment period.
- Recommend full implementation of proposed changes to the rule by 2015.

**Incentives:**

- Retrofit and replacement of school boilers to meet BARCT standards (30 ppm) are relatively cost effective incentive options. Grant history indicates that participation is higher for programs that offer full replacement as opposed to retrofit
- Consider adopting a backstop rule to assure participation in the incentive program and improve cost effectiveness.

**Projected Reductions:**

Calculated reductions assuming the recommended emission limits described above:

| Pollutant | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | |
| NOx | 0 | 0 | 0 | 0 | 0 | 0 |
| PM2.5 | 0 | 0 | 0 | 0 | 0 | 0 |
| $SO_2$ | 0 | 0 | 0 | 0 | 0 | 0 |
| Tons per day – annual average | | | | | | |
| NOx | 0 | 0 | 0 | 0 | 0 | 0 |
| PM2.5 | 0 | 0 | 0 | 0 | 0 | 0 |
| $SO_2$ | 0 | 0 | 0 | 0 | 0 | 0 |

## Boilers, Steam Generators, and Process Heaters, > 0.075 MMBtu/hr but < 2.0 MMBtu/hr (S-COM-3)

(Electrical Utilities, Cogeneration, Oil & Gas Production – Combustion, Petroleum Refining – Combustion, Manufacturing & Industrial, Food & Ag Processing, Service & Commercial, Other – Fuel Combustion)

**Source Category:**
Facilities with boilers in this size range may include electrical utilities, crude oil production facilities, manufacturing facilities, food processing facilities, hospitals, office buildings, schools and universities.

**Emissions Inventory:**
Data reflects current controls and regulations, but does not include any reductions from proposed controls.

| Pollutant | 2005 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | | |
| NOx | 3.66 | 3.78 | 3.84 | 3.89 | 3.94 | 3.99 | 4.05 |
| PM2.5 | 0.35 | 0.36 | 0.37 | 0.37 | 0.38 | 0.38 | 0.39 |
| $SO_2$ | 3.17 | 3.30 | 3.37 | 3.43 | 3.49 | 3.55 | 3.61 |
| Tons per day – annual average | | | | | | | |
| NOx | 3.47 | 3.59 | 3.65 | 3.70 | 3.75 | 3.80 | 3.86 |
| PM2.5 | 0.32 | 0.33 | 0.34 | 0.35 | 0.35 | 0.36 | 0.36 |
| $SO_2$ | 3.17 | 3.30 | 3.37 | 3.43 | 3.49 | 3.55 | 3.61 |

- **EIC Affected:** 020-005-0110-0000; 050-070-0110-0000; 050-995-0110-0000; 050-995-0120-0000; 050-995-1500-0000; 052-070-0110-0000; 060-010-0110-0000; 060-995-0110-0000; 060-995-0120-0000; 060-995-1500-0000; 099-995-0000-0000; 310-356-0110-0000; 310-995-1600-0000; 410-400-2036-0000
- The EIC include emissions from all units rated less than 5 MMBtu/hr. To more accurately assess control measure reductions, half of the emissions in these EIC will be assumed to be controlled by S-COM-2 (2 to 5 MMBtu/hr) and half are controlled by S-COM-3 (0.075 to 2 MMBtu/hr).

**Current Control:**
- District Rule 4308 limits NOx emissions for new and replacement units to the following levels:
  0.093 lb NOx/MMBtu for units rated between 0.075 and 0.4 MMBtu/hr, and
  0.036 lb NOx/MMBtu for units rated between 0.4 and 2.0 MMBtu/hr.

**Future Control Options:**
- Ultra Low NOx Burner could achieve lower emission level but may not be available for smaller unit.

Boilers, Steam Generators, and Process Heaters, 0.075 MMBtu/hr
(Continued)

- Replacement of older existing units with new ones that already integrate low NOx technology is possibly the more cost effective control options to that of retrofitting existing units.
- Replacing with electric heaters may also be an option since most facilities are in areas connected to existing commercial electric grid system.

**Discussion:**

- The District has legal authority to regulate air emissions from units operated at stationary sources.
- Although current District Rule 4308 has a specific date for when new and replacement boilers must meet the emission limit, it does not specify the turnover of boilers in service prior to that date. Mandating a specific date that all boilers in this size range must meet the current emission limit would generate faster turnover of the existing, boilers than natural attrition.
- At full implementation, NOx emission reductions were estimated to be 2.0 tons NOx per day, or about 60% of the baseline inventory of 3.3 tons per day.
- Currently, there are no known small gaseous-fired or liquid-fired units that operate with both PM2.5 and SO2 control devices. Control devices such as baghouse, electrostatic precipitators, and scrubbers are available, but they have not yet been demonstrated or achieved-in-practice for these units. Units firing on natural gas, propane, liquefied petroleum gas, or low sulfur diesel tend to emit very low levels of PM2.5 and $SO_2$. AP-42 indicates that the uncontrolled total PM (condensable and filterable) is 0.007 pound per million Btu and uncontrolled $SO_2$ is 0.0006 pound per million Btu for boilers firing on natural gas. The PM and $SO_2$ emissions are less than 4% and 0.3%, respectively, of the AP-42 uncontrolled NOx emission factor of 0.186 pound per million Btu from natural gas-fired boilers.
- Control of PM2.5 and $SO_2$ can be achieved by requiring the units be fired exclusively on PUC quality natural gas, propane or Liquefied Petroleum Gas (LPG). Firing on other fuel types may only be allowed during natural gas curtailment periods.
- Physical space where the units are located is often limited and could impede installation of PM and $SO_2$ control device, which can be almost as large as the combustion units.
- Other constraints, not known at this time, may have to be considered when deciding the implementation schedule for this control measure. Constraints such as longer lead-time to design, manufacture, deliver and install the technology could affect early implementation of lower limits. Availability of trained installation and source testing personnel will also be considered during rule development.
- Mandating conversion to electric boilers could be a possibility for this source category. Further study is needed to determine the most cost effective way to implement the standard for these units.

Boilers, Steam Generators, and Process Heaters, 0.075 MMBtu/hr
(Continued)

**Recommendation:**

- Accelerate the replacement of older units by 5% per year starting in 2011 with new units meeting the Rule 4308 NOx emission rate limits by a rule-based requirement (e.g. no units operating within the District that are 10 years or older, unless a certain emission rate can be demonstrated) or by the use of incentives or a combination of both strategies. An additional reduction of 5% from baseline emissions could be achieved by amending the current rule to accelerate replacement of older units.
- Explore possibilities of converting units to electric boilers where cost effective and socioeconomically viable.
- Control PM2.5 and SO2 by requiring the units be fired exclusively on PUC-quality natural gas, propane, or liquefied petroleum gas (LPG). Allow units be fired on liquid fuel with a sulfur content of 15 ppm or less only during PUC-quality natural gas curtailment periods.

**Projected Reductions:**

Calculated emission reductions, assuming the recommended controls:

| Pollutant | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | |
| NOx | 0 | 0 | 0.13 | 0.28 | 0.41 | 0.57 |
| PM2.5 | TBD | TBD | TBD | TBD | TBD | TBD |
| $SO_2$ | TBD | TBD | TBD | TBD | TBD | TBD |
| Tons per day – annual average | | | | | | |
| NOx | 0 | 0 | 0.12 | 0.27 | 0.39 | 0.55 |
| PM2.5 | TBD | TBD | TBD | TBD | TBD | TBD |
| $SO_2$ | TBD | TBD | TBD | TBD | TBD | TBD |

## Solid Fuel Boilers, Steam Generators, and Process Heaters (S-COM-4)

(Electric Utilities, Cogeneration, Service and Commercial)

**Source Category:**
This source category includes facilities that operate boilers, steam generators, and process heaters (units) that are fired on solid fuel. These units are used in facilities that generate utility and industrial power (electricity and heat) by burning solid fuels including petroleum coke, coal, municipal solid wastes, tires, or biomass wastes.

**Emissions Inventory:**
Data reflects current controls and regulations, but does not include any reductions from proposed controls.

| Pollutant | 2005 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | | |
| NOx | 4.06 | 4.11 | 4.16 | 4.16 | 4.16 | 4.15 | 5.15 |
| PM2.5 | 0.59 | 0.59 | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 |
| $SO_2$ | 1.33 | 1.34 | 1.34 | 1.34 | 1.34 | 1.34 | 1.34 |
| Tons per day – annual average | | | | | | | |
| NOx | 4.12 | 4.17 | 4.22 | 4.22 | 4.22 | 4.21 | 4.21 |
| PM2.5 | 0.62 | 0.62 | 0.63 | 0.63 | 0.63 | 0.63 | 0.63 |
| $SO_2$ | 1.36 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 | 1.37 |

- **EIC Affected:** 010-005-0214; 010-005-0240; 010-005-0243; 010-005-0254; 020-005-0214; 020-005-0218; 020-005-0220; 020-005-0230; 060-005-0250; 050-005-0214-0000; 052-005-0240-0000
- The emissions inventory will be further refined to ensure that it captures the NOx reductions from existing boiler permit NOx limits as well as current Rule 4352 limits.

**Current Control:** District Rule 4352 requires municipal solid waste units to meet a NOx limit of 200 ppmv @ 12% CO2. For all other units, the NOx limits is 115 ppmv @ 3% O2.

**Future Control Options:**
- Current BACT is selective non-catalytic reduction (SNCR) or ammonia injection for municipal waste-fired or biomass-fired boilers. Sources subject to Rule 4352 are already operating at or below the BACT limits by using this control technology.
- ARB recommended that staff examine if the NOx emission limits from Sacramento AQMD (70 ppmv) or (40 ppmv) are achievable.
- There is some increased use of selective catalytic reduction (SCR) with ammonia injection in new coal-fired boilers in eastern states in the nation. European Best Available Technology (BAT) listed SCR for coal and lignite firing boilers.
- There are no biomass-fired or municipal waste-fired boilers that are currently using SCR in the nation or in Europe.

Solid Fuel Boilers, Steam Generators, and Process Heaters
(Continued)

- Coal-fired units are not comparable to the District's biomass fired or municipal solid waste fired boilers, which are non-homogenous fuel and therefore higher emission variability. Further research would need to be conducted to determine if SCR could be retrofitted to the existing boilers or if they also need combustion retrofits that would require boiler rebuilds.

**Discussion:**

- The District has legal authority to regulate air emissions from units operated at stationary sources.
- Rule 4352 was recently amended to implement BARCT and All Feasible Control Measure as a commitment in the District's One-hour Extreme Ozone Attainment Demonstration Plan. A discussion of possible NOx emission levels and controls was included in the analysis for that rule amendment project.
- Facilities subject to Rule 4352 operate boilers that burn locally generated agricultural waste and municipal waste materials as well as waste materials imported into the Valley. Continued operation of these facilities is important to reduce emissions from open burning.

**Recommendation:**

- This source category is recommended for feasibility study to investigate the feasibility of retrofitting the units with SCR or other combustion modifications to achieve additional NOx emissions reduction and controls for PM2.5 and $SO_2$.

**Projected Reductions:**

Emission reductions will be calculated based on the information derived from the Feasibility Study, but are not quantifiable at this time.

| Pollutant | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | |
| NOx | NQ | NQ | NQ | NQ | NQ | NQ |
| PM2.5 | NQ | NQ | NQ | NQ | NQ | NQ |
| $SO_2$ | NQ | NQ | NQ | NQ | NQ | NQ |
| Tons per day – annual average | | | | | | |
| NOx | NQ | NQ | NQ | NQ | NQ | NQ |
| PM2.5 | NQ | NQ | NQ | NQ | NQ | NQ |
| $SO_2$ | NQ | NQ | NQ | NQ | NQ | NQ |

## Stationary Gas Turbines (S-COM-5)

(Electric Utilities, Cogeneration, Oil & Gas Production – Combustion, Petroleum Refining – Combustion, Manufacturing & Industrial, Service & Commercial, Other – Fuel Combustion)

**Source Category:**
This source category includes any operations that use stationary gas turbines for the generation of electrical power.

**Emissions Inventory:**
Data reflects current controls and regulations, but does not include any reductions from proposed controls.

| Pollutant | 2005 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | | |
| NOx | 8.37 | 4.93 | 4.95 | 5.00 | 5.05 | 5.09 | 5.13 |
| PM2.5 | 1.06 | 1.14 | 1.14 | 1.15 | 1.16 | 1.16 | 1.17 |
| $SO_2$ | 0.18 | 0.19 | 0.19 | 0.20 | 0.20 | 0.20 | 0.20 |
| Tons per day – annual average | | | | | | | |
| NOx | 8.40 | 4.94 | 4.97 | 5.02 | 5.06 | 5.10 | 5.15 |
| PM2.5 | 1.06 | 1.14 | 1.14 | 1.15 | 1.16 | 1.17 | 1.17 |
| $SO_2$ | 0.18 | 0.19 | 0.19 | 0.20 | 0.20 | 0.20 | 0.20 |

- **EIC Affected:** 010-045-0110; 010-045-1200; 020-045-0110; 030-045-0110; 030-045-1200; 040-045-1412; 050-045-1200; 060-045-0110; 060-045-1420
- The above emissions inventory does not reflect the reductions from the recent September 2007 amendments to Rule 4703.

**Current Control:**
- Due to the recent September 2007 amendments, District Rule 4703 is considered to be the most stringent rule in California for this category.
- Rule 4703 applies to stationary gas turbines with rated 0.3 megawatt (MW) and/or a maximum heat input greater than 3 MMBtu/hr.
- Recent amendments in September 2007, established the following NOx emission limits corrected to 15% $O_2$ for gas fired turbines which will be effective in 2012 or within 90 days following the next major overhaul in 2009, whichever occurs first:
  - Less than 3 MW: 9 ppmv
  - 3 MW to 10 MW pipeline gas turbine: 8 ppmv (steady state); 12 ppmv (non-steady state)
  - 3 MW to 10 MW, operating less than 877 hours/yr, except for above mentioned units: 9 ppmv
  - 3 MW to 10 MW operating at 877 or greater hours/year: 5 ppmv
  - Greater than 10 MW, simple cycle and operating no greater than 200 hours/year: 25 ppmv
  - Greater than 10 MW, simple cycle, operating no greater than 200 hours/year: 25 ppmv

- Greater than 10 MW, simple cycle, operating greater than 200 hours/year, but less than 877 hours/year: 5 ppmv
- Greater than 10 MW, Combined cycle: 3 ppmv (enhanced compliance option) and 5 ppmv (standard compliance option).
- For liquid fired turbines the NOx limit is 25 ppmv (regardless of turbine size)

- The previous exemption for low-use turbines' operating hours limitation has been lowered from 877 hours/year to 200 hours/year.
- Exemption includes laboratory turbines used exclusively in turbine technology research, turbines used exclusively for fire fighting and/or flood control, emergency turbines operated $\leq$ 100 hours per year.

**Future Control Options:**

- Rule 4703 was recently amended in September 2007which requires units to meet the most stringent NOx limits in the nation.
- Currently, there are no turbines firing on gaseous fuel in the nation or elsewhere that operate with PM2.5 and $SO_2$ control devices for units. Control devices such as baghouse, electrostatic precipitators, and scrubbers are available, but they have not yet been demonstrated or achieved-in-practice for turbines.
- PM2.5 and $SO_2$ controls could include requiring firing the units on PUC quality natural gas, propane or liquefied petroleum gas. Combustion of these types of gases emits very low amount PM2.5 and $SO_2$. If the units are not firing on PUC quality natural gas, propane or liquefied petroleum gas, consider requiring operation of PM2.5 and $SO_2$ control devices.

**Discussion:**

- The District has legal authority to regulate air emissions from units operated at stationary sources.
- Controlling PM and $SO_2$ may be technologically feasible, but the cost effectiveness of controlling these pollutants from units firing on natural gas with the above mentioned emission factors is expected to be prohibitive.
- The economic feasibility of controlling PM and $SO_2$ would need to be evaluated in light of the recent September 2007 amendments requiring most units to retrofit by 2012 to meet the most stringent NOx limits.
- Physical space where the units are located could impede or present challenges to the effective installation of PM and $SO_2$ control device, which can be almost as large as the combustion units.
- The proprietary SCONOX has achieved as low as 3 ppmv NOx for several categories and sizes of turbines compared to the limits specified in Rule 4703. But application of SCONOX has been limited to natural gas-fired combined cycle turbine using water injection. A simple-cycle turbine without water injection or combined-cycle turbines using dry low NOx could not use the SCONOx system. (Source "Final

Stationary Gas Turbines
(Continued)

Determination of Compliance Engineering Evaluation of Application No. 2686: Gilroy Energy Center LM600 Phase I Project Plant #11180, 8/28/01).

**Recommendation:**

- This control measure is recommended as a feasibility study to investigate the PM2.5 and $SO_2$ controls for this source category.

**Projected Reductions:**

Calculated NOx emissions reflect the reductions from September 2007 Rule 4703 amendments which have not been previously reflected in the emissions inventory. The potential for emission reductions for PM2.5 and SOx will be calculated based on the information derived from the Feasibility Study, but are not quantifiable at this time.

| Pollutant | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | |
| NOx | 0 | 0 | 0 | 2.20 | 2.20 | 2.20 |
| PM2.5 | NQ | NQ | NQ | NQ | NQ | NQ |
| $SO_2$ | NQ | NQ | NQ | NQ | NQ | NQ |
| Tons per day – annual average | | | | | | |
| NOx | 0 | 0 | 0 | 2.21 | 2.21 | 2.21 |
| PM2.5 | NQ | NQ | NQ | NQ | NQ | NQ |
| $SO_2$ | NQ | NQ | NQ | NQ | NQ | NQ |

## Reciprocating Internal Combustion Engines (S-COM-6)

(Cogeneration, Oil & Gas Production – Combustion, Petroleum Refining – Combustion, Manufacturing & Industrial, Food & Ag Processing, Service & Commercial, Other – Fuel Combustion)

**Source Category:**
This source category includes all reciprocating internal combustion engines. District Rule 4702 currently applies to engines greater than 50 brake-horsepower (50 bhp).

**Emissions Inventory:**
Data reflects current controls and regulations, but does not include any reductions from proposed controls.

| Pollutant | 2005 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | | |
| NOx | 20.39 | 20.23 | 19.86 | 19.47 | 19.08 | 18.68 | 18.27 |
| PM2.5 | 1.09 | 1.00 | 0.98 | 0.96 | 0.93 | 0.91 | 0.89 |
| $SO_2$ | 1.61 | 1.62 | 1.62 | 1.62 | 1.62 | 1.63 | 1.63 |
| Tons per day – annual average | | | | | | | |
| NOx | 26.29 | 25.57 | 25.07 | 24.52 | 23.96 | 23.38 | 22.79 |
| PM2.5 | 1.49 | 1.35 | 1.32 | 1.28 | 1.25 | 1.21 | 1.18 |
| $SO_2$ | 2.22 | 2.22 | 2.22 | 2.22 | 2.22 | 2.22 | 2.22 |

- **EIC Affected:** 010-040-0110; 010-040-1200; 020-040-0110; 020-040-1200; 030-040-0100; 030-040-0110; 030-040-0124; 030-040-1100; 030-040-1200; 030-040-1210; 040-040-0110; 050-040-0012; 050-040-0110; 050-040-0124; 050-040-1200; 050-040-1299; 050-040-3220; 050-995-1220; 052-040-0110; 052-040-1200; 052-042-1200; 060-040-0012; 060-040-0110; 060-040-0124; 060-040-0142; 060-040-0146; 060-040-1100; 060-040-1200; 060-040-1210; 060-995-1220; 099-040-1200
- The emissions inventory does not reflect the reductions from the recent ARB Air Toxic Control Measures for stationary internal combustion engines.

**Current Control:**
- District Rule 4702 regulates NOx emissions from stationary spark-ignited engines and stationary compression ignited (diesel) engines greater than 50 horsepower.
- NOx limits for spark-ignited engines used exclusively in agricultural operations (AO) are: Rich burn – 90 ppmv or 80 percent reduction; lean-burn – 150 ppmv or 70 percent reduction. The full compliance schedule for these engines is 2009, or 2010 if an operator has an agreement to replace an existing engine with an electric motor.
- For non-AO spark-ignited engines: Rich-burn – 25 ppmv or 96 percent reduction; lean-burn – 65 ppmv or 90 percent reduction. The full compliance schedule for non-AO engines is 2007.

Reciprocating Internal Combustion Engines
(Continued)

- NOx limits for compression ignited engines are: for non-EPA certified engines greater than 500 bhp and at least 1,000 annual operating hours – 80 ppmv and a full compliance schedule of 2008; 50 bhp to 750 bhp operating less than 1,000 hours per year – EPA certified Tier 3 to Tier 4 depending engine size and a compliance schedule of 2010 or 2011 based on engine size. For EPA certified compression ignited engines: EPA certified Tier I or Tier 2 must comply with Tier 4 standard by 2015 or 12 years after installation date whichever is later.

**Future Control Options:**

- Electrification - replacing engines with electric motors - where possible.
- Lower agricultural spark-ignited engine NOx emission limits to the same level as the non-AO units.
- Consider the 2007 proposed South Coast Air Quality Management District (SCAQMD) Rule 1110.2 (Emissions from Gaseous- and Liquid-Fueled Engines) emissions standards as discussed below.

**Discussion:**

- The District has legal authority to regulate air emissions from units in this source category located at stationary sources.
- The current Rule 4702 is as stringent as other air district rules.
- SCAQMD is currently proposing amendments to Rule 1110.2 (Emissions from Gaseous- and Liquid-Fueled Engines). Rule 1110.2 applies to all portable and stationary engines greater than 50 bhp-hr. The proposal would lower the NOx emissions limits for engines greater than or equal to 500 bhp-hr from 36 ppmv to 11 ppmv, and 45 ppmv for engines less than 500 bhp-hr effective July 1, 2010. Effective on and after July 1, 2011, the NOx limit would be 11 ppmv. For landfill and digester gas-fired engines the current limit would be lowered to 11 ppmv NOx effective on and after July 1, 2012.
- Electrification should also be considered as part of a strategy to reduce engine emissions. Operators are currently electrifying 2,000 agricultural diesel engines under an incentive program the utility company and the District.
- Technical and economic conditions may limit the application of electric motors in some locations and possible impacts to the power grid should be examined.
- Current Rule 4702 goes beyond the ARB Suggested Control Measure for this source category.
- Currently, no PM and $SO_2$ control technologies have been demonstrated or achieved in practice for gaseous fired units. The AP-42 uncontrolled emissions factors for natural gas-fired 4-stroke lean burn engines are 0.000077 lb/MMBtu for filterable PM2.5 and 0.000588 lb/MMBtu $SO_2$. The PM2.5 and $SO_2$ emissions are about 0.01% and 0.07%, respectively, of the AP-42 uncontrolled NOx emission factor of 0.847 lb/MMBtu NOx emission factor for natural gas-fired 4-stroke lean burn engines. Diesel fired (compression ignited) engines are already required to meet 0.01 grams/bhp-hr PM limit imposed by the ARB Air Toxic Control Measure, which was implemented in 2005.

Reciprocating Internal Combustion Engines
(Continued)

**Recommendation:**

- Since natural gas fuel is inherently low in sulfur content, additional controls have not been required or developed for spark-ignited engines that fire on natural gas to further reduce $SO_2$ emissions. The feasibility of controlling $SO_2$ emissions natural gas fired engines should be investigated.
- Since the ARB ATCM already established PM emission limit from stationary diesel engines, the District plans to implement the ATCM as part of the permitting process, which will require units to meet the specified PM limit by the ARB deadline.
- District staff recommends this source category as a control measure for rule amendments to consider SCAQMD's Rule 1110.2 proposed NOx limits, and to include PM2.5 and $SO_2$ controls. The emissions inventory may need to be adjusted to account for $SO_2$ emissions reductions from the use of state-mandated low sulfur diesel fuel for stationary engines.

**Projected Reductions:**

Emission reductions will be estimated during the ~~plan~~ rule development process.

| Pollutant | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | |
| NOx | NQ | NQ | NQ | NQ | NQ | NQ |
| PM2.5 | NQ | NQ | NQ | NQ | NQ | NQ |
| $SO_2$ | NQ | NQ | NQ | NQ | NQ | NQ |
| Tons per day – annual average | | | | | | |
| NOx | NQ | NQ | NQ | NQ | NQ | NQ |
| PM2.5 | NQ | NQ | NQ | NQ | NQ | NQ |
| $SO_2$ | NQ | NQ | NQ | NQ | NQ | NQ |

## Small Spark-Ignited Engines and Agricultural Spark Ignited Engines

**(S-COM-6A)**

(Cogeneration, Oil & Gas Production – Combustion, Petroleum Refining – Combustion, Manufacturing & Industrial, Food & Ag Processing, Service & Commercial, Other – Fuel Combustion)

### Source Category:

This source category includes stationary small internal combustion engines rated at less 50 brake-horsepower-hour (bhp-hr) or less and spark-ignited engines used in agricultural operations.

### Emissions Inventory:

Data reflects current controls and regulations, but does not include any reductions from proposed controls.

| Pollutant | 2005 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | | |
| NOx | TBD | TBD | TBD | TBD | TBD | TBD | TBD |
| PM2.5 | TBD | TBD | TBD | TBD | TBD | TBD | TBD |
| $SO_2$ | TBD | TBD | TBD | TBD | TBD | TBD | TBD |
| Tons per day – annual average | | | | | | | |
| NOx | TBD | TBD | TBD | TBD | TBD | TBD | TBD |
| PM2.5 | TBD | TBD | TBD | TBD | TBD | TBD | TBD |
| $SO_2$ | TBD | TBD | TBD | TBD | TBD | TBD | TBD |

- **EIC Affected:** 010-040-0110; 010-040-1200; 020-040-0110; 020-040-1200; 030-040-0100; 030-040-0110; 030-040-0124; 030-040-1100; 030-040-1200; 030-040-1210; 040-040-0110; 050-040-0012; 050-040-0110; 050-040-0124; 050-040-1200; 050-040-1299; 050-040-3220; 050-995-1220; 052-040-0110; 052-040-1200; 052-042-1200; 060-040-0012; 060-040-0110; 060-040-0124; 060-040-0142; 060-040-0146; 060-040-1100; 060-040-1200; 060-040-1210; 060-995-1220; 099-040-1200
- The ARB emissions inventory does not include the emissions from stationary internal combustion engines rated at 50 bhp-hr or less are not included in the emissions inventory. A survey of businesses and industries is needed to accurately determine the total number of small engines and to calculate their emissions.
- A survey of agricultural operation (AO) sources is needed to accurately determine the total number of AO spark-ignited engines and update the emissions inventory. Based on extrapolation from preliminary data provided by a stakeholder, there are at least 1,000 AO spark-ignited engines operating within the District.

### Current Control:

- Rule 4702 applies to stationary internal combustion engines greater than 50 bhp-hr. Small stationary spark-ignited engines rated at 50 bhp-hr or less are exempt from Rule 4702.

Small Spark-Ignited Engines and Agricultural Spark-Ignited Engines
(Continued)

- Rule 4702 NOx limits for spark-ignited engines (greater than 50 bhp-hr) used exclusively in agricultural operations (AO) are: Rich burn – 90 ppmv or 80 percent reduction; lean-burn – 150 ppmv or 70 percent reduction. The full compliance schedule for these engines is 2009, or 2010 if an operator has an agreement to replace an existing engine with an electric motor.
- For non-AO spark-ignited engines (greater than 5 bhp-hr): Rich-burn – 25 ppmv or 96 percent reduction; lean-burn – 65 ppmv or 90 percent reduction. The full compliance schedule for non-AO engines is 2007.

**Future Control Options:**

- Electrification – replacing engines with electric motors – where possible.
- Evaluate potential controls for small spark-ignited engines.
- Consider lowering the current NOx emission limits in Rule 4702 for agricultural spark-ignited engine to the same level as non-AO units (i.e., rich-burn: 25 ppmv; lean-burn: 65 ppmv).
- Evaluate the feasibility of South Coast Air Quality Management District (SCAQMD) currently proposed amendments to Rule 1110.2 (Emissions from Gaseous- and Liquid-Fueled Engines) that would lower the NOx limit to 11 ppmv by July 1, 2011 to determine if agricultural spark-ignited engines could meet the limit.

**Discussion:**

- The District has legal authority to regulate air emissions from units in this source category located at stationary sources.
- Federal law prohibits air districts from regulating stationary engines 25 bhp-hr or less. Therefore, the District could regulate engines greater than 25 bhp-hr.
- SCAQMD is currently proposing amendments to Rule 1110.2 (Emissions from Gaseous- and Liquid-Fueled Engines). Rule 1110.2 applies to all portable and stationary engines greater than 50 bhp-hr. The proposal would lower the NOx emissions limits for engines greater than or equal to 500 bhp-hr from 36 ppmv to 11 ppmv, and 45 ppmv for engines less than 500 bhp-hr effective July 1, 2010. Effective on and after July 1, 2011, the NOx limit would be 11 ppmv. For landfill and digester gas-fired engines the current limit would be lowered to 11 ppmv NOx effective on and after July 1, 2012.
- Additional NOx reductions could be achieved by lowering the current emission limits for agricultural spark-ignited engines and by expanding the applicability of existing Rule 4702 so that engines rated at greater than 25 bhp-hr to 50 bhp-hr would be subject to the rule.

**Recommendation:**

- Explore opportunities for incentive funding and regulatory action to achieve earlier and additional emission reductions from this source category.

Small Spark-Ignited Engines and Agricultural Spark-Ignited Engines
(Continued)

- Conduct an emissions inventory survey to determine the total number of small spark-ignited engines and agricultural operations spark-ignited engines operating in the District.
- Evaluate potential controls for small spark-ignited engines.
- Evaluate if SCAQMD's proposed 11 ppmv NOx limit is feasible for agricultural spark-ignited engines.
- District staff recommends this source category as a control measure for Feasibility Study.

**Projected Reductions:**
Emission reductions will be calculated based on the information derived from the Feasibility Study, but are not quantifiable at this time.

| Pollutant | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | |
| NOx | NQ | NQ | NQ | NQ | NQ | NQ |
| PM2.5 | NQ | NQ | NQ | NQ | NQ | NQ |
| $SO_2$ | NQ | NQ | NQ | NQ | NQ | NQ |
| Tons per day – annual average | | | | | | |
| NOx | NQ | NQ | NQ | NQ | NQ | NQ |
| PM2.5 | NQ | NQ | NQ | NQ | NQ | NQ |
| $SO_2$ | NQ | NQ | NQ | NQ | NQ | NQ |

## Glass Melting Furnaces (S-COM-7)

(Glass and Related Products)

**Source Category:**
This source category includes any glass-melting furnace. Within the District, there are four types of glass produced: container glass (bottles and jars), flat glass (windows and automobile windshields), wool fiberglass (building insulation), and continuous strand fiberglass (aircraft insulation and filter media for air and water).

**Emissions Inventory:**
Data reflects current controls and regulations, but does not include any reductions from proposed controls.

| Pollutant | 2005 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | | |
| NOx | 9.38 | 8.16 | 8.37 | 8.56 | 8.73 | 8.94 | 9.08 |
| PM2.5 | 1.03 | 1.10 | 1.12 | 1.15 | 1.17 | 1.20 | 1.22 |
| $SO_2$ | 3.79 | 4.07 | 4.17 | 4.26 | 4.34 | 4.44 | 4.52 |
| Tons per day – annual average | | | | | | | |
| NOx | 9.38 | 8.17 | 8.37 | 8.56 | 8.73 | 8.94 | 9.08 |
| PM2.5 | 1.03 | 1.10 | 1.12 | 1.15 | 1.17 | 1.20 | 1.22 |
| $SO_2$ | 3.79 | 4.07 | 4.17 | 4.26 | 4.34 | 4.44 | 4.52 |

- **EIC Affected:** 460-460-7037, 460-460-7038, 460-460-7039

**Current Control:**
Rule 4354 regulates the emissions from furnaces use to melt sand and other ingredients to produce glass products. NOx emission limits range from 4.0 to 9.2 pounds NOx per ton of glass pulled, depending on market sector, firing technology, and emission averaging period. VOC emission limits are 20 ppmv or range from 0.1 to 0.25 lb/ton glass pulled depending on market sector and firing technology. Operators meet current emission limits through a selection of furnace firing technology and glass raw materials.

With recent rule amendments, Rule 4354 applies to all industrial glass-melting furnaces in the District. The NOx emissions are controlled 67% to 76% compared to uncontrolled glass-melting furnaces.

**Future Control Options:**
- NOx controls: 100% Oxygen fired (Oxy-fueled), proprietary 3R technology, Selective Catalytic Reduction (SCR), and electric furnaces.
- Particulate controls: Gaseous fuel, Bag house (mechanical filter), wet scrubber, and electrostatic precipitator.
- SOx controls: Raw material selection, and scrubbers (wet or dry).

Glass Melting Furnaces
(Continued)

**Discussion:**

- Lower NOx emissions have been achieved within the District with changes to traditional firing technology, glass formulations, and controls.
- SCR is an add-on control that may help operators meet lower NOx limits. SCR has been used by other source categories to reduce NOx emissions. Glass melting furnaces in Europe and Asia have successfully used SCR to control NOx emissions, but to date; no facility in the US has implemented this control technology.
- Emission reductions from the last furnaces to meet the 2002 rule amendments will begin starting in 2008. There are four furnaces with NOx limits greater than these limits that are expected to be rebuilt by 2012: three container glass furnaces and one flat glass furnace. The most cost-effective time to change NOx controls is during furnace rebuild. To ensure that furnaces meet the limits by 2012, it is recommended that rule development be completed by 2009.
- Operators have increased production capacity during the most recent round of rebuilds, triggering Best Available Control Technology (BACT) provisions. The BACT provisions have resulted in NOx emissions limits that are much less than 3 and 5 pounds per ton of glass pulled for container/fiberglass and flat glass furnaces, respectively, so the current draft rule proposes similar limits.
- When fully implemented, District staff has estimated that actual NOx emission reductions from rule amendments would be an additional 0.4 tons per day beginning in 2012.

**Recommendation:**

A rule project for this control measure has already begun. Estimated adoption of amendments is third quarter 2008, with full implementation possible by 2012.

**Projected Reductions:**

NOx data reflects the estimated reductions from the draft rule amendments and the reductions from the current rule, which have not been added to the inventory. PM2.5 and SOx reductions will be calculated based on the information derived from current rule development project, but are not quantifiable at this time.

| Pollutant | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | |
| NOx | 1.22 | 1.25 | 1.18 | 1.60 | 1.67 | 1.58 |
| PM2.5 | TBD | TBD | TBD | TBD | TBD | TBD |
| SOx | TBD | TBD | TBD | TBD | TBD | TBD |
| Tons per day – annual average | | | | | | |
| NOx | 1.22 | 1.25 | 1.18 | 1.60 | 1.67 | 1.58 |
| PM2.5 | TBD | TBD | TBD | TBD | TBD | TBD |
| $SO_2$ | TBD | TBD | TBD | TBD | TBD | TBD |

## Lime Kilns (S-COM-8)

(Food & Ag Processing)

**Source Category:**
This source category pertains to facilities operating lime kilns in a wide variety of manufacturing and processing operations, including food and agriculture.

**Emissions Inventory:**
Data reflects current controls and regulations, but does not include any reductions from proposed controls.

| Pollutant | 2005 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | | |
| NOx | TBD | TBD | TBD | TBD | TBD | TBD | TBD |
| PM2.5 | TBD | TBD | TBD | TBD | TBD | TBD | TBD |
| $SO_2$ | TBD | TBD | TBD | TBD | TBD | TBD | TBD |
| Tons per day – annual average | | | | | | | |
| NOx | TBD | TBD | TBD | TBD | TBD | TBD | TBD |
| PM2.5 | TBD | TBD | TBD | TBD | TBD | TBD | TBD |
| $SO_2$ | TBD | TBD | TBD | TBD | TBD | TBD | TBD |

- **EIC Affected:** Need to assign an EIC because lime kilns are not included in the ARB emissions inventory. There is only one device operating in the District and it currently complies with the rule associated with this device.

**Current Control:**
District Rule 4313 limits NOx emissions from lime kilns to no more than 0.1 lb/MMBTU for gaseous fuel-fired; 0.12 lb/MMBTU for distillate fuel oil-fired; 0.20 lb/MMBTU residual fuel oil-fired

**Future Control Options:**
- Future control option includes lowering the current NOx emission limits.
- Available retrofit combustion control technologies to achieve lower NOx limits include low NOx burner and ultra low NOx burners fired on natural gas. Add-on controls such as SCR or SCNR is technologically feasible but its cost effectiveness should be examined for this application.

**Discussion:**
- The District has legal authority to regulate these units which are located at stationary sources.
- There is only one permitted lime kiln operating in the District. The kiln is operated only during ozone season to manufacture sugar.
- The current permit allows firing on distillate fuel oil (#6 fuel oil) as primary fuel and natural gas as back-up fuel.
- Current NOx limit of 0.1 lb/MMBtu is considered uncontrolled emission limit.

Lime Kilns
(Continued)

- Lower the NOx limits to at least 0.036 lb/MMBtu (30 ppmv) fired on natural gas fuel and 0.052 lb/MMBtu (40 ppmv) fired on liquid fuel (residual fuel oil or distillate oil), at 3% excess oxygen.
- Require firing on natural gas as primary fuel. Distillate oil firing as a back-up fuel could be allowed during natural gas curtailment period.
- A reduction of about 64% from current emissions level could be achieved by lowering the NOx limit to at least 30 ppmv for natural gas firing.
- A reduction of about 75% from current emissions level could be achieved by lowering the NOx limit to at least 40 ppmv for distillate oil firing.

**Recommendation:**

- Staff recommends this source category be controlled through regulatory method with implementation schedule not earlier than 2012 to allow time to design, procure, and install retrofit control technology. Compliance schedule for the new emission limit should coincide during off-season when the kiln is not operating so retrofit could be completed without disrupting normal manufacturing operations.
- Amend Rule 4313 to lower the NOx limits. A reduction of between 64% to 75% from current emissions level from this source category could be achieved by combustion control retrofit technologies discussed above depending on the type of fuel (natural gas or distillate) used to fire the unit.
- Consider inclusion of an alternative compliance option to improve cost effectiveness of this control measure.
- Based on the current emissions inventory or lack thereof, control level, and existing technology, emission reductions are not quantifiable for this source category. However, a future study to re-evaluate this source category may be planned in the future.

**Projected Reductions:**

Calculated emission reductions, assuming the recommended controls:

| Pollutant | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | |
| NOx | 0 | 0 | 0 | 0 | 0 | 0 |
| PM2.5 | 0 | 0 | 0 | 0 | 0 | 0 |
| SOx | 0 | 0 | 0 | 0 | 0 | 0 |
| Tons per day – annual average | | | | | | |
| NOx | 0 | 0 | 0 | 0 | 0 | 0 |
| PM2.5 | 0 | 0 | 0 | 0 | 0 | 0 |
| $SO_2$ | 0 | 0 | 0 | 0 | 0 | 0 |

## Residential Water Heaters (S-COM-9)

(Residential Fuel Combustion)

**Source Category:**
Units in this source category are water heaters sold for use in private residences.

**Emissions Inventory:**
Data reflects current controls and regulations, but does not include any reductions from proposed controls.

| Pollutant | 2005 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | | |
| NOx | 1.37 | 1.28 | 1.29 | 1.30 | 1.31 | 1.32 | 1.33 |
| PM2.5 | 0.17 | 0.17 | 0.18 | 0.18 | 0.18 | 0.18 | 0.18 |
| $SO_2$ | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| Tons per day – annual average | | | | | | | |
| NOx | 1.37 | 1.28 | 1.29 | 1.30 | 1.31 | 1.32 | 1.33 |
| PM2.5 | 0.17 | 0.17 | 0.18 | 0.18 | 0.18 | 0.18 | 0.18 |
| $SO_2$ | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |

- **EIC Affected:** 610-608-0110

**Current Control:** District Rule 4902 currently requires any new or replacement natural-gas fired, new residential water heaters, which are rated at less than 75,000 BTU heat input, not to exceed 93 pounds of NOx emissions per billion Btu (lb of NOx/bBtu) of heat input.

**Future Control Options:**
- New water heaters are designed to be more energy efficient and emit less NOx, using low-NOx combustion technology.
- Electrification – replacement with electric water heaters – could also significantly lower NOx emissions.
- Encourage early replacement of exiting units using either a specific compliance schedule or incentive funding.

**Discussion:**
- Lower NOx limits are currently in place in SCAQMD Rule 1121 which are become effective in 2007 and 2008. Because of the tendency for manufacturers to supply SCAQMD-complying products for the entire state, many new water heaters in the San Joaquin Valley may already meet the new limits.
- Nonresidential water heaters and mobile home heaters are exempt from current rule requirements, although these applications generally use similar water heating devices.
- The transition from older to newer, less NOx-emitting units currently occurs through attrition and assumes a 20-year lifetime for water heaters.

Residential Water Heaters
(Continued)

- The reductions from the new water heaters are mainly in the form of NOx since the VOC emissions are considered negligible.

**Recommendation:**

- Amend Rule 4902 to lower the NOx emission limit, similar to SCAQMD Rule 1121 standard for post-2008 units and expand its applicability to nonresidential and mobile home heaters, taking into account any technological limitations.
- Control PM2.5 and SO2 by requiring the units be fired exclusively on PUC-quality natural gas, propane, or liquefied petroleum gas (LPG). The use of liquid fuel with a sulfur content of 15 ppm or less would be allowed only during PUC-quality natural gas curtailment periods.
- Currently this source category is not a candidate for incentive funding, but further analysis and study will be done during the rule project to determine if this source category may garner cost effective reductions in the future provided funding sources are available.

**Projected Reductions:**

Calculated reductions assuming the recommended emission limits described below:

| Pollutant | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | |
| NOx | 0 | 0 | 0.20 | 0.25 | 0.32 | 0.40 |
| PM2.5 | TBD | TBD | TBD | TBD | TBD | TBD |
| $SO_2$ | TBD | TBD | TBD | TBD | TBD | TBD |
| Tons per day – annual average | | | | | | |
| NOx | 0 | 0 | 0.20 | 0.25 | 0.32 | 0.40 |
| PM2.5 | TBD | TBD | TBD | TBD | TBD | TBD |
| $SO_2$ | TBD | TBD | TBD | TBD | TBD | TBD |

- The reductions reflect controls that come by natural attrition of the units, which is projected to take 20 years resulting in a reduction rate of 5% per year of the final emission reduction total.
- The reductions are based on 75% reduction of NOx (reducing from 93 to 23 lb of NOx/billion Btu) for the additional applicable units.

## Natural Gas-Fired, Fan-Type Residential Central Furnaces (S-COM-10)

(Residential Fuel Combustion)

**Source Category:**
This source category covers natural gas-fired, residential central heating furnaces. These units are in the size range of rated heat input capacity of less than 175,000 British thermal units per hour and, for combination heating and cooling units, a rated cooling capacity of less than 65,000 British thermal units per hour.

**Emissions Inventory:**
Data reflects current controls and regulations, but does not reflect the reductions from the proposed control.

| Pollutant | 2005 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | | |
| NOx | 4.21 | 4.09 | 4.06 | 4.03 | 4.00 | 3.97 | 3.93 |
| PM2.5 | 0.34 | 0.33 | 0.33 | 0.33 | 0.32 | 0.32 | 0.32 |
| $SO_2$ | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.02 | 0.02 |
| Tons per day – annual average | | | | | | | |
| NOx | 2.49 | 2.42 | 2.40 | 2.39 | 2.37 | 2.35 | 2.33 |
| PM2.5 | 0.20 | 0.20 | 0.19 | 0.19 | 0.19 | 0.19 | 0.19 |
| $SO_2$ | 0.02 | 0.02 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |

- **EIC Affected:** 610-606-0110-0000

**Current Control:**
- Rule 4905 was adopted on October 20, 2005 and limits NOx emissions from residential central furnaces.
- The rule requires any new or replacement natural gas-fired fan-type residential central furnace to have certified emissions of oxides of nitrogen less than or equal to 0.093 pounds of oxides of nitrogen per million BTU heat output or 55 ppm NOx at 3.00% $O_2$ stack gas by volume (dry).

**Future Control Options:**
- Low-NOx burner (LNB) technology with NOx emissions of approximately 0.046 lb/MMBtu has been developed, but it has not reached the commercially available stage. These burners could be required when the technology matures.
- Incentivize the use of more efficient “condensing” heating units, which have Annual Fuel Utilization Efficiency (AFUE) upwards of 90%, in contrast to “noncondensing” units that have 78% AFUE. Higher efficiencies lead to less fuel usage and lower total emission amounts.
- Require state-of-the-art control systems that minimize energy use and reduce fuel consumption.

Natural Gas-Fired, Fan-Type Residential Central Furnaces
(Continued)

**Discussion:**

- A 50% NOx emission reduction could be achieved by requiring LNB on units, once that technology is commercially viable.
- Currently, there are no known units that operate with both PM2.5 and SO2 control devices for these units. PM2.5 and SO2 emissions will be controlled by ensuring complete combustion of natural gas fuel. Natural gas contains only trace quantities of non-combustible material. Since natural gas fuel is inherently low in sulfur content, additional controls have not been required or developed that would reduce emissions further. Since these units are fired on natural gas, no significant reduction in PM2.5 and SO2 is anticipated.

**Recommendation:**

- LNB are not currently commercially available but do present the possibility of significant reductions from new or replacement units. Therefore, staff recommends amending Rule 4905 to establish more stringent NOx limits for new and replacement units.

**Projected Reductions:**

Emission reductions will be estimated during the ~~plan~~ rule development process.

| Pollutant | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | |
| NOx | NQ | NQ | NQ | NQ | NQ | NQ |
| PM2.5 | NQ | NQ | NQ | NQ | NQ | NQ |
| $SO_2$ | NQ | NQ | NQ | NQ | NQ | NQ |
| Tons per day – annual average | | | | | | |
| NOx | NQ | NQ | NQ | NQ | NQ | NQ |
| PM2.5 | NQ | NQ | NQ | NQ | NQ | NQ |
| $SO_2$ | NQ | NQ | NQ | NQ | NQ | NQ |

## Dryers (S-COM-11)

(Mineral Processes, Other – Industrial Processes)

**Source Category:**
This source category includes any dryer, dehydrator, or oven. Some examples of units subject the this rule are onion dehydrators, dryers that convert liquid milk to dried milk, and units used to dry aggregate at asphalt plants.

**Emissions Inventory:**
Data reflects current controls and regulations, but does not include any reductions from proposed controls.

| Pollutant | 2005 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | | |
| NOx | 2.46 | 2.63 | 2.67 | 2.73 | 2.78 | 2.83 | 2.90 |
| PM2.5 | 0.94 | 1.00 | 1.01 | 1.02 | 1.03 | 1.05 | 1.06 |
| $SO_2$ | 1.52 | 1.63 | 1.66 | 1.69 | 1.73 | 1.75 | 1.79 |
| Tons per day – annual average | | | | | | | |
| NOx | 2.49 | 2.66 | 2.70 | 2.77 | 2.81 | 2.87 | 2.93 |
| PM2.5 | 0.99 | 1.06 | 1.07 | 1.08 | 1.09 | 1.10 | 1.12 |
| $SO_2$ | 1.64 | 1.76 | 1.79 | 1.82 | 1.86 | 1.89 | 1.93 |

- **EIC Affected:** 430-422-7078, 430-424-7006, 430-995-7000, 499-995-0000, 499-995-5630

**Current Control:**
District Rule 4309 requires dehydrators to be fired on PUC-quality natural gas; all others units have a NOx emission limit of 3.5 to 5.3 ppmv using an oxygen correction factor. Operators may meet NOx emission limit using a NOx emission control system.

Because this rule was recently adopted, no estimation has been made of the proportion of additional units that are at least 5 MMBtu/hr or larger that will be subject to this rule. At full implementation of the current rule requirements, NOx emissions from units subject to the rule are estimated at 66% of uncontrolled emissions.

**Future Control Options:**
- No new technologies that are not currently specified under current controls are known at this time.

**Discussion:**
- Low-NOx burners are already in use for sources subject to rule provisions. Some of the sources that are currently exempt from the rule are already using this technology as part of their Permit to Operate.
- The bulk of the dryers, dehydrators, and ovens operate at temperatures that are too low for efficient operation of NOx emission control systems, therefore add-on controls are not an option for this source category.

Dryers
(Continued)

- Some currently exempt units operate for a short limited season, for example, dryers and humidifiers at cotton gins, so the amount of NOx emission reductions from these units would be small since nearly all exempted units run on PUC natural gas which is a clean burning technology.
- Another option for this rule is to change the rule applicability by reducing the total heat input cut-off for units subject to the rule below the current 5.0 MMBtu/hr. As the heat input cut-off decreases, the sources that would be affected by the rule become more diverse. For example, commercial laundry dryers and ovens for pre-packaged tortillas are units that are in the range of 2 to 3 million Btu/hr. Since the industries would be varied, more analysis would be needed throughout the rule development project to adequately assess the technology available for these lower heat input units. Nearly all of the exempted units are firing on PUC-quality natural gas already, which is a very clean-burning technology.

**Recommendation:**

- The recent adoption of this rule has maximized the possible emission reductions from this source category. Future equipment advancements may produce additional reductions from exempt equipment. A feasibility study to re-evaluate this source category is planned.

**Projected Reductions:**

Calculated emission reductions, assuming the recommended controls:

| Pollutant | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | |
| NOx | NQ | NQ | NQ | NQ | NQ | NQ |
| PM2.5 | NQ | NQ | NQ | NQ | NQ | NQ |
| $SO_2$ | NQ | NQ | NQ | NQ | NQ | NQ |
| Tons per day – annual average | | | | | | |
| NOx | NQ | NQ | NQ | NQ | NQ | NQ |
| PM2.5 | NQ | NQ | NQ | NQ | NQ | NQ |
| $SO_2$ | NQ | NQ | NQ | NQ | NQ | NQ |

## Wood Burning Fireplaces and Wood Burning Heaters (S-COM-14)

(Residential Fuel Combustion)

**Source Category:**
This source category includes fireplaces and heaters that burn wood for space heating.

**Emissions Inventory:**
Data reflects current controls and regulations, but does not include any reductions from proposed controls.

| Pollutant | 2005 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | | |
| NOx | 2.12 | 1.77 | 1.73 | 1.66 | 1.59 | 1.52 | 1.46 |
| PM2.5 | 20.44 | 17.67 | 17.37 | 16.75 | 16.22 | 15.72 | 15.22 |
| $SO_2$ | 0.33 | 0.34 | 0.34 | 0.34 | 0.34 | 0.34 | 0.35 |
| Tons per day – annual average | | | | | | | |
| NOx | 1.09 | 0.91 | 0.89 | 0.85 | 0.81 | 0.78 | 0.75 |
| PM2.5 | 10.48 | 9.06 | 8.90 | 8.59 | 8.31 | 8.06 | 7.80 |
| $SO_2$ | 0.17 | 0.17 | 0.17 | 0.17 | 0.18 | 0.18 | 0.18 |

- **EIC Affected:** 610-600-0230-0000; 610-602-0230-0000

**Current Control:** Rule 4901 regulates the emissions of particulate matter and carbon monoxide from wood burning fireplaces and wood burning heaters (devices) are currently regulated in the San Joaquin Valley under Rule 4901. The rule was adopted in 1993 and amended in 2003.

- Exempts gaseous-fueled devices and cook stoves described in the Code of Federal Regulations.
- From November through February, the episodic wood burning curtailment provisions prohibits using wood burning devices when the Air Quality Index (AQI) value is predicted to be 150 or higher for a specific geographic region (county).
- Wood burning devices located at least 3000 feet in elevation, or where natural gas service is not available, or if they are the sole source of heat in a residence are not subject to the episodic curtailment provisions.
- New wood burning device must be either an EPA Phase II certified unit or a pellet-fueled device.
- Real property cannot be sold or transferred if it includes a wood burning heater, unless each heater in the real property is EPA certified. Seller must provide the recipient and the District a signed statement that the device is EPA certified.
- A wood burning fireplace cannot be installed in a new residential development with a density greater than two dwelling units per acre.
- No more than two EPA Phase II certified wood burning heaters can be installed per acre in any new residential development with more than three dwelling per acre.
- Certain materials, such as waste wood and coal, cannot be burned in the devices.

Wood Burning Fireplaces and Wood Burning Heaters
(Continued)

**Future Control Options:**

- The current AQI threshold of 150 for declaring mandatory curtailment of wood burning activities needs to be lowered to an appropriate level to achieve additional emission reductions necessary in attaining the new federal PM2.5 standard.
- Wood burning devices located at least 3,000 elevation, or where natural gas service is not available, or if they are the sole source of heat, are currently not subject to the rule. The rule could include a provision to allow counties, cities, and municipalities to require residents their geographical areas to participate in mandatory burn curtailment program, even though they are otherwise exempt from the curtailment.
- Rule applicability could be extended to include wood-burning chimineas, fire pits, and outdoor fireplaces.

**Discussion:**

- The District has the authority to regulate this source category.
- Rule 4901 is one of the most stringent rules in the nation. Other air districts have used it as a model when developing their rules.
- The District's "Check Before You Burn" Program has raised public awareness to a high level and the active participation of Valley residents resulted in significant emission reductions that enabled the District to attain the federal PM10 standards.

**Recommendation:**

- Staff recommends amending Rule 4901 with implementation schedule in 2009.

**Projected Reductions:**

Calculated reductions assuming the recommended emission limits described below:

| Pollutant | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | |
| NOx | 0.0 | 0.08 | 0.15 | 0.14 | 0.14 | 0.14 |
| PM2.5 | 0.0 | 0.76 | 1.48 | 1.43 | 1.39 | 1.35 |
| $SO_2$ | 0.0 | 0.01 | 0.03 | 0.03 | 0.03 | 0.03 |
| Tons per day – annual average | | | | | | |
| NOx | 0.0 | 0.04 | 0.08 | 0.07 | 0.07 | 0.07 |
| PM2.5 | 0.0 | 0.39 | 0.76 | 0.73 | 0.71 | 0.69 |
| $SO_2$ | 0.0 | 0.01 | 0.02 | 0.02 | 0.02 | 0.02 |

## Prescribed Burning and Hazard Reduction Burning (S-GOV-6)

(Managed Burning and Disposal)

**Source Category:**
This source category includes activities related to prescribed burning and hazard reduction burning in wildland/urban interface areas.

**Emissions Inventory:**
Data includes current controls and regulations but does not reflect the reductions from the proposed control.

| Pollutant | 2005 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | | |
| NOx | 0.37 | 0.36 | 0.36 | 0.36 | 0.35 | 0.35 | 0.35 |
| PM2.5 | 1.17 | 1.14 | 1.14 | 1.13 | 1.12 | 1.12 | 1.11 |
| $SO_2$ | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 |
| Tons per day – annual average | | | | | | | |
| NOx | 1.77 | 1.77 | 1.77 | 1.76 | 1.76 | 1.76 | 1.76 |
| PM2.5 | 5.10 | 5.07 | 5.07 | 5.06 | 5.06 | 5.05 | 5.05 |
| $SO_2$ | 0.52 | 0.52 | 0.52 | 0.52 | 0.52 | 0.52 | 0.52 |

- **EIC Affected:** 670-666-0200, 670-667-0200, 670-668-0200, 670-670-0200

**Current Control:**
- District Rule 4106 authorizes restrictions on material; burning allocations; prescribed burning requirement; permits for hazard reduction burning; smoke management plans for prescribed burning; go/no go decisions for naturally ignited Wildland Fire Use fires
- Hazard reduction burning occurs generally from late October/early November through May 1st.

**Future Control Options:**
- Encourage and/or incentivize land management practices that result in less uncontrolled and untimely fires

**Discussion:**
- The District has authority over emissions from this source category.
- District Rule 4106 is currently the most stringent regulatory strategy in California for this source category.
- While the hazard reduction burning is stringently regulated, other alternatives to burning exist. Particularly for homeowners, much green waste is generated in preparing their property to meet the guidelines adopted by the California to minimize wildfire propagation. Since these properties are outside city limits, green waste collection is not usually offered as part of the county waste collection program.

Prescribed Burning and Hazard Reduction Burning
(Continued)

A few homeowners compost their own materials, but most do not. Woody materials could be chipped to make mulch, but the cost of a chipper that could process good-sized tree limbs is too costly for most residents. Therefore, the most cost-effective solution for homeowners currently is burning the dried plant materials.

- This source category could be a candidate for an incentives program such as offering free or reduced cost hauling of the green waste from private properties at the wildland/urban interface. Free or reduced cost for chipping/grinding of wood-based materials could also be considered.
- Hazard reduction burning is allowed with a burn permit within the State Responsibility Area and the Federal Responsibility Area of the District. These areas are generally the foothill and mountain areas of the District. Such burning is prohibited in the Local Responsibility Area, which represents the valley floor.
- Fire Safe Councils and Resource Conservation Districts within the urban/wildland interface often receive Federal grant monies for fuel break and hazard fuel reduction programs, of which much of the accumulated materials are chipped and not burned. Examples include the Hwy 168 Fire Safe Council, the Eastern Madera Fire Safe Council, the Central Sierra Watershed Committee, the Yosemite/Sequoia Resource Conservation and Development Area, and the Coarsegold Resource Conservation District.

**Recommendation:**

- This source category is recommended for an incentives program or policy changes to achieve additional emission reductions from this source category.
- The magnitude of the current emissions inventory for this source category warrants a close look at possible methods of reducing emissions. A feasibility study to closely examine alternatives to prescribed burning is planned.

**Projected Reductions:**

Emissions reductions will be quantified during the rule development process when the appropriate AQI threshold for mandatory curtailment of wood burning activities is established.

| Pollutant | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | |
| NOx | NQ | NQ | NQ | NQ | NQ | NQ |
| PM2.5 | NQ | NQ | NQ | NQ | NQ | NQ |
| $SO_2$ | NQ | NQ | NQ | NQ | NQ | NQ |
| Tons per day – annual average | | | | | | |
| NOx | NQ | NQ | NQ | NQ | NQ | NQ |
| PM2.5 | NQ | NQ | NQ | NQ | NQ | NQ |
| $SO_2$ | NQ | NQ | NQ | NQ | NQ | NQ |

## Cotton Gins (S-IND-8)

(Food and Agriculture)

**Source Category:**
This source category includes all cotton ginning facilities within the District.

**Emissions Inventory:**
Data reflects current controls and regulations, but does not include any reductions from proposed controls.

| Pollutant | 2005 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | | |
| NOx | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PM2.5 | 0.91 | 0.77 | 0.75 | 0.76 | 0.77 | 0.78 | 0.79 |
| $SO_2$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Tons per day – annual average | | | | | | | |
| NOx | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PM2.5 | 0.66 | 0.56 | 0.54 | 0.55 | 0.56 | 0.57 | 0.58 |
| $SO_2$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

- **EIC Affected:** 420-418-6028, 420-420-6028

**Current Control:**
To reduce PM10, District Rule 4204 requires the use of BACT-level 1D3D cyclones for existing cotton gins according to a compliance schedule. The rule also requires that new cyclones or replacement parts of existing cyclones have the dimensional characteristics of the Enhanced 1D3D cyclone or the 1D3D with expansion chamber. Rule 4204 also regulates the trash conveyance systems on gins.

**Future Control Options:**
- Additional research is required to determine if controls such as baghouses, stacked cyclones or other PM10 controls are applicable to controlling PM2.5 emissions from cotton gins.

**Discussion:**
- The District has legal authority to regulate this source category.
- Research at Texas A&M University cited the 1D3D and 2D2D cyclones as the most efficient collectors of fine dust (PM10) with the 1D3D more efficient than the 2D2D. A number of jurisdictions have thus classified the 1D3D as BACT.
- Two jurisdictions, Maricopa County (AZ) and the State of North Carolina, require 1D3D and/or 2D2D cyclones in ginning operations.
- It is unknown if these are the most effective technologies for controlling PM2.5
- Rule 4204 (Cotton Gins) is currently the most stringent in the nation for this source category to control PM10.

Cotton Gins
(Continued)

**Recommendation:**
A feasibility study of this source category is recommended to investigate the efficacy of additional controls for PM2.5.

**Projected Reductions:**
Emission reductions will be calculated based on the information derived from the Feasibility Study, but are not quantifiable at this time.

| Pollutant | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | |
| NOx | 0 | 0 | 0 | 0 | 0 | 0 |
| PM2.5 | TBD | TBD | TBD | TBD | TBD | TBD |
| $SO_2$ | 0 | 0 | 0 | 0 | 0 | 0 |
| Tons per day – annual average | | | | | | |
| NOx | 0 | 0 | 0 | 0 | 0 | 0 |
| PM2.5 | TBD | TBD | TBD | TBD | TBD | TBD |
| $SO_2$ | 0 | 0 | 0 | 0 | 0 | 0 |

## Commercial Charbroiling (S-IND-9)

(Commercial Cooking)

**Source Category:**
This source category includes charbroiling equipment located in restaurants, including hospitals, educational institutions, military, and government facilities.

**Emissions Inventory:**
Data reflects current controls and regulations, but does not include any reductions from proposed controls.

| Pollutant | 2005 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| Tons per day - winter season | | | | | | | |
| NOx | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PM2.5 | 2.68 | 2.84 | 2.89 | 2.93 | 2.97 | 3.02 | 3.06 |
| SO2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Tons per day - annual average | | | | | | | |
| NOx | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PM2.5 | 2.68 | 2.84 | 2.89 | 2.93 | 2.98 | 3.02 | 3.06 |
| SO2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

- **EIC Affected:** 690-680-6000

**Current Control:**
- Existing Rule 4692, adopted in April 2002, applies only to chain-driven charbroiling equipment to control VOC and PM10 emissions, but not to all under-fired charbroilers. Operators of chain-driven charbroilers must install and operate an approved catalytic oxidizer on their charbroiler exhaust stack.

**Future Control Options:**
- Expand the applicability of Rule 4692 to include control of emissions from under-fired charbroilers.
- The BAAQMD draft Regulation 6 Rule 2 would require operators of under-fired charbroilers, at least 10 square feet, to exhaust their emissions to an approved PM10 control device. The BAAQMD does not consider VOC control from under-fired charbroilers to be economically feasible. If the PM10 controls prove to be feasible, similar requirements could be added to Rule 4692.
- BAAQMD Draft Staff Report indicated that regulating under fired charbroilers. could reduce PM emissions from under-fired charbroilers about 90%.

Commercial Charbroiling
(Continued)

**Discussion:**

- The District has legal authority to regulate air emissions units located at stationary sources.
- The total number of affected sources operating under-fired charbroilers equipment would need to be determined, as well as the amount of meat being cooked. Information of number of cooking establishments may be obtained from the county or city Health Departments responsible for inspecting and regulating such food establishments.
- A baseline emissions for under-fired charbroilers would need to be determined because the ARB inventory reported total emissions from both under-fired versus chain-driven charbroilers. BAAQMD Draft Staff Report for Regulation 6 Rule 2 stated that according to U.C. Riverside study conducted in 1997 under-fired charbroilers account for 82% of PM emissions generated by restaurants.
- This control measure will primarily target PM emissions reduction from under-fired charbroilers since the BAAQMD has determined that control of VOC emissions from under-fired charbroilers not economically feasible.
- Currently, there are no achieved-in-practice or technologically feasible control technologies to reduce NOx or $SO_2$ emissions from charbroiling equipment.

**Recommendation:**

- Expand applicability of Rule 4692 to regulate PM emissions from under-fired charbroilers with full implementation by 2011.

**Projected Reduction:**

Calculated emission reductions, assuming the recommended controls:

| Pollutant | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | |
| NOx | 0 | 0 | 0 | 0 | 0 | 0 |
| PM2.5 | 0 | 0 | 2.16 | 2.21 | 2.25 | 2.28 |
| $SO_2$ | 0 | 0 | 0 | 0 | 0 | 0 |
| Tons per day – annual average | | | | | | |
| NOx | 0 | 0 | 0 | 0 | 0 | 0 |
| PM2.5 | 0 | 0 | 2.17 | 2.21 | 2.25 | 2.28 |
| $SO_2$ | 0 | 0 | 0 | 0 | 0 | 0 |

## Fugitive PM10 Prohibitions (S-IND-10)

(Construction, demolition, excavation, extraction or other earthmoving activities; handling transport, and storage of bulk materials; landfill operations; unpaved roads, unpaved vehicle/equipment traffic areas; disturbed open areas; and off-field agricultural sources.)

**Source Category:**
Anthropogenic (human-caused) activities result in the majority of fugitive dust emissions. Mechanical disturbance (for example, vehicles traveling over an unpaved surface, or earthmoving operations associated with construction activities, or sand and gravel or other mining activities) is a significant source of fugitive dust emissions). Wind events, although infrequent in the San Joaquin Valley, also contribute to fugitive dust emissions especially as wind travels over previously disturbed, unstabilized surface.

**Emissions Inventory:**
Refer to Emissions Inventory for each Regulation VIII rules below.

**Current Control:**
- Existing Regulation VIII (Fugitive PM10 Prohibitions) is comprised of eight rules that regulate fugitive dust emissions. Regulation VIII applies to anthropogenic dust sources; it does not apply to PM10 precursor sources or sources of smoke. Specifically, Regulation VIII applies to activities that have the potential to emit or result in primary PM10 fugitive dust emissions such as construction, demolition, excavation, extraction or other earthmoving activities; handling transport, and storage of bulk materials; landfill operations; unpaved roads, unpaved vehicle/equipment traffic areas; disturbed open areas; and off-field agricultural sources.
- The eight rules under Regulation VIII are: Rule 8011 (General Requirements); Rule 8021 (Construction, Demolition, Excavation, Extraction, and other Earthmoving Activities); Rule 8031 (Bulk Materials); (4) Rule 8041 (Carryout and Trackout); Rule 8051 (Open Areas); Rule 8061 (Paved and Unpaved Road); Rule 8071 (Unpaved Vehicle/Equipment Traffic Areas); and Rule 8081(Agricultural Sources). Current control requirements of each rule are discussed below.

**Future Control Options:**
- Change existing administrative requirements and dust control plans, applicability, thresholds (e.g. amount of activity such as vehicular passes per day, size of an area where an activity occurs, or amount of material moved during an activity, and additional control options).
- Eliminate or reduce current exemptions.
- Evaluate techniques that prevent fugitive dust as opposed to techniques that require a reactive or mitigation response (e.g., prevent soil trackout instead of clean up of trackout).
- Enhance District enforcement presence in the field for increased compliance assistance and greater public outreach.

Fugitive PM10 Prohibitions
(Continued)

**Discussion:**
Please refer to specific discussions for each of the rule in Regulation VIII, which follow below.

**Recommendation:**

- At this point in time, PM2.5 factors are not well defined in the San Joaquin Valley, and it is not known if controls for PM10 are effective for PM2.5 emissions reductions. Staff recommends that a Feasibility Study to determine PM2.5 emission factors and appropriate PM2.5 controls be completed by 2009.

## 1. Rule 8011 (General Requirements)

**Source Category:**
The provisions of Rule 8011 are applicable to specified outdoor fugitive dust sources. Rule 8011 contains definitions, exemptions, requirements, administrative requirements, recordkeeping requirements, exemptions, and test methods which are applicable to all rules under Regulation VIII (i.e., Rules 8021, 8031, 8041, 8051, 8061, 8071, and 8081)

**Emissions Inventory:**
There is no specific emissions inventory associated with Rule 8011.

**Current Control:**
- Materials used for chemical/organic stabilization of soils should not violate State Water Quality Control Board standards for use as a soil stabilizer. Materials accepted by ARB and EPA, which meets State water quality standards are acceptable to the District.
- Materials prohibited for use as dust suppressant by EPA, ARB, or other applicable laws, rules, or regulations are also prohibited for use under Regulation VIII.
- Prohibits the use of hygroscopic materials as dust suppressant in areas lacking sufficient atmospheric moisture of soil for such material to effectively reduce fugitive dust emissions. Use of such materials may be allowed in conjunction with sufficient watering of the controlled area.
- Specifies test methods for determination of visible dust emission opacity, stabilized surface, soil moisture content, silt content, threshold friction velocity for demonstration of compliance with the standards specified in Regulation VIII rules.
- Allows an alternative compliance option for certain specified requirements of Rule 8061 (Paved and Unpaved Road) and Rule 8071 (Unpaved Vehicle/Equipment Traffic Areas) provided the operator submits a Fugitive PM10 Management Plan that is designed to achieve 50 percent control efficiency and has been approved by the District.

**Future Control Options:**
- Increase the current 50 percent control efficiency required by the alternate compliance option's Fugitive PM10 Management Plan.
- Evaluate other more effective feasible control techniques.

**Discussion:**
- Fugitive dust generating activities are located at stationary sources and area sources for which the District has legal authority to regulate air emissions.
- Stationary sources subject to Regulation VIII rules are required to obtain operating permits. However, most area sources such as construction, demolition, excavation, or other earthmoving activities are not required to obtain operating permits from the District. For sources that are not required to have operating permits, the District should periodically examine county/city building permits department records to determine the location and duration of fugitive dust generating activities so that District inspectors could ensure operators are complying with the rules.

- Enhance the effectiveness of the rules through several actions including, but not limited to, an increased presence of District Compliance Division staff in the field, increased use of Dust Control Plans, increased compliance assistance, and greater public outreach.

**Recommendation:**

- See recommendations for Regulation VIII as a whole.

## 2. Rule 8021 (Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities)

### Source Category:
Sources subject to Rule 8021 include, but are not limited to, building and construction industry, mining industry, sand and gravel industry, and oil and gas production.

### Emissions Inventory:
Data reflects current controls and regulations, but does not include any reductions from proposed controls.

| Pollutant | 2005 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | | |
| NOx | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PM2.5[1] | 1.00 | 1.08 | 1.09 | 1.01 | 1.01 | 1.02 | 1.03 |
| $SO_2$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Tons per day – annual average | | | | | | | |
| NOx | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PM2.5[1] | 1.09 | 1.18 | 1.19 | 1.10 | 1.11 | 1.11 | 1.12 |
| $SO_2$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

[1] PM2.5 reductions from existing controls have been assumed to be proportional to PM10 reductions.

- **EIC Affected:** 630-622-5400-0000; 630-624-5400-0000; 630-626-5400-0000; 630-628-5400-0000; 630-634-5400-0000

### Current Control:
- Rule 8021 applies to any construction, demolition, excavation, extraction, and other earthmoving activities including, but not limited to, land clearing, grubbing, scraping, travel on site, and travel on access roads to and from the site. Applies to construction of new landfills or modification of existing landfills prior to commencement of landfilling activities.
- Current rule exempts several activities such as blasting activities that have been permitted by the California Division of Industrial Safety; maintenance or remodeling of existing buildings and additions to existing buildings where the total building area is not increased by more than 50 percent or 10,000 square feet (whichever is less); additions to single family residential buildings; disking of weeds and dried vegetation related to fire prevention required by federal, state, or local agency on a site less than one-half (½) acre; and spreading of landfill daily cover necessary to cover garbage/rubbish in order to preserve public health and safety and to comply with California Integrated Waste Management Board requirements during conditions which would generate fugitive dust.
- The rule requires submission of Dust Control Plan with specific information on the location, total land area that would be disturbed, including duration of activities, volume of earthmoving activities, type of dust suppressant to be applied, measures to be taken to control carryout/trackout. Operators/owners are required to submit Dust Control Plan for any construction activity on any site 10 or more acres of disturbed surface area for residential developments, or five acres or more for non-

residential development, or will include moving, depositing, or relocating more than 2,500 cubic yards per day of bulk materials on at least three days.
- Basically, the rule requires application of water, chemical/organic stabilizers/dust suppressants in sufficient quantity and frequency so as to limit visible dust emission (VDE) to 20% or less during pre-activity, during active operations and during periods of inactivity.
- Restrict speed limits to no more than 15 mph on uncontrolled unpaved access/haul roads on construction sites.
- Cease outdoor construction, excavation, extraction, and other earthmoving activities that disturb the soil whenever VDE exceeds 20% opacity.

**Future Control Options:**
- Evaluate the feasibility of eliminating existing exemptions or lowering current exemption thresholds.
- Lower existing speed limit on uncontrolled unpaved access/haul roads on construction sites.
- Strengthen the effectiveness of the rule by lowering the current threshold requirements for submission of Dust Control Plan.
- Control techniques that may deem feasible would be evaluated during the rule development process.

**Discussion:**
- Fugitive dust generating activities are located at stationary sources and area sources for which the District has legal authority to regulate air emissions.
- Stationary sources subject to Regulation VIII rules are required to obtain operating permits. However, most area sources such as construction, demolition, excavation, or other earthmoving activities are not required to obtain operating permits from the District. For sources that are not required to have operating permits, the District should periodically examine county/city building permits department records to determine the location and duration of fugitive dust generating activities so that District inspectors could ensure operators are complying with the rules.
- Enhance the effectiveness of the rules through several actions including, but are not limited to, an increased presence of District Compliance Division staff in the field, increased use of Dust Control Plans, increased compliance assistance, and greater public outreach.

**Recommendation:**
- See recommendations for Regulation VIII as a whole.

## 3. Rule 8031 (Bulk Materials)

**Source Category:**
Sources subject to Rule 8031 include, but are not limited to, building and construction industry, mining industry, sand and gravel industry, food and agricultural processing industry, mineral processing industry, glass and related products industry, chemical industry, landfills, and companies that transport bulk materials.

**Emissions Inventory:**
Data reflects current controls and regulations, but does not include any reductions from proposed controls.

| Pollutant | 2005 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | | |
| NOx | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PM2.5 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.04 | 0.04 |
| $SO_2$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Tons per day – annual average | | | | | | | |
| NOx | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PM2.5 | 0.04 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.06 |
| $SO_2$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

- **EIC Affected:** 430-436-7006-0000; 430-436-7078-0000; 430-995-7064-0000

**Current Control:**
- Rule 8031 exempts several activities such as outdoor storage, handling, or transport of bulk materials which would be damaged by wetting or application of chemical/organic dust suppressants if none of the controls listed in the rule could be implemented to limit VDE to 20% opacity or less or provide a stabilized surface; spreading of landfill daily cover; transport of bulk materials in an outdoor area for a distance of 12 feet or less with the use of a chute or conveyor device; outdoor storage of bulk material at a single site where no material is actively being added or removed at the end of the workday or overnight and where the total material stored is less than 100 cubic yards; agricultural sources subject to Rule 8081 (Agricultural sources) or exempt by Rule 8011 (General Requirements).
- Rule 8031 requires control of fugitive dust emissions from any outdoor handling, storage, and transport of bulk materials in such a manner that limit the VDE to 20% opacity or less in addition to implementing specific control measures listed in the rule.
    - For handling of bulk materials: Apply of water or chemical/organic stabilizers/suppressants that limits VDE to 20% opacity or less; and construct wind barriers or fences with less than 50% porosity and apply water or chemical/organic stabilizers/suppressants.
    - For storage of bulk materials: bulk material surface needs to be stabilized; cover bulk material with tarp or other suitable material and anchored securely;

Construct wind barriers or fences to limit VDE to 20% opacity and less than 50% porosity and apply water or chemical/organic stabilizers/suppressants; and use 3-sided structure with the height equal to the height of the stored bulk material and with less than 50% porosity.

- For on-site transporting of bulk materials: Limit vehicular speed on the work site sufficient to limit VDE to 20% opacity; or load haul trucks such that freeboard is not less 6 inches so that VDE is limited to 20% opacity; or apply water on top of the load to limit VDE to 20% opacity; or cover haul trucks with tarp or other suitable cover.
- For off-site transporting of bulk materials: clean interior of the cargo compartment or cover compartment before the empty truck leaves the work site; prevent spillage or loss of bulk material from holes or openings in the cargo compartment's floor, sides, and tailgates; and load haul trucks such that the freeboard is not less than 6 inches and apply water to the top of the material sufficient to limit VDE to 20% opacity or cover haul trucks with tarp or other suitable cover.
- For outdoor transport of bulk materials: fully enclose the chute or conveyor; operate water spray equipment that sufficiently wets materials to limit VDE to 20% opacity; or wash separated or screened materials to remove conveyed materials having an aerodynamic diameter of 10 microns or less sufficient to limit VDE to 20% opacity.

**Future Control Options:**

- Spray material with water, as necessary, prior to stacking, loading, unloading, and/or while stacking, loading and unloading.
- Remove material from downwind side of the storage pile when safe to do so.
- Empty loader bucket slowly and keep loader bucket close to the truck to minimize drop height while dumping.
- Pre-water and maintain surface soils in a stabilized condition where support equipment and vehicles will operate.
- Apply water to maintain soil moisture at a minimum of 12%, or for areas that have optimum moisture content for compaction of less than 12%, maintain at least 70% moisture content.
- Change the haul truckload freeboard limit to more than 6 inches.

Rule 8031
(Continued)

**Discussion:**

- Fugitive dust generating activities are located at stationary sources and area sources for which the District has legal authority to regulate air emissions.
- Stationary sources subject to Regulation VIII rules are required to obtain operating permits. However, most area sources such as construction, demolition, excavation, or other earthmoving activities are not required to obtain operating permits from the District. For sources that are not required to have operating permits, the District should periodically examine county/city building permits department records to determine the location and duration of fugitive dust generating activities so that District inspectors could ensure operators are complying with the rules.
- Enhance the effectiveness of the rules through several actions including, but are not limited to, an increased presence of District Compliance Division staff in the field, increased use of Dust Control Plans, increased compliance assistance, and greater public outreach.

**Recommendation:**

- See recommendations for Regulation VIII as a whole.

## 4. Rule 8041 (Carryout and Trackout)

**Source Category:**
Sources subject to Rule 8041 include, but are not limited to, building and construction industry, mining industry, sand and gravel industry, food and agricultural processing industry, mineral processing industry, glass and related products industry, chemical industry, landfills, and companies that transport bulk materials.

**Emissions Inventory:**
Data reflects current controls and regulations, but does not include any reductions from proposed controls.

| Pollutant | 2005 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | | |
| NOx | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PM2.5[1] | TBD | TBD | TBD | TBD | TBD | TBD | TBD |
| $SO_2$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Tons per day – annual average | | | | | | | |
| NOx | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PM2.5[1] | TBD | TBD | TBD | TBD | TBD | TBD | TBD |
| $SO_2$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

[1] Further study is needed to confirm whether PM2.5 and PM10 reductions are proportional for this category.

- **EIC Affected:** EIC for carryout and trackout source categories would need to be established.
- The ARB Emissions Inventory database does not contain emissions data pertaining to carryout and trackout. Needs to establish the baseline emissions for carryout and trackout and update the ARB database.

**Current Control:**
- Rule 8041 applies to all sites that are subject to Rules 8021, 8031, 8061, 8071 where carryout or trackout has occurred or may occur on paved public roads or paved shoulders of a paved public road.
- In addition to the exemptions provided in Rule 8011, carryout and trackout caused by agricultural sources are also exempt from complying with Rule 8041.
- Rule 8041 requires operators/owners to sufficiently prevent or cleanup carryout and trackout.
- Prohibits the use of blower devices, or dry rotary brushes or brooms, for removal of carryout or trackout.
- Requires removal of all visible carryout or trackout at the end of each workday.
- For any site with 150 or more vehicle trips per day, or 20 or more vehicle trips per day by vehicles with 3 or more axles:
    - Prevent carryout or trackout by installing and maintaining a trackout control device at all access points to paved public roads; or

  - Utilize a carryout or trackout device prevention procedure that has been demonstrated to the satisfaction of the APCO and EPA as achieving equivalent or greater level of control than the device mentioned above.
- If the carryout and trackout device is insufficient, remove carryout and trackout within ½ hour of the generation of such carryout and trackout.
- Within urban areas, prevent carryout and trackout, or immediately remove carryout and trackout when it extends 50 feet or more from the nearest unpaved surface exit point of the site.
- Within rural areas, construction projects 10 acres or more in size, prevent carryout and trackout, or immediately remove carryout and trackout when it extends 50 feet or more from the nearest unpaved surface exit point of the site.
- Cleanup of trackout and carryout should be done by manually sweeping and picking up, operating a rotary brush or broom accompanied or preceded by wetting to limit VDE to 20% opacity; operating a PM10-efficient street sweeper that has a pick-up efficiency of at least 80%, or flushing with water, if curbs or gutters are not present and where the use of water will not result as a source of trackout material or result in adverse impacts on storm water drainage systems or violate any NPDES permit program.
- The rule specifies criteria for use of grizzlies, gravel pads, and paving of surfaces to prevent carryout and trackout.

**Future Control Options:**

- Eliminate the vehicle trips per day threshold for requiring installation of control device to prevent trackout and carryout.
- Clearly establish and enforce traffic patterns to route traffic over selected trackout control devices.
- Limit accessibility to the site by installing barriers on unprotected routes without trackout control devices.
- Pave roadways as soon as possible in areas where construction activities will occur.
- Decrease the 50 feet of carryout/trackout accumulation distance threshold for requiring cleanup of carryout and trackout.

**Discussion:**

- Fugitive dust generating activities are located at stationary sources and area sources for which the District has legal authority to regulate air emissions.
- Stationary sources subject to Regulation VIII rules are required to obtain operating permits. However, most area sources such as construction, demolition, excavation, or other earthmoving activities are not required to obtain operating permits from the District. For sources that are not required to have operating permits, the District should periodically examine county/city building permits department records to determine the location and duration of fugitive dust generating activities so that District inspectors could ensure operators are complying with the rules.

- Enhance the effectiveness of the rules through several actions including, but are not limited to, an increased presence of District Compliance Division staff in the field, increased use of Dust Control Plans, increased compliance assistance, and greater public outreach.

**Recommendation:**

- See recommendations for Regulation VIII as a whole.

## 5. Rule 8051 (Open Areas)

**Source Category:**
Sources subject to Rule 8051 include, but are not limited to, building and construction industry, mining industry, oil and gas production, sand and gravel industry, food and agricultural processing industry, mineral processing industry, glass and related products industry, chemical industry, landfills, and government agencies, industrial manufacturing companies, and transportation companies that have open areas located within their jurisdiction.

**Emissions Inventory:**
Data reflects current controls and regulations, but does not include any reductions from proposed controls.

| Pollutant | 2005 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | | |
| NOx | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PM2.5 | 4.51 | 4.42 | 4.40 | 4.39 | 4.37 | 4.37 | 4.35 |
| $SO_2$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Tons per day – annual average | | | | | | | |
| NOx | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PM2.5 | 7.18 | 7.03 | 7.00 | 6.99 | 6.97 | 6.94 | 6.92 |
| $SO_2$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

- **EIC Affected:** 650-650-5400-0000; 650-651-5400-0000; 650-652-5400-0000.
- The ARB Emissions Inventory database indicates emissions from windblown dust from non-pasture agricultural lands, pasturelands, and from unpaved roads and associated areas. It appears that the database does not account the emissions from disturbed open areas. Improvement in emissions inventory for open areas is needed.

**Current Control:**
- Rule 8051 applies to any open area having 0.5 acres or more within urban areas, or three acres or more within rural areas, and contains at least 1,000 square feet of disturbed surface area.
- Requires operators to implement specific control measures whenever open areas are disturbed or vehicles are used in open areas to comply with conditions for stabilized surface at all times and to limit VDE to 20% opacity.
- Control measures to limit VDE to 20% opacity include the application of water or dust suppressants to all non-vegetated areas, establishment of vegetation on all previously disturbed areas, or paving, application and maintenance of gravel, or application and maintenance of chemical/organic stabilizers/suppressants.
- If there is evidence of trespass, prevent unauthorized vehicle access by posting No Trespassing signs or installing barriers such as fences, gates, posts, or other appropriate barriers to effectively prevent access.

Rule 8051
(Continued)

**Future Control Options:**

- Fugitive dust generating activities are located at stationary sources and area sources for which the District has legal authority to regulate air emissions.
- Change the applicability of the rule so it applies to any open area 0.10 acre or larger and have a cumulative of 500 square feet of disturbed area.
- Implement similar control requirements and reporting provisions for open areas as specified in Maricopa County APCD Regulation III Rule 310.01 (Fugitive Dust from Open Areas, Vacant Lots, Unpaved Parking Lots, and Unpaved Roadways).
- Stationary sources subject to Regulation VIII rules are required to obtain operating permits. However, most area sources such as construction, demolition, excavation, or other earthmoving activities are not required to obtain operating permits from the District. For sources that are not required to have operating permits, the District should periodically examine county/city building permits department records to determine the location and duration of fugitive dust generating activities so that District inspectors could ensure operators are complying with the rules.
- Develop an outreach program requiring property owners/operators to report information on the size of their open areas to the District along with the submission of a Dust Control Plan listing the control measures that would be implemented if their property is subject to Rule 8051.
- Enhance the effectiveness of the rules through several actions including, but are not limited to, an increased presence of District Compliance Division staff in the field, increased use of Dust Control Plans, increased compliance assistance, and greater public outreach.

**Recommendation:**

- See recommendations for Regulation VIII as a whole.

## 6. Rule 8061 (Paved and Unpaved Roads)

### Source Category:

Sources subject to Rule 8061 include, but are not limited to, city, county, and state agencies, mining industry, oil and gas production, sand and gravel industry, agriculture industry, mineral processing industry, landfills, and manufacturing companies that have paved and unpaved roads located within their jurisdiction.

### Emissions Inventory:

Data reflects current controls and regulations, but does not include any reductions from proposed controls.

| Pollutant | 2005 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | | |
| NOx | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PM2.5[1] | 8.18 | 8.25 | 8.46 | 8.63 | 8.80 | 8.98 | 9.15 |
| $SO_2$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Tons per day – annual average | | | | | | | |
| NOx | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PM2.5[1] | 9.65 | 9.70 | 9.93 | 10.11 | 10.30 | 10.48 | 10.67 |
| $SO_2$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

[1] PM2.5 reductions from existing controls have been assumed to be proportional to PM10 reductions.

- **EIC Affected:** 640-635-5400-0000; 640-637-5400-0000; 640-639-5400-000; 640-641-5400-0000; 640-643-5400-0000; 645-638-5400-0000; 645-640-5400-0000; 645-644-5400-0000; 645-646-5400-0000

### Current Control:

- Applicability: Rule 8061 applies to any new or existing public or private paved or unpaved roads, road construction projects, or road modification projects.
- Exemption: In addition to the exemptions provided in Rule 8011, Rule 8061 exempts the following:
  - Unpaved road segment with less than 26 annual average daily vehicle trips (AADT).
  - Maintenance and resurfacing of existing paved road.
  - Agricultural sources subject to Rule 8081.
  - Emergency activities performed to ensure public health and safety.
  - Equipment used to remove debris beyond the capabilities of PM10-efficient street sweepers.
- Paved Roads: The rule includes the following requirements:
  - New or modified paved roads must be constructed in accordance with the standards established by the American Association of State Highway and Transportation guidelines for width of shoulders and for medians shoulders. The minimum paved or stabilized shoulder widths based on annual average daily vehicle trips are specified in the rule.
  - Curbing adjacent to and contiguous with the travel lanes or paved shoulder of roads mat be constructed in lieu of the required shoulder width standards.

Rule 8061
(Continued)

- Mud/dirt Cleanup Requirements:
  - Use of PM10-efficient street sweepers and conducting routine street sweeping operations of paved roads not less than once per month.
  - Remove any accumulated mud/dirt of at least one-inch thickness over an area of at least 50 square feet on road surface travel lanes resulting from wind/storm/water erosion and runoff within 24 hours of discovery of such
  - condition.
  - Allows an extension to cleanup period if unsafe travel conditions exist, but requires notification to the District and approval by APCO.
  - Dust minimization practices must be followed during removal of mud/dirt.
- Unpaved Roads:
  - Limit VDE to 20% opacity on any unpaved road segment with 26 or more AADT and comply with the requirements of a stabilized unpaved road by applying chemical/organic dust stabilizers/suppressants, watering, paving, installing roadmix or uniform layer of washed gravel, or other equivalent methods approved by the APCO.
  - Construction of new unpaved road in urban areas except for temporary unpaved roads that meets the conditions specified in Rule 8011.
  - Each city, county, or state agency with primary responsibility for any existing unpaved roads within rural and urban areas must pave an average of 20% annually of all unpaved roads within their jurisdiction by 1/1/2010 (priority must be given to unpaved roads with the highest AADT. Annual reports (April 1 of each year) must be to the District on the total number and percent of unpaved road miles that have been paved during the previous calendar year.
- Existing Paved Public Roads with Unpaved Shoulders in Urban and Rural Areas:
  - Each city, county, or state agency must:
    - Provide a list to the District of all existing paved public roads with unpaved shoulders.
    - In urban areas, pave or stabilize 4-foot shoulders on 50% of existing paved public roads with the highest AADT by 1/1/10.
    - In rural areas, pave or stabilize 4-foot shoulders on 25% of existing paved public roads with the highest AADT by 1/1/10.
    - If the requirements above could not be met due to budgetary constraints, submit statement of financial hardship to the District for approval of the APCO and EPA.
    - Establishment and Posting of speed Limits on Unpaved Roads:
    - Establish a maximum speed limit of 25 mph on each unpaved road with 26 AADT and post speed limit signs one in each direction, per mile of unpaved road segment in urban areas, and per two miles of unpaved road segment in rural areas.

Rule 8061
(Continued)

**Future Control Options:**
Evaluate the feasibility and cost effectiveness of requiring all unpaved shoulders on paved roads to be paved.
Incentivize the paving of unpaved shoulders to assist city and county agencies that are financially constrained.

**Discussion:**
- District has legal authority to regulate air emissions from sources subject to Rule 8061.
- District staff should evaluate the compliance status of each city, county, and state agencies to determine the effectiveness of existing rule requirements.
- Based on overall compliance status, District staff needs to reevaluate the emissions data for this source category and update the emissions inventory database, preferably on an annual basis.
- Currently, the rule only requires submission of required reports by city, county, and state agencies, but does not mention federal agencies (e.g., U.S. Forest and Parks, Bureau of Land Management, etc.), which also have unpaved roads within their jurisdiction. Information on total number and miles of unpaved roads and associated AADT from responsible federal agencies responsible within the San Joaquin Valley are necessary to establish more accurate emissions inventory.
- Enhance the effectiveness of the rule through several actions including, but are not limited to, an increased presence of District Compliance Division staff in the field, increased use of Dust Control Plans, increased compliance assistance, and greater public outreach.

**Recommendation:**
See recommendations for Regulation VIII as a whole.

## 7. Rule 8071 (Unpaved Vehicle and Equipment Traffic Areas)

**Source Category:**
Sources subject to Rule 8071 include, but are not limited to, building and construction industry, city, county, and state agencies, mining industry, oil and gas production, sand and gravel industry, food and agriculture processing industry, mineral processing industry, landfills, and industrial and manufacturing companies that have unpaved vehicle and equipment traffic areas.

**Emissions Inventory:**
Data reflects current controls and regulations, but does not include any reductions from proposed controls.

| Pollutant | 2005 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | | |
| NOx | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PM2.5 | 0.58 | 0.57 | 0.57 | 0.57 | 0.57 | 0.57 | 0.57 |
| $SO_2$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Tons per day – annual average | | | | | | | |
| NOx | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PM2.5 | 0.57 | 0.56 | 0.56 | 0.56 | 0.56 | 0.56 | 0.56 |
| $SO_2$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

- **EIC Affected:** 645-645-5400-0000; 645-647-5400-0000
- The ARB Emissions Inventory database does not contain emissions data on unpaved vehicle and equipment traffic areas. Needs to establish the baseline emissions for this source and update the ARB database.

**Current Control:**
- Applicability: Rule 8071 applies to any unpaved vehicle and equipment traffic area.
- Exemption: In addition to the exemptions provided in Rule 8011, Rule 8061 exempts the following:
  - Unpaved vehicle and equipment traffic areas with less than 50 annual average daily vehicle trips (AADT).
  - Agricultural sources subject to Rule 8081.
- Requirements:
  - Limit VDE to 20% opacity and stabilize unpaved road by the application of at least one of the following control measures:
    - Watering
    - Uniform layer of washed gravel
    - Chemical/organic dust stabilizers/suppressants
    - Vegetative materials
    - Paving or roadmix
    - Other APCO-approved methods that effectively limits VDE to 20% opacity.

- In lieu of complying with the above requirements, implement an APCO-approved Fugitive PM10 Management Plan as specified in rule 8011.
- Areas with 150 vehicle daily trips (VDT), or 150 VDT that are utilized intermittently for 30 days or less during a calendar year, implement the control measures indicated above when the unpaved areas are utilized.
- Each day that 25 or more VDT with 3 or more axles will occur on unpaved area, limit VDE to 20% opacity, comply with the requirement for stabilized surface and implement the above control measures.
- Each day when special event will result in 1,000 or more vehicles will travel/park on unpaved area, notify the District at least 48 hours in advance of the special event and during the duration of the event limit VDE to 20% opacity, comply with the requirements for stabilized surface, and apply/reapply water or chemical/organic dust suppressants.
- On each day 50 or more VDT, or 25 or more VDT with 3 or more axles, originates from within and remains exclusively within an unpaved areas apply/reapply water to limit VDE to 20% opacity.

**Future Control Options:**

- Establish a database of the total number of unpaved vehicle and equipment traffic areas and calculate the emissions associated with this source category.
- Evaluate the feasibility of paving vehicle and equipment traffic areas that are frequently and regularly used on a daily basis.

**Discussion:**

- District has legal authority to regulate air emissions from these sources.
- District staff should evaluate the compliance status of source owners/operators to determine the effectiveness of existing rule requirements.
- Based on overall compliance status, District staff needs to reevaluate the emissions data for this source category and update the emissions inventory database, preferably on an annual basis.
- Enhance the effectiveness of the rule through several actions including, but are not limited to, an increased presence of District Compliance Division staff in the field, increased use of Dust Control Plans, increased compliance assistance, and greater public outreach.

**Recommendation:**

- See recommendations for Regulation VIII as a whole.

## 8. Rule 8081 (Agricultural Sources)

**Source Category:**
Sources subject to Rule 8081 are agriculture industry (farming and livestock husbandry).

**Emissions Inventory:**
Data reflects current controls and regulations, but does not include any reductions from proposed controls.

| Pollutant | 2005 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | | |
| NOx | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PM2.5 | 13.22 | 13.60 | 13.69 | 13.82 | 13.95 | 14.08 | 14.21 |
| $SO_2$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Tons per day – annual average | | | | | | | |
| NOx | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PM2.5 | 14.79 | 15.15 | 15.23 | 15.36 | 15.48 | 15.60 | 15.73 |
| $SO_2$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

- **EIC Affected:** 620-614-5400-0000; 620-615-5400-0000; 620-618-0262-0101; 620-618-0262-0102; 620-618-0262-0103; 620-618-0262-0104; 620-618-0262-0105; 620-618-0262-0106; 620-618-0262-0107; 620-618-0262-0108; 620-618-0262-0109; 620-618-0262-0110

**Current Control:**
- Applicability: Rule 8071 applies to off-field agricultural sources.
- Exemption: In addition to the exemptions provided in Rule 8011, Rule 8061 exempts the following:
  - On-field agricultural sources
  - Off-field agricultural sources necessary to minimize or respond to adverse effects on agricultural crops during freezing temperatures.
  - Outdoor storage, handling, or transport of bulk materials which would be damaged by wetting with water or chemical/organic dust suppressants if the operator could demonstrate that none of the other control measures specified in the rule could be implemented to limit VDE to 20% opacity and provided it is approved by the EPA and APCO.
  - Any unpaved road segment with less than 75 VDT. This threshold does not apply to unpaved road segments subject to Rule 4550 (Conservation Management Practices). Equipment with loading forks employed in loading and unloading harvested commodities in the harvest location and traveling at 3 miles per hour or less is not included in the VDT counts.
  - The felling or removal of trees from forest lands. However, Regulation VIII rules apply to other timber harvest activities such as site preparation of log storage and staging areas.

  - Outdoor storage of bulk materials at a single site where no material is actively added or removed and where the total material stored is less than 100 cubic yards.
  - Any unpaved vehicle and equipment parking and traffic area less than 1.0 acre and more than one mile from an urban area, or with less than 50 AADT, or less than 150 VDT that are utilized intermittently for a period of 30 days or less in a calendar year.
  - Transport of bulk material in an outdoor area for a distance of 12 feet or less.
- Requirements:
  - The requirements of Rule 8061 regarding the construction standards for shoulder width and medians apply when constructing new or modifying existing paved roads.
  - Except as specifically exempted by Rule 8081, owners/operators must comply with similar requirements for storage, handling and transport of bulk materials specified in Rule 8031.
  - For unpaved road segments, on each day that 75 or more VDT, or 25 or more VDT with 3 or more axles will occur, limit VDE to 20% opacity and comply with the requirements for stabilized surface by application of at least one of the following:
    - Watering
    - Uniform layer of washed gravel
    - Chemical/organic dust suppressants
    - Vegetative materials
    - Paving or roadmix
    - Other methods that effectively limits VDE to 20% opacity and is approved by the APCO.
  - Unpaved vehicle/equipment parking and traffic areas:
    - For 50 or more AADT that will occur on unpaved vehicle/equipment traffic area, limit VDE to 20% opacity and comply with the requirements of a stabilized unpaved road by the application of the control measures mentioned above.
    - For 150 or more VDT, or 150 or more VDT that are utilized intermittently for a period of 30 days or less during the calendar year, implement control measures mentioned above.
    - On each day that 25 or more VDT with 3 or more axles will occur, limit VDE to 20% opacity and comply with the requirements for stabilized surface by the application of the control measures mentioned above.
  - For carryout and trackout, comply with the requirements of the California Vehicle Code Section 23112-23113 which requires material, including dirt deposited on any public highway or street to be cleaned up.
  - As an alternative compliance option, owners/operators may implement a Fugitive PM10 Management Plan (FPMP) that achieves 50% efficiency and

approved by the Fresno Regional Office of the U.S. Department of Agriculture Natural Resource Conservation Service based on criteria established by the APCO. The rule includes provisions outlining the submission and approval process for FPMP, including the information that must be included in the FPMP.

**Future Control Options:**

- Evaluate the appropriateness of continuing the exemption for bulk material storage of less than 100 cubic yards at a single location where no material is actively added or removed. Bulk material storage pile is susceptible to windblown emissions if left exposed (without cover such as tarp) especially during high wind conditions.
- Reevaluate existing exemption of on-field agricultural sources in conjunction with current requirements of Rule 4550 (Conservation Management Plan).
- Consider establishing similar appropriate control requirements for carryout and trackout as specified in Rule 8081 instead current requirements to comply the requirements under the California Vehicle Code sections 23112-23113.

**Discussion:**

- District has legal authority to regulate air emissions from sources subject to Rule 8081.
- District staff should evaluate the compliance status of source owners/operators to determine the effectiveness of existing rule requirements.
- Based on overall compliance status, District staff needs to reevaluate the emissions data for this source category and update the emissions inventory database, preferably on an annual basis.
- Enhance the effectiveness of the rule through several actions including, but are not limited to, an increased presence of District Compliance Division staff in the field, increased use of Dust Control Plans, increased compliance assistance, and greater public outreach.

**Recommendation:**

- See recommendations for Regulation VIII as a whole.

## Flares (S-IND-21)

(Oil & Gas Production – Combustion, Sewage Treatment, Landfills, Incinerators, Oil & Gas Production, Petroleum Refining)

### Source Category:

This source category includes any operation involving the use of flares.

### Emissions Inventory:

Data reflects current controls and regulations, but does not include any reductions from proposed controls.

| Pollutant | 2005 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | | |
| NOx | 0.33 | 0.33 | 0.33 | 0.33 | 0.34 | 0.34 | 0.34 |
| PM2.5 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| $SO_2$ | 0.60 | 0.63 | 0.63 | 0.63 | 0.64 | 0.64 | 0.64 |
| Tons per day – annual average | | | | | | | |
| NOx | 0.33 | 0.33 | 0.33 | 0.33 | 0.34 | 0.34 | 0.34 |
| PM2.5 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| $SO_2$ | 0.60 | 0.63 | 0.63 | 0.63 | 0.64 | 0.64 | 0.64 |

- **EIC Affected:** 110-132-0130; 120-132-0136; 130-132-0110; 130-132-0136; 310-320-0110; 310-320-0120; 310-320-0130; 320-320-0010; 320-320-0130
- The current emissions inventory will be validated to ensure it accounts for the emissions generated during emergency flaring events. Current NOx emissions appear to be low and may have only accounted for the emissions generated by the gas fuel used by the flare pilot flame.
- Usage records will be used to determine the total amount of gases sent to the flare during normal operation and process equipment upset or breakdown periods. Thereafter, the emissions will be calculated and the emissions inventory will be updated.

### Current Control:

- District Rule 4311 addresses operations involving the use of a flare. Specific requirements include: pilot flame devices, automatic ignition systems, heat-sensing devices, use of purge gases, applicable provisions of 40CFR60.18, and emission standards for ground-level enclosed flares.

### Future Control Options:

- Operators could be required to prepare and submit a Flare Minimization Plan (FMP) to reduce emissions from flaring including installing vapor recovery systems; increasing the vapor recovery system capacity; increasing the fuel gas treating capacity; more rigorous monitoring and reporting requirements; and improving operational and maintenance procedures to prevent upset conditions.
- Control devices for NOx, PM2.5 and SOx emissions from flares should be considered.

Flares
(Continued)

**Discussion:**

- The BAAQMD and SCAQMD have required operators to prepare FMP which resulted in data being gathered on strategies that can be used in reducing flaring events.
- The South Coast rule has provisions explicitly prohibiting flaring in some instances and a reporting requirement for flare emissions that spread over 100,000 cubic feet.
- During the last amendment of Rule 4311, an FMP not required since the districts that incorporated this requirement were unable to explicitly state the expected emission reduction potential and control measure options of this strategy.

**Recommendation:**

- Evaluate the effect of FMP and related information that other districts have implemented. Amend District Rule 4311 to incorporate requirements that will result in reduced flaring events.
- Consider control devices for NOx, PM2.5 and SOx emissions from flares.

**Projected Reductions:**

Emission reductions will be calculated during the rule project, but are not quantifiable at this time.

| Pollutant | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | |
| NOx | TBD | TBD | TBD | TBD | TBD | TBD |
| PM2.5 | TBD | TBD | TBD | TBD | TBD | TBD |
| $SO_2$ | TBD | TBD | TBD | TBD | TBD | TBD |
| Tons per day – annual average | | | | | | |
| NOx | TBD | TBD | TBD | TBD | TBD | TBD |
| PM2.5 | TBD | TBD | TBD | TBD | TBD | TBD |
| $SO_2$ | TBD | TBD | TBD | TBD | TBD | TBD |

## Indirect Source Review (ISR) Enhancement (M-OTH-8)

(Light and medium duty vehicles, heavy-duty vehicles, and off-road equipment)

**Source Category:**
In terms of NOx reductions, ISR impacts three main source categories: (1) Vehicles used for commuting to and from a development project after its completion; (2) Heavy-duty vehicles such as trash haulers; and (3) Off-road equipment, including street sweepers; small off-road engines such as lawn equipment using IC engines-mowers, edgers, and leaf blowers; and heavy-construction machinery.

**Emissions Inventory:**
The baseline inventory for ISR is in the three source category groups mentioned above and is included in the ARB mobile source inventories.

**Current Control:**
The Indirect Source Rule, Rule 9510, is designed to mitigate emissions associated with development projects that exceed two tons per year of NOx and PM10. Specifically, for the construction phase of a development project, Rule 9510 requires a 20% NOx reduction from the statewide average resulting from the use of construction equipment that is greater than 50 horsepower. For the operational emissions, defined as the combination of the area and mobile emissions associated with the project, Rule 9510 requires 33% NOx reduction from the operational baseline, as computed using an APCO-approved model, e.g. URBEMIS. Both sources of NOx reductions can be met by implementing on-site emission reduction measures or by payment of off-site mitigation fees to the District.

VOC reductions are not part of the mitigation requirements of Rule 9510, since the effects of VOC emissions have been deemed as insignificant in the formation of PM2.5. However, ozone formation involves both VOC and NOx. Therefore, VOC emissions associated with development projects and its reduction through mitigation measures are now an integral part when considering Rule 9510 as a current ozone control mechanism.

**Future Control Options:**
A feasibility study will evaluate the potential of suggestions received during the development of the *2007 Ozone Plan*:

- Increase the required reduction from the use of construction equipment greater than 50 horsepower from 20% to 50% NOx reduction from the statewide average.
- Increase the required reduction from the operational baseline from 33% to 50% NOx reduction.
- Add VOC (an ozone precursor) reduction as a mitigation requirement.

**Discussion:**

- The 20% reduction from the statewide average for construction emissions was based on the assumption that it was sufficient from the point of controlling emissions in order for the District to meet its one-hour ozone plan requirements.

Indirect Source Review (ISR) Enhancement
(Continued)

- The 33% operational baseline emission reduction for NOx was based on the assumption that mobile source emissions will come down by 50% over 10 years due to improved tailpipe emissions. Instead of mitigating 100% of the remaining emissions, after deducting the emission reduction attributable to ARB's tailpipe control, Rule 9510 required only 33% mitigation. This method was used in order to assure that development projects do not over-mitigate its emissions.
- The potential NOx emission reduction from increasing the mitigation requirements from 33% to 50% reduction of the operational baseline emissions is approximately 2 tons per day.
- A future reevaluation of Rule 9510 should include analysis of VOC emissions and its reduction through mitigation requirements.

**Recommendation:**

- At this point, the District is exploring all possibilities of gaining emission reductions from sources under its jurisdiction. Legal limitations in state law are also being examined.
- The District invites comments and suggestions to further improve control options, within legal limitations set by state law.
- A future feasibility study to re-evaluate this source category is planned. See the *2007 Ozone Plan,* Chapter 8, Innovative Strategies and Programs, for any additional information on this source category.

**Projected Reductions:**

Emission reductions will be calculated based on the information derived from the Feasibility Study, but are not quantifiable at this time.

| Pollutant | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | |
| NOx | NQ | NQ | NQ | NQ | NQ | NQ |
| PM2.5 | NQ | NQ | NQ | NQ | NQ | NQ |
| $SO_2$ | NQ | NQ | NQ | NQ | NQ | NQ |
| Tons per day – annual average | | | | | | |
| NOx | NQ | NQ | NQ | NQ | NQ | NQ |
| PM2.5 | NQ | NQ | NQ | NQ | NQ | NQ |
| $SO_2$ | NQ | NQ | NQ | NQ | NQ | NQ |

## Healthy Air Living (M-OTH-1)

(Lawn-care equipment, architectural coatings and solvents, asphalt paving and roofing operations, barbecue cooking, off-road construction machinery, recreational vehicles and watercrafts, household aerosols, single occupancy vehicle travel and other stationary sources)

### Emissions Inventory:

Data reflects current controls and regulations, but does not include any reductions from proposed controls.

| Pollutant | 2005 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | | |
| NOx | NQ | NQ | NQ | NQ | NQ | NQ | NQ |
| PM2.5 | NQ | NQ | NQ | NQ | NQ | NQ | NQ |
| $SO_2$ | NQ | NQ | NQ | NQ | NQ | NQ | NQ |
| Tons per day – annual average | | | | | | | |
| NOx | NQ | NQ | NQ | NQ | NQ | NQ | NQ |
| PM2.5 | NQ | NQ | NQ | NQ | NQ | NQ | NQ |
| $SO_2$ | NQ | NQ | NQ | NQ | NQ | NQ | NQ |

### Current Control:

Public service announcements which encourage residents and employees to curtail activities that cause air pollution; partnerships with 700 public and private entities enable workers to participate in Spare-The-Air (STA) day activities, including receiving rewards and recognition; various outreach programs, including: clean yard machines trade-ins, air quality school curriculums, and public forums.

### Future Control Options:

- Recruit more public agencies, private companies and members of the public as clean air partners; add additional programs, including assisting businesses and public agencies in establishing alternative transportation programs, telecommuting programs, voluntary episodic operation curtailments, emissions reduction potential analysis, and emissions footprints.
- Additionally emphasize trip reduction programs, idling curtailments, low emissions yard care equipment throughout the three month Ozone season with an intense focus on behavior change over heightened promotional awareness week.
- Voluntary no-sell policy of VOC-emitting products, such as paints and solvents.
- Curtailment of recreational activities, such as off-road motorcycling and motorized watercraft use throughout the Ozone season.
- Postpone the use of heavy construction machinery, such as bulldozers, levelers, and pavers, to days that are less conducive to ozone formation.
- Postpone nonessential activities in stationary sources, such as structural repairs, maintenance, or painting, which result in emissions of NOx and VOC to days that are less conducive to ozone formation.

Healthy Air Living
(Continued)

**Discussion:**

- The District's in-house approach to encouraging employees to curtail activities during past Spare the Air days is a good model for other public and private entities to follow. District employees take part in activities, such as: (1) Staying in for lunch, (2) Carpooling for lunch, (3) Carpooling and trip linking with fellow employees for lunchtime errands, and (4) Stepped-up efforts to use alternative transportation to and from work. The District's public education unit, which awards prizes to outstanding participants, coordinates these efforts.
- The District's alternative transportation program gets 40% participation, wherein employees taking part use alternative transportation for three days out of a five-day workweek (60%) and get rewarded $50 for a two-week pay period. This 40% participation is approximately 16% higher than the general working population's use of alternative transportation (US Census 2000).
- Free transit rides, as done in the Bay Area during their Spare the Air days, have increased ridership in buses and trains. However, these free rides have relatively very high costs in reducing vehicle miles traveled (VMT), compared to other programs that reduce VMT.
- Curtailment of activities that contribute to ozone formation will be on a voluntary basis, since the District does not have the authority to impose an outright ban on these activities. Local government entities are empowered by state law to limit certain activities, as has been done by cities in limiting usage of lawn equipment, such as leaf blowers.

**Recommendation:**

- Expand the District's current Spare the Air programs with the following improvements:
    - Assist public and private agencies to assess, organize, implement and evaluate alternative transportation programs and emissions reduction protocols and projects.
    - Promote voluntary curtailment of activities that produce NOx and VOC.
    - Write model ordinances that prevent NOx and VOC emissions by restricting certain activities, such as use of recreational vehicles and watercraft, lawn-maintenance equipment, drive-thorough, etc. Promote the adoption of these ordinances by cities and counties, with the District providing technical and scientific assistance in subjects pertaining to air quality.
    - Explore ways to incentivize the voluntary participation of stationary sources in curtailing activities that contribute to ozone formation.
    - As a form of voluntary and emerging measures for which EPA has provided guidelines for SIP credits, design Healthy Air Living projects so that EPA criteria for SIP accreditation are fulfilled.

Healthy Air Living
(Continued)

**Projected Reductions:**
Emission reductions will be calculated based on the information derived from the Feasibility Study, but are not quantifiable at this time.

| Pollutant | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | |
| NOx | NQ | NQ | NQ | NQ | NQ | NQ |
| PM2.5 | NQ | NQ | NQ | NQ | NQ | NQ |
| $SO_2$ | NQ | NQ | NQ | NQ | NQ | NQ |
| Tons per day – annual average | | | | | | |
| NOx | NQ | NQ | NQ | NQ | NQ | NQ |
| PM2.5 | NQ | NQ | NQ | NQ | NQ | NQ |
| $SO_2$ | NQ | NQ | NQ | NQ | NQ | NQ |

## Fireworks and Pyrotechnic Displays (M-OTH-10)

(Fireworks, pyrotechnic displays, and use of consumer fireworks)

**Emissions Inventory:**

Data reflects current controls and regulations, but does not include any reductions from proposed controls.

| Pollutant | 2005 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | | |
| NOx | TBD | TBD | TBD | TBD | TBD | TBD | TBD |
| PM2.5 | TBD | TBD | TBD | TBD | TBD | TBD | TBD |
| $SO_2$ | TBD | TBD | TBD | TBD | TBD | TBD | TBD |
| Tons per day – annual average | | | | | | | |
| NOx | TBD | TBD | TBD | TBD | TBD | TBD | TBD |
| PM2.5 | TBD | TBD | TBD | TBD | TBD | TBD | TBD |
| $SO_2$ | TBD | TBD | TBD | TBD | TBD | TBD | TBD |

- **EIC Affected:** There is no known inventory for emissions caused by the use of fireworks and pyrotechnic displays in the Valley. The inventory will be revised as part of the further study.

**Current Control:**

- Some counties and municipalities limit the time and place of use, as well as regulating the type of fireworks that may be sold to the public.
- Where allowed by local ordinances, fireworks emissions are generally uncontrolled.
- The U.S. Consumer Product Safety Commission (CPSC) regulates consumer fireworks as part of its mission to protect the public from unreasonable risk of serious injury or death from consumer products. Its regulations contain construction, performance, amount and composition of pyrotechnic (powder) material present in the fireworks devices, and labeling requirements for consumer fireworks. OSHA regulates the working conditions relating to the manufacture of explosives and including pyrotechnics (commonly called fireworks). However, CPSC and OSHA regulations do not address emissions of air pollutants.
- Some facilities, such as California theme parks, may use pneumatic launchers to decrease emissions from propellant charges.

**Future Control Options:**

- Cities and municipalities could pass ordinances that limit or prohibit the use of fireworks during periods of unhealthy air quality.
- The District could adopt regulations that require facilities to use pneumatic launchers and other abatement measures to reduce emissions from fireworks and pyrotechnic displays.

Fireworks and Pyrotechnic Displays
(Continued)

**Discussion:**

- Large fireworks displays, in combination with other sources, can in some circumstances be potentially significant sources of air pollutant emissions. For this reason, reasonable precautions are taken to minimize exposures to emissions from fireworks displays. Such precautions include alerting the public to the potential for short-term air quality impacts that may result from the discharge of fireworks at large displays.
- The District considers the use of fireworks displays to be integral to significant, traditional July 4 events. Air quality data associated with July 4 events is flaffed and flag to be excluded, similar to exceptional events under section 319 of the Clean Air Act.

**Recommendation:**

- The District will explore all possibilities of gaining emission reductions from sources under its jurisdiction. Legal limitations in state law are also being examined.
- The District invites comments and suggestions to further improve control options, within legal limitations set by state law.
- A feasibility study to evaluate this source category is planned.

**Projected Reductions:**

Emission reductions will be calculated based on the information derived from the Feasibility Study, but are not quantifiable at this time.

| Pollutant | 2005 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | | |
| NOx | NQ | NQ | NQ | NQ | NQ | NQ | NQ |
| PM2.5 | NQ | NQ | NQ | NQ | NQ | NQ | NQ |
| $SO_2$ | NQ | NQ | NQ | NQ | NQ | NQ | NQ |
| Tons per day – annual average | | | | | | | |
| NOx | NQ | NQ | NQ | NQ | NQ | NQ | NQ |
| PM2.5 | NQ | NQ | NQ | NQ | NQ | NQ | NQ |
| $SO_2$ | NQ | NQ | NQ | NQ | NQ | NQ | NQ |

## Employer-based Trip Reduction Programs (M-TRAN-1)

Light-Duty Passenger (LDA), Light Duty Trucks-1 (LDT1), Light Duty Trucks-2 (LDT2), Medium-Duty Trucks (MDV), and Motorcycles.

**Source Category:**
Van Pools, Carpools, Public Transit Use, Employer-based Alternative Transportation Programs, and Other Commute Options to Reduce Vehicle Miles Traveled.

**Emissions Inventory:**
Data reflects current controls and regulations, but does not include any reductions from proposed controls.

| Pollutant | 2005 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| **Tons per day – winter season** | | | | | | | |
| **NOx** | 3.78 | 2.74 | 2.57 | 2.36 | 2.17 | 1.99 | 1.83 |
| **PM2.5** | 0.11 | 0.12 | 0.13 | 0.13 | 0.13 | 0.14 | 0.14 |
| **SO2** | 0.02 | 0.020 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 |
| **Tons per day – annual average** | | | | | | | |
| **NOx** | 3.50 | 2.54 | 2.60 | 2.19 | 2.01 | 1.84 | 1.69 |
| **PM2.5** | 0.11 | 0.12 | 0.13 | 0.13 | 0.14 | 0.14 | 0.14 |
| **SO2** | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 |

- **EIC Affected:** 710-XXX-XXXX (LDA); 722-XXX-XXXX (LDT1); 723-XXX-XXXX (LDT2); 724-XXX-XXXX (MDV); 750-XXX-XXXX (MCY)

The above baseline emission inventory reflects the emissions for vehicles involved in commuting to work at employers of over 100 employees.

**Current Control:**
The Metropolitan Planning Organizations in the San Joaquin Valley have been very proactive in encouraging ride sharing. And while some municipalities have had incredible success, the efforts still remain voluntary in nature and limited in scope. Trip reduction programs have the potential to achieve significant reductions in vehicle miles traveled (VMT).

**Future Control Options:**
- Organize and use incentives to achieve more participation, both private and public, in trip reduction programs.
- Emphasize trip reduction programs using the previous Spare The Air Program (STA) and the new Healthy Air Living initiative by increasing public awareness campaigns. The District currently has more than 700 private and public Spare the Air Employer Partners from Stockton to Arvin, who demonstrate their commitment to improving air quality by their implementation of VMT reduction activities.
- Adopt a rule requiring employer-based trip reduction programs.

Employer-based Trip Reduction Programs
(Continued)

**Discussion:**

- Single-occupancy vehicle trips to work sites contribute significantly to traffic congestion, emissions of direct PM2.5 and its associated precursors.
- The number of vehicle miles traveled in the SJV is growing at a rate 2½ times greater than the rate of population growth.
- District Rule 9001 (Commuter-based Trip Reduction) was adopted on January 20, 1994. It was repealed on February 15, 1996 with the passage of state Senate Bill 437, which prohibited mandatory employer-based trip reduction programs.
- On February 21, 2003, in response to Senate Bill 709 (Flores), an act was added to Chapter 5.7 (commencing with Section 40600) to Part 3 of Division 26 of the Health and Safety Code, to add Section 9205.16 to the Vehicle Code, and to repeal Section 5 of Chapter 915 of the Statues of 1994, relating to air quality. Section 40601(d) allows the District Governing Board to adopt by the earliest feasible date rules and regulations that require all businesses employing at least 100 people, as described further by Section 40601(d)(1 & 2), to establish rideshare programs.
- With the anticipated doubling of the Valley's population in the next 40 years, reducing commute trips will be essential.

**Recommendation:**

- Adopt a rule requiring employers (with over 100 employees) to establish employee trip reduction programs.

**Projected Reductions:**

With recommended controls

| Pollutant | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|
| Tons per day – winter season | | | | | | |
| NOx | TBD | TBD | TBD | TBD | TBD | TBD |
| PM2.5 | TBD | TBD | TBD | TBD | TBD | TBD |
| $SO_2$ | TBD | TBD | TBD | TBD | TBD | TBD |
| Tons per day – annual average | | | | | | |
| NOx | TBD | TBD | TBD | TBD | TBD | TBD |
| PM2.5 | TBD | TBD | TBD | TBD | TBD | TBD |
| $SO_2$ | TBD | TBD | TBD | TBD | TBD | TBD |

The District is committed to developing this rule and emissions reduction calculations are undergoing review. The District is ensuring that emissions reductions estimates are consistent with vehicle activity data and current EMFAC2007 model runs. The reductions will be finalized during the rule development process.

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