Chapter 8

Air Quality Impacts of Continued Open Burning and Alternatives

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8.1 SMOKE MANAGEMENT SYSTEM

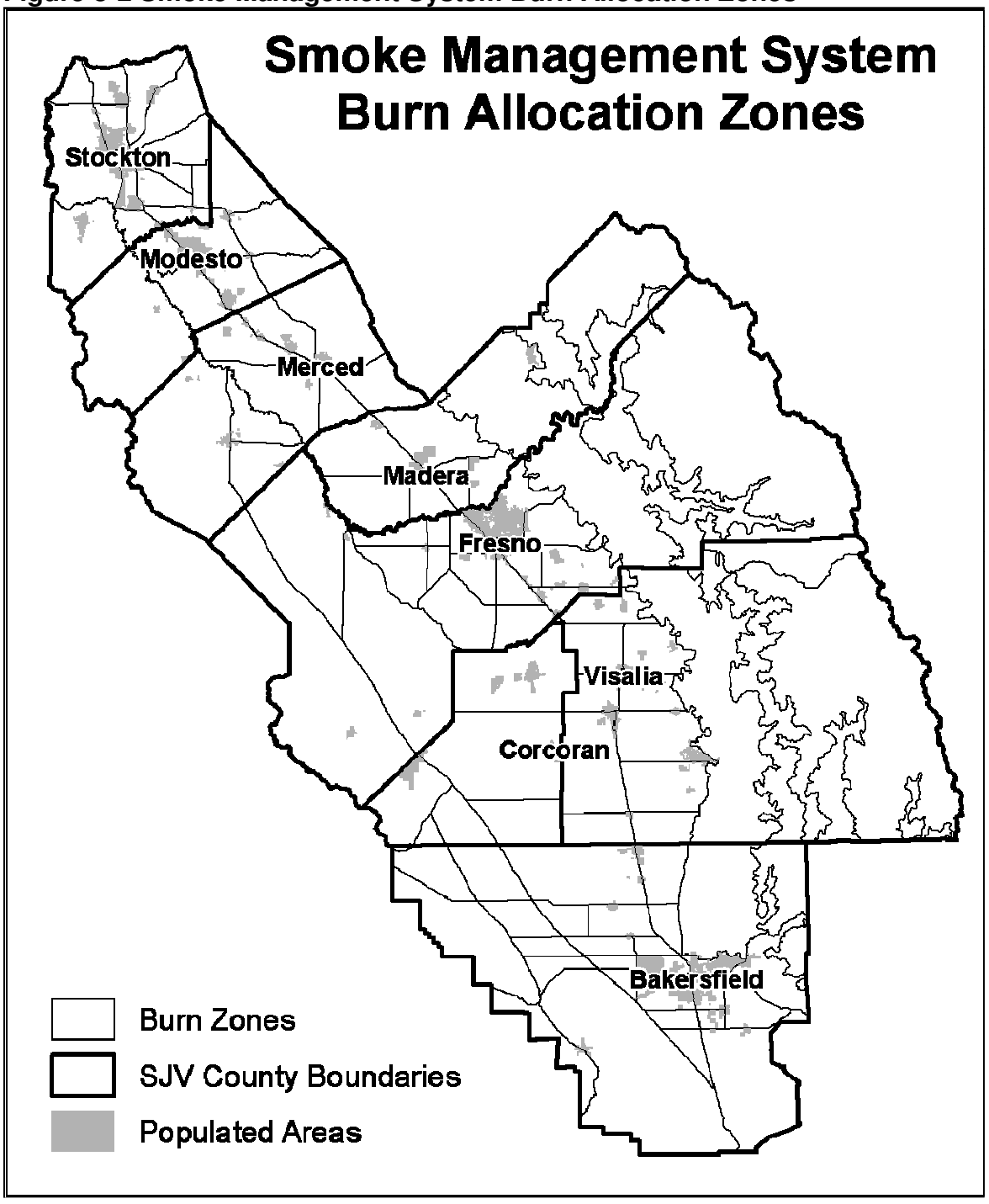
Open burning of agricultural crops and materials is managed by the District's Smoke Management System (SMS). The SMS uses a combination of real-time meteorological information and computer modeling to determine the allowable amount and location of agricultural burning. Under the SMS, the amount of burning allowed to take place on any given day would be based on several factors such as the local meteorology, the air quality conditions, the atmospheric holding capacity, the amount of burning already approved in a given area, and the potential impacts on downwind populations. The District's use of the SMS is intended to limit emissions to levels below the federal ambient air quality standards and to better distribute emissions temporally and spatially for flexibility of burn days for growers while minimizing the impact on the public.

Under the SMS, the SJVAB is classified into three regions (north, central, and south), the number of which will be determined by the topographical, geological and meteorological conditions in the San Joaquin Valley Air Basin (SJVAB). Burning is allocated by region, depending upon each region's carrying capacity for smoke on each day. Not every burner who wants to burn on a given day may be able to do so. Therefore, the District established a system for prioritizing burning within each region. The SMS analyzes the daily impact of open burning on air quality in 103 zones in the SJVAB.

Because of the general locations where agricultural and prescribed burning activities tend to occur, combined with the topography, geology, and weather conditions in the SJVAB, it is expected that the regions will fall into three categories: (a) regions where only prescribed burning will occur; (b) regions where only agricultural burning will occur; and (c) regions where both prescribed and agricultural burning will occur. In regions where only agricultural burning will occur, the allocation will be on a first come, first served basis. However, burners who do not receive an allocation on a particular day will be placed on a waiting list for the following day(s). The District has established a procedure whereby burners on the waiting list receive notification when their allocation is going to be available. Properly managed burning allocations under the existing District SMS ensures that air quality and health impacts of open burning of agricultural materials, prescribed burning, and hazard reduction burning are minimized to the fullest extent.

Figure 8-2 shows the burn allocation zones in each of the eight counties in the SJVAB

Figure 8-2 Smoke Management System Burn Allocation Zones



8.2 2007 OZONE PLAN

Air monitoring data in the San Joaquin Valley Air Basin (SJVAB) indicates ozone levels that exceed the eight-hour ozone National Ambient Air Quality Standards (NAAQS) set by the federal government to protect public health and welfare. As a result, the United States Environmental Protection Agency (EPA) has classified the Valley as serious nonattainment. In accordance with the requirements of the federal Clean Air Act, nonattainment areas must develop plans to achieve attainment of the NAAQS. Consequently, the San Joaquin Valley Unified Air Pollution Control District (District), adopted the 2007 Ozone Plan. The Ozone Plan contains a comprehensive and exhaustive list of regulatory and incentive-based measures to reduce emissions of ozone and particulate matter precursors throughout the Valley. Additionally, the Plan calls for major advancements in pollution control technologies for mobile and stationary sources of air pollution, and a significant increase in state and federal funding for incentive-based measures to create adequate reductions in emissions to bring the entire Valley into attainment with the federal ozone standard.

In preparing the Ozone Plan, consistent with the District's guiding principle, the control strategy in the Plan is developed with the utmost consideration to future needs for the PM2.5 Attainment Plan discussed below. Both Plans' focus is based on NOx reduction strategy. Consequently, the control strategy to attain the federal 8-hour ozone standard produces NOx emissions reductions that are close to what is needed for attainment of the 1997 PM2.5 standards by the maximum statutory attainment date of April 15, 2015. This suggests that the ozone strategy will provide most – if not all – of the reductions needed to attain the PM2.5 annual standard, based on simple modeling exercises. There is a possibility that that some additional NOx emissions reductions from incentive-based measures may be needed to demonstrate attainment of the 19977 annual PM2.5 standard.

Appendix I of the Ozone Plan listed the Control Measures that are needed to achieve attainment of the standards. One of these Control Measures is S-AGR-1 Open Burning, which addressed the phased-down prohibitions of burning agricultural materials mandated by the state Health and Safety Code Sections 41855.5 and 41855.6. District Rule 4103 (Open Burning) in conjunction with the District's "Staff Report and Recommendations on Agricultural Burning" is the mechanism by which the District is implementing the agricultural materials open burn prohibition.

8.3 2008 PM2.5 PLAN

In 1997, EPA sets two PM2.5 standards: a 24-hour standard (65 $\mu g/m^3$) to protect short term health impacts, and a 12-month (annual) standard (15 $\mu g/m^3$)

to protect against long-term impacts. The San Joaquin complied with the 24-hour standard, based on data from 2004 through 2006. In 2006, EPA revised the 24-hour standard to lower the standard (35 $\mu g/m^3$). It is estimated that that attainment plans for this new standard may be required by 2012 or 2013.

EPA has designated the San Joaquin Valley Air Basin as nonattainment of the federal PM2.5 standards. In April 2008, the District Governing Board adopted the PM2.5 Plan that demonstrates the strategies the District will pursue in order to achieve attainment of the federal PM2.5 standards. The 2008 PM2.5 Plan builds upon the comprehensive strategy adopted in the District's 2007 Ozone Plan to bring the San Joaquin Valley Air Basin into attainment of the federal PM2.5 standards. In preparing the 2007 Ozone Plan, the control strategy was developed with utmost consideration to future needs for the PM2.5 attainment plan. An evaluation of the District's ozone control strategy to attain the federal 8-hour ozone standard has determined that the ozone plan included NOx emissions reductions that are close to what is needed for attainment of the 1997 PM2.5 standards by the maximum statutory date attainment date of April 5, 2015. Based on simplified modeling exercises performed at the time of the ozone plan was completed, the ozone control strategy was determined to have a design value that would provide most – if not all – of the reductions needed to attain the PM2.5 annual standard.

Appendix I of the PM2.5 Plan listed the Control Measures that are needed to achieve attainment of the standards. One of these Control Measures is S-AGR-1 Open Burning, which addressed the phased-down prohibitions of burning agricultural materials mandated by the California Health and Safety Code (CH&SC) Sections 41855.5 and 41855.6. District Rule 4103 (Open Burning) in conjunction with the District's "Staff Report and Recommendations on Agricultural Burning" is the mechanism by which the District is implementing the agricultural materials open burn prohibition.

8.3.1 Annual PM2.5 Standard

As discussed in the District 2008 PM2.5 Plan, attainment of the annual standard is projected by 2014 by the regional photochemical model and all receptor evaluations. The predicted value is within one microgram of the standard; therefore, a weight of evidence evaluation is appropriate. The predictions of these models are compared, along with air monitoring data, trends and other technical information, to establish a weight of evidence assurance that attainment will be achieved. The weight of evidence evaluation supports acceptance of the regional and receptor modeling predictions. Evaluation of the receptor modeling identifies that attainment will not occur by 2009 with the expected achievable reductions and will require the extensive NOx reductions proposed by ARB for 2014. Reductions achieved by the District and current ARB efforts for all directly

emitted and secondary particulate sources are important to achieving attainment. The proposed NOx reductions for 2014 would not be sufficient to achieve attainment without these other reductions. The strategy for attainment includes reduction of directly emitted PM2.5 (geologic, mobile, organic carbon and vegetative burning) as well as reductions from SOx and NOx as precursors to ammonium sulfate and ammonium nitrate. Secondary organic aerosol particulate formation is also included in the modeling evaluation of motor vehicle and organic carbon contributions.

8.3.2 24-Hour PM2.5 Standard

As discussed in the District 2008 PM2.5 Plan, attainment of the prior 24-hour 65 microgram standard is projected to occur prior to 2014 and with much less reductions required than are needed to attain the annual standard. This means that the annual standard identifies the amount of reductions needed to achieve attainment. ARB used the regional model to evaluate the top 25% of days modeled to provide the annual analysis. Based on design values for 2005, ARB projected a 2014 value of 45 micrograms or less at all sites. Due to concerns that the last two years have experienced slightly higher 24-hour values, the District also performed a screening assessment with estimated design values for 2007 (based on incomplete and uncertified data). Evaluation by the District projected a 2014 value of 53 micrograms. Both of these projections are well below the 65 microgram standard and do not require a weight of evidence evaluation.

Unmonitored area evaluation for the year 2014 was conducted by ARB and provides confirming evidence for the attainment demonstration. The unmonitored area evaluation requires examination of regional modeling results for the entire Valley. ARB has provided a screening assessment produced from the regional model results for the year 2014 to determine if any portion of the modeling domain predicts concentrations greater than the monitored locations. This initial analysis did not identify any grid squares that have higher values. ARB has committed to conduct further evaluation in accordance with EPA guidance should this be determined to be necessary; however, the screening assessment indicates that it is unlikely that any areas will be identified that require subsequent evaluation or temporary monitoring. The District and ARB will confer with EPA to ensure that the unmonitored area evaluation provides sufficient confirmation for the attainment demonstration.

8.4 OPEN BURNING EMISSIONS INVENTORY

The prohibition of open burning of certain materials has been implemented by adopting Rule 4103 in June 1992. The rule was subsequently amended in December 1992, December 1993, June 2001, September 2004, May 2005, and May 2007. The emissions inventory from the *2007 Ozone Plan* and the *2008*

PM2.5 Plan for Control Measure S-AGR-1 (Open Burning) are shown in Table 1 below. The projected emission reductions and actual estimated emissions reductions for the 2010 burn prohibition schedule are presented in Table 2 and Table 3 below. Both of the plans did not include the projected emissions reduction from 2007 and 2010 burn prohibition deadlines.

Since District's implementation of the open burning prohibitions of agricultural materials pursuant to the state law requirements, emission of NOx, PM, and VOC from this source category has significantly been reduced. The emissions reductions achieved so far are more than the estimated amount indicated in the *PM2.5 Plan* and *Ozone Plan*. In addition to fulfilling the CH&SC 2010 burn prohibition deadline and the requirements from Rule 4103, the District has also met the State Implementation Plan commitments for this source category.

Table 8 – 1 Emissions Inventory from the PM2.5 and Ozone Plans for Open Burning

Emissions Inventory for Open Burning (S-AGR-1)	**NOx (tpd)**	**PM2.5 (tpd)**	**VOC (tpd)**	**SO_2 (tpd)**
PM2.5 Plan: Emissions Inventory by 2010	5.27	6.94	n/a	0.13
Ozone Plan: Emissions Inventory by 2008[1]	4.8	n/a	5.7	n/a

1. The Ozone Plan does not show projected reductions for 2010.

Table 8 – 2 *PM2.5 Plan* Projected Emissions Reduction for Open Burning

***PM2.5 Plan*: Emissions Reduction**	**NOx (tpd)**	**PM2.5 (tpd)**	**VOC (tpd)**	**SO_2 (tpd)**
PM2.5 Plan: Projected Annual Average Reductions for the Open Burning Control Measure by 2010[1]	1.95	2.57	n/a	0.05
PM2.5 Plan: Estimated Reductions from 2007 Burn Prohibition Deadline (Annual)	3.54	4.57	n/a	0.09
PM2.5 Plan: Estimated Reductions from 2010 Burn Prohibition Deadline (Annual)	0.54	1.79	n/a	0.03
District's Total Estimated Reductions for Open Burning	**4.08**	**6.36**	**n/a**	**0.12**

1. The projected reductions include emissions from the rulemaking projects from the 2007 and 2010 CH&SC deadlines.
*tpd: tons per day; N/A: not applicable to the Plan

Table 8 – 3 *Ozone Plan* Projected Emissions Reduction for Open Burning

***Ozone Plan*: Emissions Reduction**	**NOx (tpd)**	**PM2.5 (tpd)**	**VOC (tpd)**	**SO_2 (tpd)**
Ozone Plan: Projected Annual Average Reductions for the Open Burning Control Measure by 2008[1]	1.1	n/a	1.3	n/a
Ozone Plan: Estimated Reductions from 2007 Burn Prohibition Deadline (Annual)	3.2	n/a	3.7	n/a
Ozone Plan: Estimated Reductions from 2010 Burn Prohibition Deadline (Annual)	0.5	n/a	1.5	n/a
District's Total Estimated Reductions for Open Burning	**3.7**	**n/a**	**5.2**	**n/a**

1. The projected reductions include emissions from the rulemaking projects from the 2007 and 2010 CH&SC deadlines.
*tpd: tons per day; N/A: not applicable to the Plan

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