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Executive Summary

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EXECUTIVE SUMMARY

The air quality in the San Joaquin Valley has improved greatly in the past few years as air quality plans and regulations have been adopted and implemented. The *2006 PM10 Plan* is a continuation of the San Joaquin Valley Air Pollution Control District's (District) strategy for achieving the National Ambient Air Quality Standards (NAAQS) for particulate matter measuring less than 10 microns in diameter (PM10). It is the State Implementation Plan (SIP) revision required as a condition of U.S. Environmental Protection Agency (EPA) approval of the *2003 PM10 Plan*, which became effective June 25, 2004[1]. On May 19, 2005, the District adopted amendments to the plan to update schedules and emissions reductions and to align the contingency measure discussion with federal requirements. In addition to meeting the requirements of the federal Clean Air Act (CAA) and containing measures needed to attain the NAAQS at the earliest possible date, this SIP revision is to include an evaluation of the modeling from California Regional Particulate Air Quality Study (CRPAQS) and the latest technical information, including inventory and monitoring data.

The *2006 PM10 Plan* meets all of the following requirements for areas classified as serious nonattainment under the CAA:

- Demonstrate attainment at earliest practicable date
- Implement Best Available Control Measures/Technology (BACM/BACT) for all significant sources of PM10 or PM10 precursors
- Provide annual reductions of at least five percent of PM10 or PM10 precursor emissions based on the most recent inventory until attainment (applies only to areas designated "serious" that have failed to achieve attainment by CAA deadlines)
- Provide quantitative milestones for reasonable further progress
- Evaluate whether most recent milestone was met
- Adopt contingency measures to assure that emission reductions are in place that can be implemented if a milestone is not achieved on schedule

Particulate matter (PM) is a generic term used to describe a complex group of air pollutants that vary in size and composition. Particle size determines the deposition points along the respiratory system. Particles larger than 10 microns in aerodynamic diameter are deposited almost entirely in the nose and throat area, whereas fine and ultrafine particles are able to reach the alveoli (air spaces) deep in the lungs.

PM10 pollution is a serious health issue in the San Joaquin Valley Air Basin (SJVAB). PM10 can be inhaled through the upper respiratory airways and deposited in the lungs, causing serious health problems and the increased likelihood of death from other causes. A smaller fraction, commonly referred to as PM2.5, is of special concern to health. These finer particles are easily inhaled deeply into the lungs where they can be

[1] 69 FR 30006, May 26, 2004. This Final Rule approved the *2003 PM10 Plan* except for the contingency measure section.

absorbed into the bloodstream or remain embedded for long periods of time. Some subpopulations are at a higher risk for the effects of PM. EPA has established ambient air quality standards for PM10 to protect public health and welfare, one reflecting a daily (24-hour) concentration and one reflecting an annual concentration.[2] More information on PM and its health risks is included in Chapter 1.

Atmospheric levels of PM10 measured in the SJVAB have exceeded both the 24-hour NAAQS of 150 µg/m^3 and the annual NAAQS of 50 µg/m^3. The District air monitoring sites are the official source of data for determining the SJVAB attainment status. The *2006 PM10 Plan* includes recent air monitor measurements for PM10 as well as updated "design values," which are benchmarks used to determine whether a site attains the standard and to provide a starting point for demonstrating attainment in the future after the control strategy is implemented. Monitoring data and design values are in Chapter 2. As of 2005, only two sites within the District do not meet the PM10 NAAQS (Hanford - Irwin exceeds the 24-hour PM10 NAAQS, and Bakersfield - Golden exceeds both the annual and 24-hour PM10 NAAQS), but the District as a whole will remain designated as nonattainment until there are no sites violating the NAAQS.

To bring the District into attainment of the NAAQS, pollutant sources need to be identified, and then emissions need to be reduced through regulation, incentives, voluntary programs, or a combination thereof. Pollutant sources are identified in the emissions inventory (EI), which is an air pollutant accounting system. The inventory is a joint responsibility of the District and California Air Resources Board (ARB). The *2006 PM10 Plan* emissions inventory, Central California Ozone Study (CCOS) v2.14, was prepared by ARB to reflect emissions controls adopted by the District through April 2005 as well as other improvements. Chapter 3 of the *2006 PM10 Plan* includes inventories for total organic gases (TOG), volatile organic compounds (VOC), oxides of nitrogen (NOx), oxides of sulfur (SOx), ammonia, and PM10 for the years 2002, 2005, 2008, and 2010. The year 1999 is used as the baseline inventory because it has the most complete data. The year 2002 is used as the base year from which to calculate all future year milestones. The federal CAA determines the specific future-year milestones (2005, 2008, 2010). The milestones ensure that reductions are continually achieved over time.

Air pollution control is a shared responsibility of the EPA, ARB, the District, and local government agencies. The EPA is responsible for federal motor vehicle emissions controls; controls for certain off-road engines, trains, planes, ships; and for fuel regulations. The ARB regulates California vehicles, fuels, and consumer products. The District regulates stationary sources and indirect source control programs. Local government agencies possess authority to regulate land use, to implement transportation control measures, and to use their budget authority to implement measures that reduce emissions directly. The *2006 PM10 Plan* control strategy

[2] On December 20, 2005, EPA announced its intent to revoke the PM10 NAAQS, revise the PM2.5 NAAQS, and establish a new 24-hour NAAQS for the PM2.5-10 fraction (urban areas only). These proposed changes are driven by new evidence on health effects from specific size fractions, federal CAA requirements, and case law affecting the PM10 and PM2.5 standards.

consists of existing measures already adopted by each entity, measures needed to fulfill the BACM/BACT requirement, and other feasible measures needed to reach attainment by the earliest practicable date. BACM/BACT is defined as the maximum degree of emission reduction considering technical and economic feasibility and environmental impacts of the control. Because of previous air quality planning efforts for PM10 and ozone, the vast majority of controls anticipated as needed to attain the PM10 standards have already been adopted and implemented in the SJVAB. Chapter 4 provides a summary of District control measures, including emissions reductions that reduce emissions of PM10 and PM10 precursors.

EPA defines significant sources as those contributing more than 5 $\mu g/m^3$ to a violation of the 24-hour PM10 standard or 1 $\mu g/m^3$ to a violation of the annual PM10 standard. However, the District used a more conservative approach to define significant sources that includes each contributing component of PM10 based on the potential for a worst-case PM10 day. Areas classified as serious nonattainment for PM10 are required to implement BACM and BACT on all significant sources of PM10 or PM10 precursor emissions. BACM/BACT is defined as the maximum degree of emission reduction considering technical and economic feasibility and environmental impacts of the control. BACM/BACT must be implemented independent of attainment requirements. Even if it is not needed to attain the standards by the applicable attainment date, BACM/BACT may allow for an earlier attainment date. However, EPA guidance allows for pursuing only precursor pollutants that would be effective in reducing ambient PM10 levels. Most of the District's existing regulations were found to meet the BACM/BACT definition.

The CAA section 172(c)(9) requires attainment plans to provide contingency measures, which are specific measures to be undertaken if an area fails to demonstrate reasonable further progress. These contingency measures must take effect without any further action by the State or the EPA. The District proposes several contingency measures to meet this requirement, including surplus reductions achieved by adopted District controls and approved incentive programs.[3] If additional contingency measures are needed, the District will pursue amendments to existing rules, specifically the District's Conservation Management Practice (CMP) Program and Regulation VIII, Fugitive PM10 Prohibitions.[4]

EPA requires attainment demonstration plans to use computer models to predict future air quality so that the effectiveness of emissions reductions can be quantified. The *2006 PM10 Plan* updates specific portions of the analysis included in the *2003 PM10 Plan*. The *2003 PM10 Plan* was based on the best model and input data available at the time. When EPA approved the *2003 PM10 Plan* in 2004, they noted that better models and monitoring data would be available in the next couple of years through CRPAQS and that these new tools and data should be used in preparing the *2006 PM10 Plan*.

[3] On May 19, 2005, the District Governing Board adopted amendments to the *2003 PM10 Plan* that align contingency measures in the plan with federal requirements. EPA has not yet acted on these amendments.

[4] The nature and extent of additional PM10 contingency measures may be affected by the December 20, 2005 EPA announcement regarding PM NAAQS.

For this *2006 PM10 Plan*, ARB's CRPAQS analysis of exceedance events was used to determine whether any adjustment is required for the prediction of nitrate response to NOx or other precursor reductions. The Mesoscale Model, version 5 (MM5), was used to model atmospheric physics. The Community Multiscale Air Quality (CMAQ) model (version 4.4), with California-specific modifications correcting model code and utilizing California specific data, was used to model the secondary PM10 formed in the atmosphere for the CRPAQS winter 2000-2001 episode and to evaluate the response of particle formation to emission reductions. This evaluation is used in the District's rollback modeling. The CRPAQS results indicate that ammonia emissions reductions are not effective for reducing secondary PM10 and that the District's NOx strategy is sound.

Because rollback modeling uses linear relationships even though nitrate particle formation is not a linear process, the District uses grid-based aerosol modeling to adjust the rollback projection relationship for nitrates and NOx emissions. The *2003 PM10 Plan* used the results of the chemical mass balance (CMB) analysis with a rollback projection to predict the SJVAB's response to expected emission trends and proposed emissions reductions. The receptor CMB analysis, which involved chemical speciation with back trajectory path and gridded emissions, needed no update because it is based on exceedance events. Since all of the exceedances occurred prior to the *2003 PM10 Plan*, they have already been fully evaluated through this technique. The rollback projections, which are found in Chapter 5 of the *2006 PM10 Plan,* have been updated to reflect changes in the emissions inventory.

The *2006 PM10 Plan* provides a modeling update for predicted, future air quality in response to revised emissions projections for future years. However, the actual air quality improvements that have occurred exceed those predicted by the model. This result is not entirely unexpected since rollback projections use conservative, linear methods; however, the amount of observed air quality improvement is far greater than would have been expected by the understatement of improvement associated with a linear projection. Therefore, the *2006 PM10 Plan* provides discussion of the significance of observed air quality in comparison to the modeling projections.

The analysis and modeling approaches selected for the *2006 PM10 Plan* meet or exceed all EPA standards and guidance for the development of PM10 plans. The *2006 PM10 Plan* demonstrates that the control strategy will achieve RFP, which is the five percent per year reduction of emissions of PM10 or PM10 precursors required until attainment. This is summarized in Chapter 6.

The causes of the San Joaquin Valley's PM10 problem are complex, but our understanding has benefited through investment in air quality research focused on the region. The District, state government, federal government, and industry have allocated nearly $30 million to understand the causes of the SJVAB's PM10 problem. The Integrated Monitoring Study 1995 (IMS95) and CRPAQS collected PM10 samples during intensive monitoring periods in 1995 and 2000-2001 respectively. PM10

samples from the different sites have been analyzed to determine the various chemical components. These and other on-going efforts are presented in Chapter 7.

The studies and evaluations used in developing the *2006 PM10 Plan* indicate that the strategy put forth in the *2003 PM10 Plan* should succeed in helping the District to attain and maintain the PM10 NAAQS in the SJVAB. While significant editorial revisions and technical updates have been applied to the *2006 PM10 Plan*, the substantive parts of the control strategy and the expected results remain as they were in the *2003 PM10 Plan*.

There have been no official exceedances of the 24-hour PM10 NAAQS in the SJVAB between January and September 2005. The SJVAB may attain the PM10 NAAQS in 2006 (based on data from 2003-2005) depending on the PM10 data from October through December 2005. In general, air quality data must be submitted to the Air Quality System (AQS) within 90 days of the end of the quarter; data from the October-December quarter must be submitted to AQS by the end of March. Federal regulations require that each data reporting agency provide its data certification letter for the previous calendar year to the EPA by July 1. Therefore, any attainment determinations will be made after July 1, 2006.

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