State of California

California Environmental Protection Agency
AIR RESOURCES BOARD

Staff Report

Yuba City-Marysville PM2.5 Maintenance Plan and Redesignation Request

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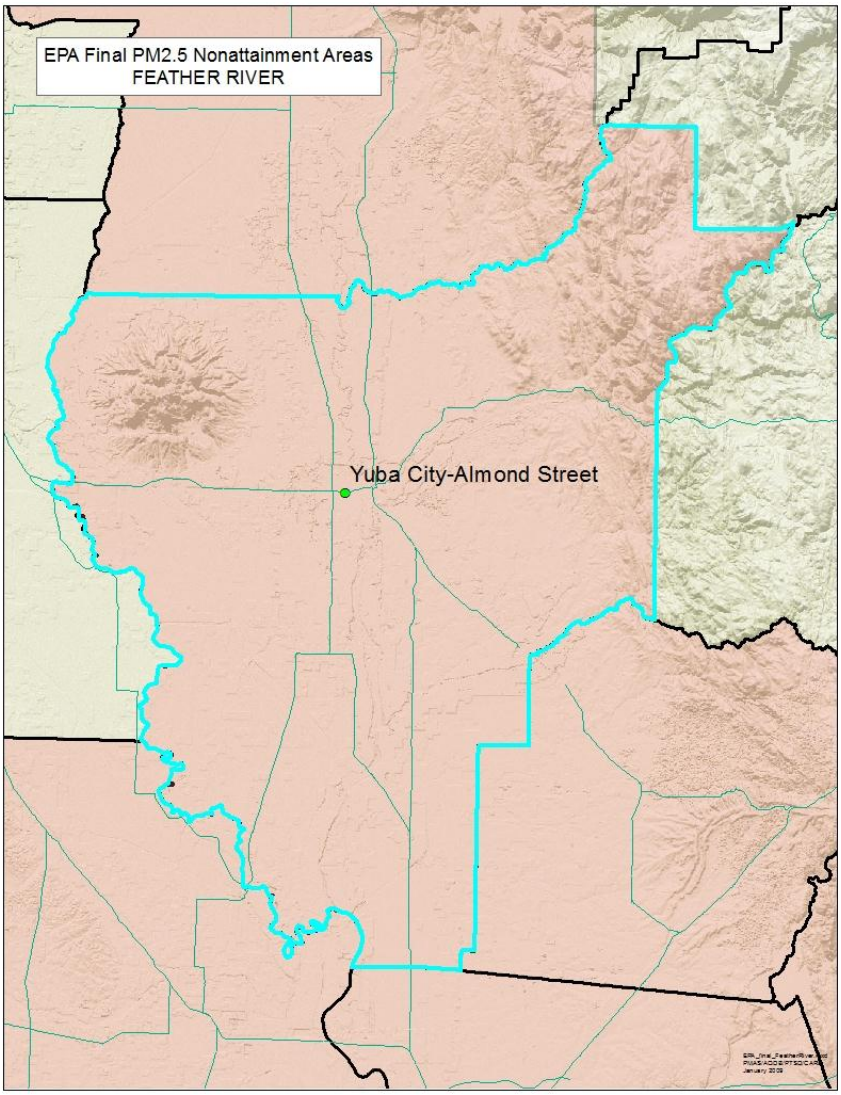
I. BACKGROUND

The Yuba City-Marysville area in the Feather River Air Quality Management District (District) was designated as nonattainment for the 2006 24-hour fine particulate (PM2.5) National Ambient Air Quality Standard (standard) on December 14, 2009. The nonattainment area includes Sutter County and a portion of Yuba County and was designated nonattainment based on 2005 to 2007 Federal Reference Monitor (FRM) data. Figure 1 outlines the nonattainment area and shows the location of the monitoring site. The Yuba City-Marysville nonattainment area has a single PM2.5 FRM monitor, which in 2007 had a design value of 40 ug/m3. Beginning in 2008, the 24-hour design value has been below the standard.

Figure 1. Map of the Yuba City-Marysville PM2.5 Nonattainment Area



II. REDESIGNATION REQUIREMENTS

On June 8, 2010, ARB submitted a request to the U.S. Environmental Protection Agency (U.S. EPA) to find the Yuba City-Marysville nonattainment area in attainment of the 35 ug/m3 24-hour PM2.5 standard. The U.S. EPA took final action on January 10, 2013 determining that the area attained the standard. This clean data finding, under the U.S. EPA *Clean Data Policy for the Fine Particulate National Ambient Air Quality Standards* (Clean Data Policy), suspends the majority of the planning elements under the Clean Air Act (Act).

Air Resources Board (ARB) staff reviewed the District's *Yuba City-Marysville PM2.5 Nonattainment Area Redesignation Request and Maintenance Plan* (Redesignation Request/Maintenance Plan) within the context of the Act, which identifies the following requirements an area must meet to be redesignated to attainment:

A. The area has attained the standard;
B. The applicable implementation plan is fully approved under Act section 110 (k), and the area has met all applicable requirements of Act section 110 and part D;
C. The PM2.5 air quality improvements are due to permanent and enforceable emission reductions; and
D. The area has a fully approved maintenance plan satisfying section 175A of the Act.

The Act also sets the general framework for maintenance plans[1]. Each PM2.5 maintenance plan must provide for continued maintenance of the PM2.5 standard for ten years after redesignation and include the following components:

1. Attainment emission inventory;
2. Maintenance demonstration;
3. Commitment to continue the monitoring network operation;
4. Commitment for verification of continued attainment; and
5. Contingency plan to promptly correct any violation of the PM2.5 standard that occurs after the area has been redesignated.

III. EVALUATION OF THE REDESIGNATION REQUEST/MAINTENANCE PLAN

Based on review of the District Redesignation Request/Maintenance Plan and supporting technical analysis, ARB staff concurs that the Redesignation Request/Maintenance Plan meets the Act's requirements. The following sections describe the major elements of the Redesignation Request/Maintenance Plan.

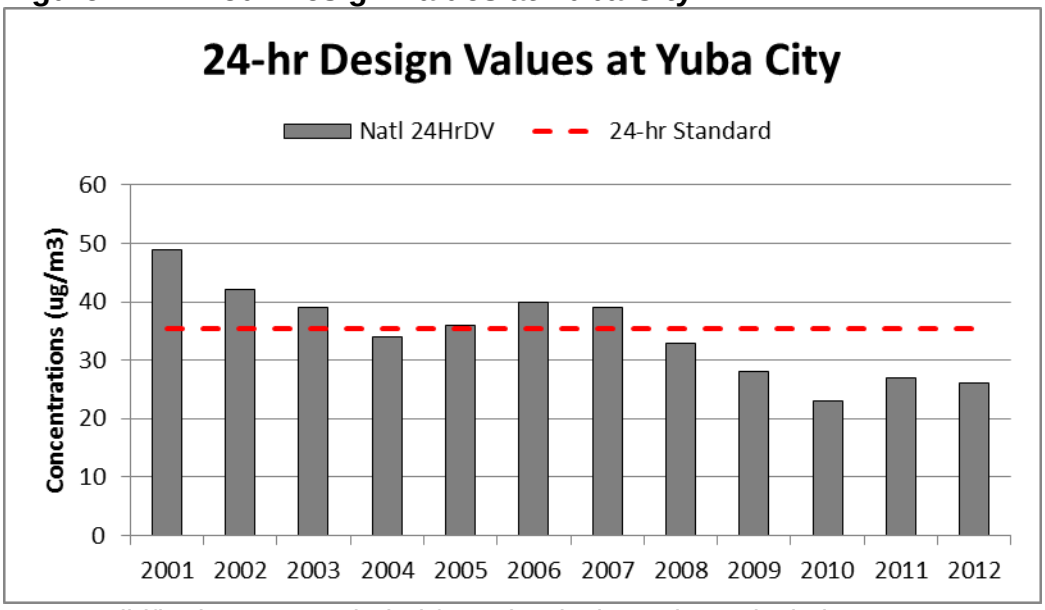
[1] Calcagni, John, Memorandum, *Procedures for Processing Requests to Redesignate Areas to Attainment, Office of Air Quality Planning and Standards*, Research Triangle Park, North Carolina, September 4, 1992. http://www.epa.gov/ttn/oarpg/t5/memoranda/redesignmem090492.pdf

A. Monitoring Shows Compliance with PM2.5 Standard

As shown in Figure 2, PM2.5 air quality has improved significantly over the last few years in the Yuba City-Marysville nonattainment area. PM2.5 is measured at a single monitoring station, Yuba City-Almond Street (Figure 1), where an FRM sampler collects 24-hour average samples daily. The area first reached compliance with the 24-hour standard in 2008, with a design value of 33 ug/m3. The design value represents the 3-year average of the 98th percentile of 24-hour PM2.5 concentrations.
Although wildfires that occurred in the summer of 2008 resulted in a number of exceedances of the 24-hour standard, U.S. EPA's exceptional events rule allows for exclusion of exceedances due to natural events. Since then, the area has continued to measure compliance with the 24-hour standard. Figure 2 shows the design values at the Yuba City site between 2001 and 2012, demonstrating attainment.

Between 2001 and 2012, annual average and 24-hour PM2.5 design values in the Yuba City-Marysville nonattainment area decreased by nearly 50 percent due to ongoing emission reductions. The downward trend was not a result of "unusually favorable meteorology". Between 2008 and 2012, the area experienced a variety of meteorological conditions, including 2011 which was extremely conducive to high PM2.5 pollution including stagnation that persisted over 20 days. Despite this, 2011 and 2012 design values are significantly below the 24-hour standard.

Figure 2. 24-hour Design Values at Yuba City*



** 2008 wildfire impacts excluded from the design value calculation*

B. Applicable Act Requirements are Satisfied

ARB and the District have met all of the Act requirements applicable for a PM2.5 nonattainment area to be considered for redesignation. On June 8, 2010, ARB requested a "clean data" finding for the 24-hour PM2.5 standard for this area. On January 10, 2013, U.S. EPA signed a final rule determining that the Yuba City-Marysville nonattainment area has attained the 24-hour PM2.5 standard based on 2009-2011 data. This clean data finding suspended the obligation to submit State Implementation Plan (SIP) elements that provide for attainment of the standard, implementation of all reasonably available control measures, reasonable further progress (RFP), and implementation of contingency measures for failure to meet deadlines for RFP and attainment. The only SIP element remaining is an emission inventory. To address the remaining SIP requirement, the District Redesignation Request/Maintenance Plan includes a 2011 winter emission inventory.

C. Attainment Results from Permanent and Enforceable Emission Reductions

Numerous District and State emission control programs have been adopted and implemented over the last several years, providing permanent and enforceable reductions in direct PM2.5 and PM2.5 precursor emissions. Many of these programs will provide additional emission reductions during the maintenance period, ensuring continued compliance with the standard. The Redesignation Request/Maintenance Plan lists post-2006 control measures that are responsible for the significant improvements in PM2.5 air quality, including restrictions on open burning and residential fuel combustion, and on-road and off-road motor vehicle and equipment control programs.

D. Maintenance Plan Provides for Continuing Attainment

Section 175A of the Act establishes the required elements of a maintenance plan for areas seeking redesignation from nonattainment to attainment. Using an attainment year inventory and future inventory projections, plans must demonstrate continued attainment through the first 10-year maintenance period. Comprehensive inventories were developed for the representative attainment year (2011), an interim year (2017), and the end of the maintenance period (2024) for directly emitted PM2.5 and PM2.5 precursors.

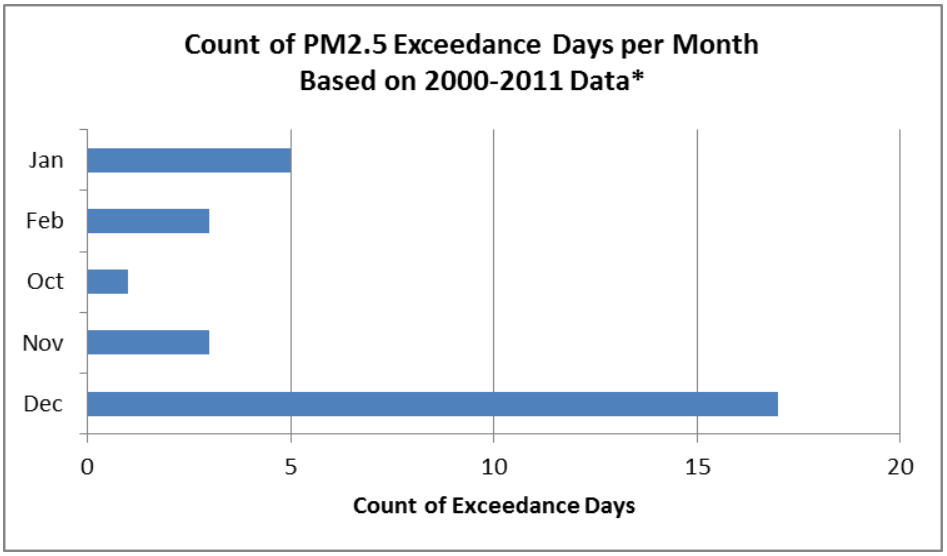
1. Attainment Year Emission Inventory

An emission inventory is a critical tool used to support evaluation, control, and mitigation of air pollution which is comprised of a systematic listing of the sources of air pollutants along with the amount of pollutants emitted from each source or category over a given period of time. Emission inventories are estimates of the air pollutant emissions released into the environment – they are not direct ambient concentration

measurements. As part of the maintenance plan, the District submitted an attainment year inventory characterizing emissions in the maintenance area.
U.S. EPA recommends that the attainment year inventory be from one of the three years used to demonstrate attainment. In case of the Yuba City-Marysville nonattainment area, 2011 was selected as an attainment year inventory coinciding with the last year in the U.S. EPA clean data finding. The attainment year inventory includes emissions of PM2.5, volatile organic compounds (VOCs), oxides of nitrogen (NOx), oxides of sulfur (SOx), and ammonia (NH3).

An emission inventory should be consistent with the nature of the air quality problem. Since the 2006 24-hour PM2.5 standard was designated to protect against peak exposures, the inventory should reflect the season when most exceedances occur. As demonstrated in the Redesignation Request/Maintenance Plan and also shown in Figure 3, all of the highest PM2.5 concentrations in the Yuba City-Marysville nonattainment area over the course of the year occur during the winter. Therefore, the winter inventory developed for the attainment year and future years is the most appropriate for SIP planning purposes. Table 1 lists 2011 winter emission inventories split by source category.

Figure 3. Total Count of Exceedance Days per Month Based on 11 Years of Data



** Excluding data affected by exceptional events.*

Table 1. Attainment Year Winter Emission Inventory (tons/day)

Category	VOC	NOX	SOX	PM2.5	NH3
STATIONARY	4.0	4.4	0.1	0.9	0.4
AREAWIDE	5.5	1.1	0.1	3.8	4.5
ON-ROAD MOTOR VEHICLES	2.8	8.4	0.0	0.3	0.2
OTHER MOBILE SOURCES	2.3	5.4	0.1	0.3	0.0
TOTAL	14.6	19.3	0.4	5.3	5.0

2. Maintenance Demonstration

In order to demonstrate maintenance of the PM2.5 24-hour standard through the year 2024, the District compiled an emission inventory for an attainment year (2011) and formulated projections for the intermediate year (2017) and for the final year of the maintenance period (2024). The attainment year and projected inventories represent winter emissions which reflect the nature of the PM2.5 problem in the area. If each of the projected emission levels is less than the emissions for the attainment year, maintenance of the standard is demonstrated. This approach assumes that ambient concentrations will remain below the standard as long as future emissions are kept below the attainment year emissions. The interim and future year inventories include banked Emission Reduction Credits (ERCs) to demonstrate that the addition of ERC's will not compromise attainment.

The maintenance demonstration includes emissions of direct PM2.5, SOx, and NOx. The U.S. EPA PM2.5 implementation rule specifies that a precursor is considered "significant" for control strategy development purposes when a significant reduction in the emission of that precursor pollutant leads to a significant decrease in PM2.5 concentration. Such pollutants are known as "PM2.5 attainment plan precursors" (72 FR 20586). The PM2.5 implementation rule also established a presumption that PM2.5, NOx, and SOx are attainment plan precursors, while VOCs and ammonia are not unless they are needed for attainment demonstration or are significant for maintaining the NAAQS.

Although speciation data is not routinely collected, limited data provided by the U.S. EPA as part of the designation process indicates that carbonaceous aerosols and nitrate are main contributors to high PM2.5 values. Carbonaceous aerosols are the largest component, contributing about 54 percent of the mass, followed by nitrate, which is responsible for about 38 percent of the mass. Although these data are based on 2004-2006 samples, the data collected at other northern and central California sites indicate that while the number of high days has decreased, the high day composition remains similar from year to year due to the nature of the PM2.5 problem.

High PM2.5 values occur exclusively under stagnant winter conditions leading to accumulation of primary pollutants and formation of secondary components. While carbonaceous aerosols are primarily directly emitted into the air, nitrates are secondary pollutants formed in the atmosphere from gaseous NOx emissions and ammonia. ARB's programs aimed at reducing NOx emissions have played an important role in reducing the nitrate fraction of PM2.5. Long term nitrate and NOx data collected throughout the State demonstrate that reductions in ambient NOx concentrations have resulted in commensurate reductions in PM2.5 nitrate concentrations. Past modeling and monitoring studies in northern and central California highlight that reductions in VOCs are not important for reducing either carbonaceous aerosols or nitrate; therefore, they would not provide any benefit in reducing PM2.5 concentrations. Based on the nature of the PM2.5 problem and an understanding of precursor effectiveness, as well

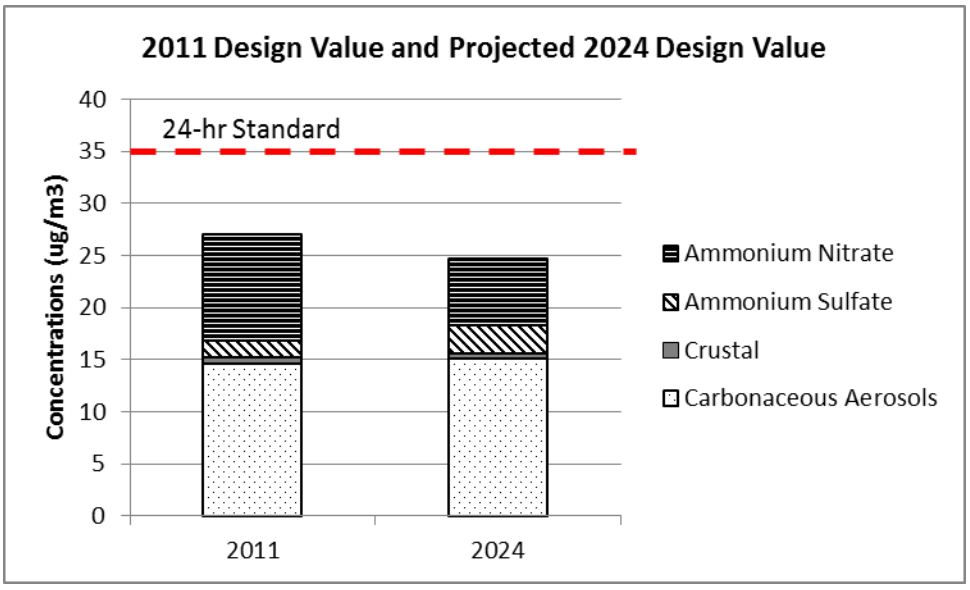
as the fact that the area has already attained the standard, VOCs and ammonia are therefore not significant PM2.5 precursors.

The consolidated emission projections for the Yuba City-Marysville nonattainment area are presented in Table 2. Between 2011 and 2024, emissions of NOx are projected to decline 37 percent while emissions of SOx and direct PM2.5 are projected to increase by a small amount. The plan demonstrates maintenance of the 24-hour PM2.5 standard because the potential increase in directly emitted PM2.5 and SOx emissions will be fully offset by a greater decrease in nitrate concentrations, as illustrated in Figure 5. Additionally, the level of 2011 emissions corresponds to a design value of 27 ug/m3, which is 24 percent below the standard. This provides additional assurance that 2017 and 2024 design values will remain below the standard.

Table 2. Projected Changes in Emissions between 2011 and 2024 (tons/day)

Year	2011	2017	2024	2024-2011
PM2.5	5.3	5.5	5.4	0.2
NOx	19.3	15.3	11.6	-7.7
SOx	0.4	0.6	0.6	0.2
ERC's included in the Above Future Year Inventories				
PM2.5		1.3	1.3	
NOx		0.9	0.9	
SOx		0.2	0.2	

Figure 5. Comparison of Measured 2011 and Projected 2024 Design Value



3. Motor Vehicle Emission Budgets

The Redesignation Request/Maintenance Plan establishes PM2.5 and NOx transportation conformity budgets for 2017 and 2024 to ensure that future emissions from on-road mobile sources provide for continuing attainment of the PM2.5 24-hour standard (Table 3). The District determined that mobile source emissions of VOCs, ammonia, SOx, re-entrained road dust, and highway and transit construction dust are not significant for maintaining the standard and do not need motor vehicle emission budgets.

Table 3. Motor Vehicle Emission Budgets (tons/day)

Year	NOx			PM2.5
	Adjusted Budgets	Safety Margin	Total Budgets	Total Budgets
2017	4.6	0.7	5.3	0.2
2024	2.6	0.5	3.1	0.2

4. PM2.5 Monitoring Network

The existing PM2.5 monitoring network in the Yuba City-Marysville nonattainment area includes a PM2.5 FRM monitor located at 773 Almond Street in Yuba City operating on a daily schedule, and a non-Federal Equivalence Method (non-FEM) Beta Attenuation Monitor (BAM) running in parallel to the FRM. Together, these two monitors provide the necessary data to demonstrate continuous compliance with the standard as well as support Air Quality Index reporting, forecasting air quality episodes, and making burn decisions in the agricultural burning program.

5. Verification of Continued Attainment

The ARB is responsible for monitoring PM2.5 air quality within the Yuba City-Marysville nonattainment area. The ARB also oversees the quality assurance of PM2.5 data and submits annual monitoring network plans to U.S. EPA on behalf of the District. The ARB commits to maintaining an appropriate PM2.5 monitoring network through the maintenance period, with any potential changes to be developed in collaboration with U.S. EPA and subject to stakeholder review. To verify continued attainment of the PM2.5 standard, the ARB will continue to conduct PM2.5 monitoring and expeditiously review data as it becomes available to evaluate any risk of impending violations. This will be used as potential trigger for early action in the contingency plan.

6. Contingency Plan

The Act requires the maintenance plan to include contingency provisions for prompt correction of any PM2.5 standard violation that might occur after the area has been redesignated to attainment. The maintenance plan is not required to contain fully adopted contingency measures that will go into effect without further state action as is

required in attainment SIPs. Instead, for maintenance plans, the area must have a plan to ensure that contingency measures are adopted once they are triggered.

The District will use the 24-hour design value as the contingency plan trigger. In the event that the 24-hour design value exceeds the standard, within 60 days the District will commence analysis, including meteorological evaluation of high PM2.5 days and emission inventory assessment. The District will also analyze the PM2.5 and meteorological data to rule out exceptional events or instrument malfunction. If a design value triggers the contingency plan, the District will complete sufficient analyses, by November 1 of the following year, to begin adoption of necessary rules for ensuring attainment and maintenance of the 24-hour standard. If new rules are necessary, they would be adopted by August 31 of the year following the completed analysis. ARB staff believes the contingency requirements in the Redesignation Request/Maintenance Plan are adequate to protect air quality in the area.

IV. STAFF RECOMMENDATION

ARB staff has reviewed the Redesignation Request/Maintenance Plan for the Yuba City-Marysville nonattainment area and consulted with District staff during this review. ARB staff finds that the Redesignation Request/Maintenance Plan meets all applicable Act requirements. The monitoring data shows that the area has attained the 24-hour PM2.5 standard, and the maintenance demonstration shows that the standard will be maintained for ten years.

Therefore, staff recommends that the Board adopt the *Yuba City-Marysville PM2.5 Nonattainment Area Redesignation Request and Maintenance Plan* as a revision to the California SIP for submittal to U.S. EPA. In addition, ARB staff recommends that the Board approve the District's request that the Yuba City-Marysville nonattainment area be redesignated from nonattainment to attainment for the federal 24-hour PM2.5 standard.