Staff Report

CARB Review of the Yuba City-Marysville PM2.5 Second Maintenance Plan for the 35 µg/m^3 24-Hour PM2.5 Standard

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CALIFORNIA
AIR RESOURCES BOARD

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Executive Summary

This report presents the California Air Resources Board (CARB or Board) staff's assessment of the Yuba City-Marysville PM2.5 Second Maintenance Plan (Plan) for the 35 µg/m^3 24-hour PM2.5 standard prepared by the Feather River Air Quality Management District (District). CARB staff has concluded that the Plan meets the State Implementation Plan (SIP) planning requirements of the federal Clean Air Act (Act). CARB will submit the Plan to the U.S. Environmental Protection Agency (U.S. EPA) as a revision to the California SIP.

The Act requires U.S. EPA to set air quality standards and periodically review the latest health research to ensure that standards remain protective of public health. In December 2006, U.S. EPA lowered the 24-hour fine particulate matter (PM2.5) National Ambient Air Quality Standard (standard) from the previous 65 µg/m^3 to 35 µg/m^3. Effective December 14, 2009, U.S. EPA designated the Yuba City-Marysville Area as nonattainment for the 35 µg/m^3 24-hour PM2.5 standard. To be reclassified as an attainment area, the Act Section 175(A) requires attainment and maintenance of the standard for 20 years, demonstrated in two consecutive 10-year maintenance periods. On April 25th, 2013, CARB approved the Yuba City-Marysville PM2.5 First Maintenance Plan and Redesignation Request. U.S. EPA redesignated the Yuba City-Marysville nonattainment area to attainment effective January 8, 2015.

The Plan was prepared by the District with the support of CARB to demonstrate maintenance through 2035. The District issued a public notice of the Plan on March 3rd, 2023 and approved the Plan On April 3rd, 2023. CARB staff has reviewed the Plan and concluded that:

1) The Plan projects a continued reduction in emissions of PM2.5 precursors (such as NOx) that are relevant to maintenance;
2) The Plan demonstrates that the Yuba City-Marysville maintenance area continues to meet the standard throughout the maintenance period until 2035;
3) The Plan includes an adequate contingency plan that will be triggered if the standard is violated; and
4) The Plan meets all the other applicable Act requirements in Section 175(A).

CARB Staff recommends the Executive Officer adopt the Plan, and direct staff to submit the Plan to U.S. EPA as a revision to the California SIP. The details of the reasoning that supports this recommendation are listed in the following CARB Staff Report.

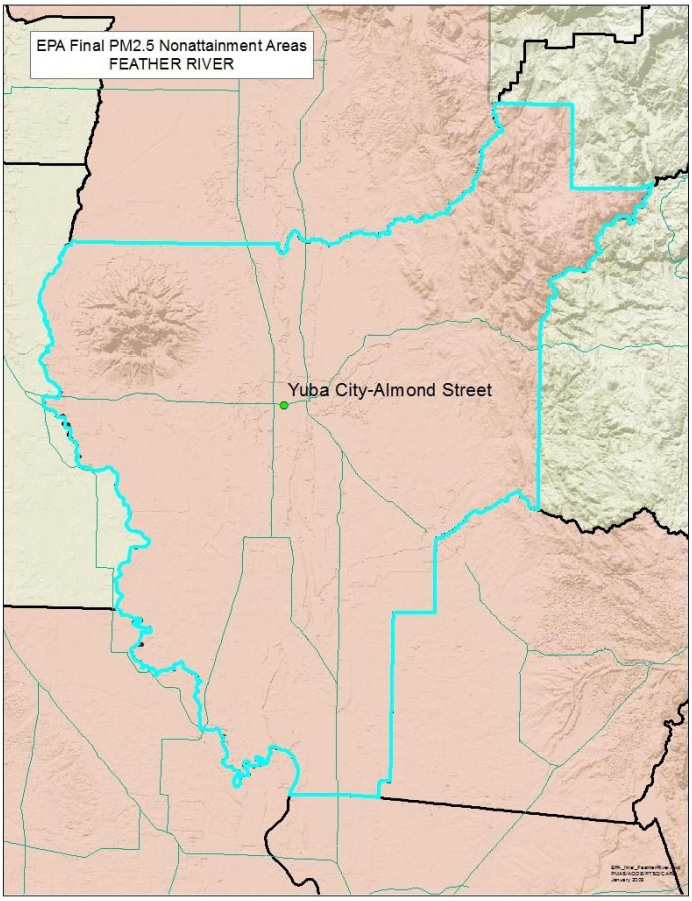
I. Background

Fine particulate matter (PM2.5) up to 2.5 micrometers in diameter, is made up of many constituent particles and liquid droplets that vary in size and chemical composition. PM2.5 contains a diverse set of substances including elements such as carbon and metals, compounds such as nitrates, sulfates, and organic materials, and complex mixtures such as diesel exhaust and soil or dust. Numerous health effects studies have linked exposure to PM2.5 to increased severity of asthma attacks, development of chronic bronchitis, decreased lung function in children, increased respiratory and cardiovascular hospitalizations, and even premature death in people with existing cardiac or respiratory disease. Those most sensitive to PM2.5 pollution include people with existing respiratory and cardiac problems, children, and older adults. In 1997, the U.S. EPA adopted the first set of health-based PM2.5 standards, a 24-hour standard of 65 $\mu g/m^3$ and an annual standard of 15 $\mu g/m^3$. In 2006, the 24-hour standard was tightened to 35 $\mu g/m^3$, and in 2012, the annual standard was lowered to 12 $\mu g/m^3$.

Effective December 14, 2009, U.S. EPA designated the Yuba City-Marysville area as nonattainment for the 35 $\mu g/m^3$ 24-hour PM2.5 standard. The Yuba City-Marysville nonattainment area (Figure 1) includes Sutter County and a portion of Yuba County and was designated nonattainment based on 2005 to 2007 PM2.5 data at the Yuba City Almond Street monitor. Figure 1 outlines the Yuba City-Marysville nonattainment area including the location of the monitoring site The District is the local district overseeing the Yuba City-Marysville nonattainment area. The Act establishes planning requirements for areas that exceed health-based standards. These nonattainment areas must develop and implement SIPs that demonstrate how they will attain the standards by specified dates.

On June 8, 2010, CARB submitted a request to U.S. EPA to find that the Yuba City-Marysville nonattainment area had met the 35 ug/m^3 24-hour PM2.5 standard based on 2009 to 2011 PM2.5 data. The U.S. EPA took final action on January 10, 2013 determining that the area met the standard, but did not redesignate the area to attainment since a maintenance plan is required prior to formal redesignation. Since the Yuba City-Marysville nonattainment area attained the 35 ug/m^3 24-hour PM2.5 standard prior to the SIP submittal deadline, the area was eligible for reduced regulatory requirements under the U.S. EPA's Clean Data Policy for the Fine Particulate National Ambient Air Quality Standards. The District addressed these SIP requirements in addition to the maintenance requirements in the first Yuba City-Marysville PM2.5 Nonattainment Area Redesignation Request and Maintenance Plan (Redesignation Request/Maintenance Plan).

Figure 1: The map of Yuba City-Marysville maintenance area and the location of the monitoring site.



On April 1st, 2013, the District approved its First Redesignation Request/Maintenance Plan to demonstrate maintenance for the first 10-year required maintenance period. The First Plan included an emission inventory that featured substantial NOx emission reduction from regulations on mobile sources. The First Plan fulfilled the Act's requirement by also including a maintenance demonstration, a motor vehicle emission budget (MVEB), a PM2.5 monitoring network description and a contingency plan. CARB approved this plan on April 25, 2013 and submitted it to U.S. EPA on May 23, 2013. CARB approved Minor Updates to Yuba City-Marysville PM2.5 Maintenance Plan and Redesignation Request on February 20, 2014, providing U.S. EPA with additional information to approve the Redesignation Request/Maintenance Plan and redesignate the Yuba City-Marysville PM2.5 area to attainment for the 35 ug/m^3 24-hour PM2.5 standard. The Yuba City-Marysville nonattainment area was redesignated to attainment for the 35 ug/m^3 24-hour PM2.5 standard effective January 8, 2015.[1] In the same action, the U.S. EPA also approved the Plan.

[1] *https://www.govinfo.gov/content/pkg/FR-2014-12-09/pdf/2014-28729.pdf*

To fulfill the requirement of the Act, the District, with the support of CARB, has prepared the Plan to demonstrate attainment and maintenance for the second 10-year maintenance period, through 2035. The main goal of this CARB staff report is (1) to evaluate the District's demonstration of continued attainment of the 35 ug/m^3 24-hour PM2.5 standard to date and show maintenance for the second maintenance period and (2) to examine if the Plan fulfilled all the necessary requirements of the Act.

II. Requirements for a Second 10-Year Maintenance Plan

To be reclassified as an attainment area, the Act section 175A requires attainment and maintenance of the standard for 20 years, demonstrated in two consecutive 10-year maintenance periods. Section 175A(b) requires the second maintenance plan be submitted 8 years after redesignation to attainment, or January 8, 2023.

This Plan[2] has been prepared to incorporate all of the requirements in section 175(A) of the Act. The data in the Plan shows that the Yuba City-Marysville nonattainment area continues to meet the 35 ug/m^3 24-hour PM2.5 standard and will maintain the standard throughout the second maintenance period, until 2035.

The Plan includes the following:

- Emission inventories for the base year (2020), first year of the second 10-year maintenance plan (2024), interim year (2026), and last year of the second 10-year maintenance plan (2035);
- Motor vehicle emission budgets for 2026 and 2035;
- Maintenance demonstration;
- Approved monitoring network plan;
- Verification of continued attainment; and
- Contingency plan to prompt correction of any unforeseen violations.

III. Evaluation of the First Maintenance Period

The 24-hour PM2.5 design value is the three-year average of annual 98th percentile 24-hour values recorded at each site. The record of twenty-two years of PM2.5 24-hour design values of the Yuba City-Marysville area shows continued improvement in PM2.5 levels (

Figure 2). The PM2.5 design values were maintained at well below the 35 µg/m^3 24-hour PM2.5 standard since 2008.

The Yuba City-Marysville area, like the rest of California, was heavily impacted by wildfire events over the years from 2016-2021. The District and CARB worked closely to develop the exceptional event demonstration for 2020 and 2021, which had the two worst ever wildfire seasons on record, and to remove the wildfire-impacted data from the design value calculation. With this effort, the design

[2] *https://www.fraqmd.org/files/639f735d7/Second+Maintenance+Plan+YCMrsvl+PM2_5.pdf*

values maintained below the 35 µg/m^3 24-hour PM2.5 standard, and the 2021 design value, after exclusion of exceptional events submitted to U.S. EPA, was 34.1 µg/m^3. U.S. EPA only allows states to officially request exclusion for days that make a difference as to whether an area meets the standard. When all wildfire days are removed, the 24-hour PM2.5 design value is 26.9 µg/m^3. The number of exceedance days during the winter season (December and January), which is when elevated PM2.5 levels occur, has also significantly decreased for the first maintenance period.

Figure 2: The record of PM2.5 24-hour design values for 2000 to 2021

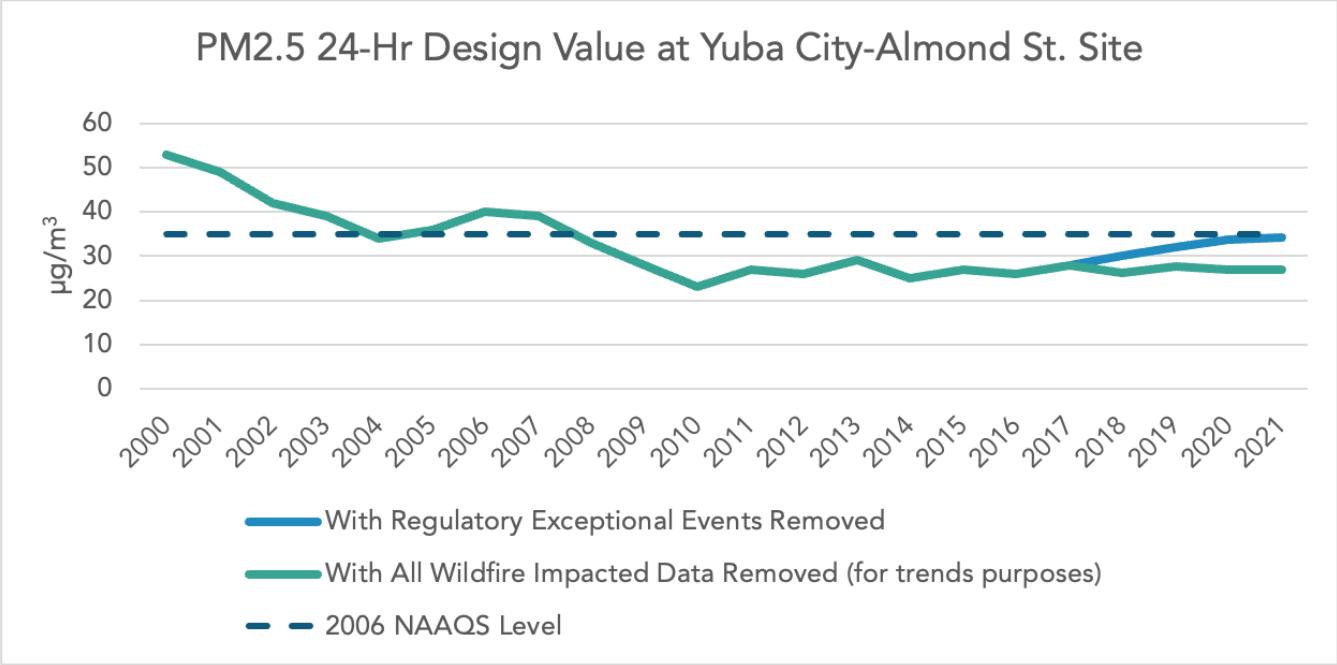
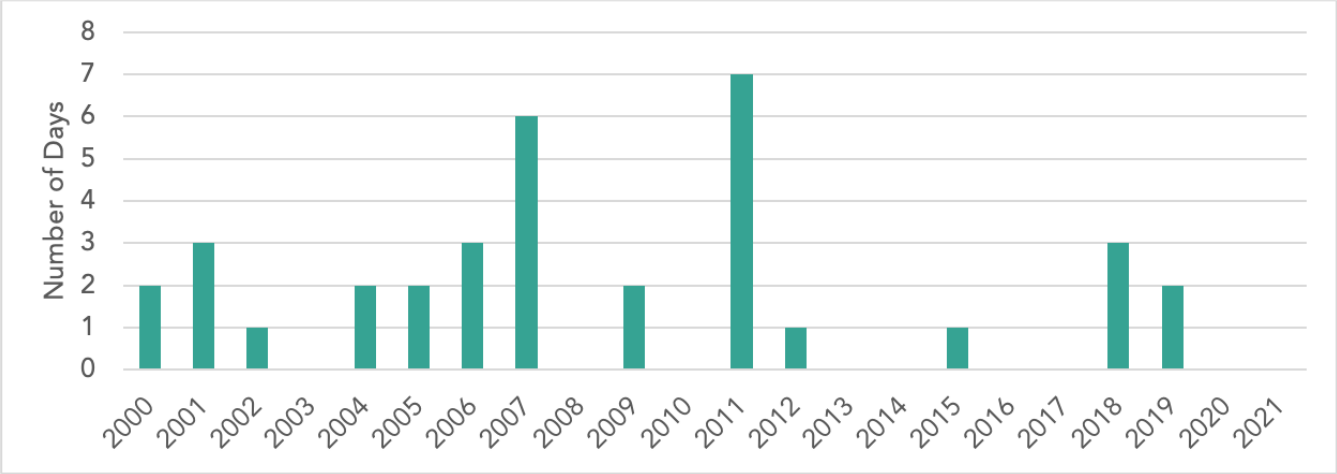


Figure 3: Number of days above 35 ug/m^3 during January and December of each year (including wildfire exceptional events).



IV. Second Period Maintenance Demonstration

Attainment Year Emission Inventory Projection

To demonstrate maintenance of the 35 µg/m^3 24-hour PM2.5 standard through the year 2035, the District and CARB compiled an emission inventory for a base year (2020) and projected the emission inventory for the maintenance years (2024 and 2035) as well as an intermediate year (2026). The reasons to use 2020 as the base year for the emission inventory are (1) U.S. EPA issued 2020 National Emission Inventory (NEI), and (2) it is within the 2019-2021 period that is used to calculate the 2021 design value. Due to the nature of PM2.5 exceedances in the Yuba City-Marysville area, winter inventories are included in the plan. The base year emission inventory includes primary PM2.5 emissions and precursor emissions such as oxides of nitrogen (NOx), reactive organic gases (ROGs), oxides of sulfur (SOx) and ammonia (Table 1). The biggest reduction is found in NOx emissions with a 42.1 percent decrease in 2035 from 2020.

The contributions from source categories to the base year emissions can be found in Table 2. Areawide sources are the biggest contributors to primary PM2.5, ROGs and ammonia emissions, while mobile sources (both on-road and others) are the dominant contributors to NOx emissions, which is the most important PM2.5 precursor in demonstrating maintenance for the Yuba City-Marysville area. CARB's commitment to continued reduction in NOx emissions from mobile sources plays an important role in the projected reduction in NOx emission in the Yuba City-Marysville area through the second maintenance period.

Table 1: Emission inventory for primary PM2.5 and precursors.

Average Winter Day Anthropogenic Emission Inventory (tons/day)	2020	2024	2026	2035
PM2.5	4.480	4.401	4.401	4.443
NOx	8.267	6.517	5.929	4.786
ROGs	13.792	12.875	12.482	11.203
SOx	0.281	0.280	0.281	0.285
Ammonia	4.237	4.189	4.174	4.124

Table 2: Base year (2020) emission inventory for each pollutant by source categories (tons/day).

Average Winter Day Inventory	PM2.5	NOx	ROGs	SOx	Ammonia
Total Anthropogenic	4.480	8.267	13.792	0.281	4.237
Stationary	0.795	1.414	3.565	0.102	0.155
Areawide	3.378	0.869	5.742	0.104	3.960
On-Road Motor Vehicles	0.126	2.870	1.000	0.019	0.119
Other Mobile	0.181	3.115	3.484	0.056	0.003
Soil and Biogenic Sources	N/A	0.268	16.016	N/A	0.238

Motor Vehicle Emission Budget

Section 176(c) of the Act establishes transportation conformity requirements intended to ensure that transportation activities do not interfere with air quality. Transportation plans, programs, and projects that obtain federal funds or approvals must be shown to conform to applicable SIPs before being approved by a Metropolitan Planning Organization (MPO). The transportation plans must not result in emissions that exceed the motor vehicle budget, that is the portion of the total emissions inventory from on-road highway and transit vehicles in all RFP milestone years and the attainment year meeting Act requirements.

The Plan establishes PM2.5 and NOx transportation conformity budgets for 2026 and 2035 to ensure that future emissions from on-road mobile sources provide for continuing attainment of the 35 $\mu g/m^3$ 24-hour PM2.5 standard (Table 3). The District determined that mobile source emissions of ROGs, 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. The Sacramento Area Council of Governments, the local MPO, adopted the motor vehicle emissions budgets during their board meeting on March 16th, 2023.

Table 3: Motor vehicle emissions budgets (tons/day)

	$PM_{2.5}$	NOx

Emission Source Type	2026	2035	2026	2035
On-Road Motor Vehicles	0.1	0.2	1.3	0.8

Maintenance Demonstration

In order to demonstrate maintenance of the 35 µg/m^3 24-hour PM2.5 standard through the year 2035, the District and CARB compiled an emission inventory for the base year (2020), an intermediate year (2026) and the attainment year (2035). 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 if future emissions are kept below the attainment year emissions. The District also includes the PM2.5 chemical compositions in the Yuba City-Marysville area to evaluate the impact from the emissions of PM2.5 precursors to the design value calculation. The intermediate and attainment year inventories include banked Emission Reduction Credits (ERCs) to demonstrate that the addition of ERCs will not compromise maintenance of attainment.

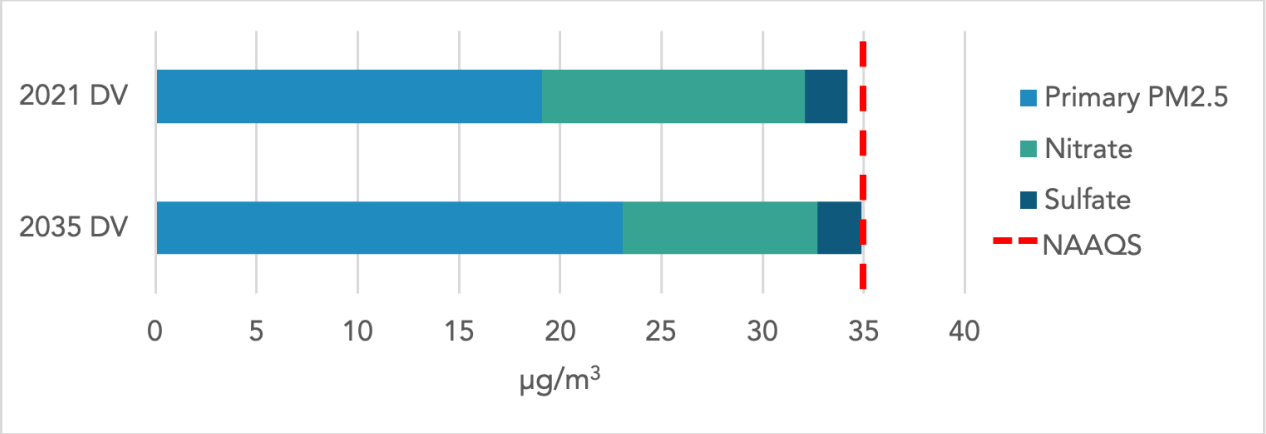
The maintenance demonstration includes emissions of direct PM2.5, SOx, and NOx (Table 4). The District argued that ROG and ammonia emissions are not significant in order for the area to maintain the standard for the reasons that (1) there are no major stationary sources of ammonia and existing major stationary sources of ROG were found to be adequately controlled, and (2) the Yuba City-Marysville area was able to maintain the 35 µg/m^3 24-hour PM2.5 standard without additional ROG and ammonia controls.

To ensure a reasonable amount of safety margin in demonstrating maintenance in 2035, the District made the assumptions below. First, all currently available NOx and PM10 ERCs are included in the emission inventory projection for 2026 and 2035. Using PM10 ERCs will be an overestimate of PM2.5 emissions since PM2.5 is a fraction of PM10 emissions. Second, the District limits the SOx ERC usage at 0.01 tons/day and intends this to be federally enforceable. These efforts result in a 33.4 percent reduction in NOx emissions in 2025 from 2020, and a 20.7 percent and 5 percent increase in PM2.5 and SOx emissions, respectively, for the same period (Table 4).

Table 4: The changes in emission from base year (2020) to intermediate year (2026) and attainment year (2035) in tons/day.

Pollutant	2020	2026 (with ERCs)	2035 (with ERCs)	Projected Change	% Change
NOx	8.267	6.649	5.503	-2.764	-33.4%
PM2.5	4.48	5.271	5.406	+0.926	+20.7%
SOx	0.281	0.291	0.295	+0.014	+5%

Figure 4: 2021 and Projected 2035 Design Values and PM2.5 Composition.



Based on the best estimate of PM2.5 composition of the area, combined with the projection in emission inventory and adjustment for a NOx to nitrate ratio of 1:0.7 (which leads to slight increase in the design value), the District estimated that the 24-hour PM2.5 design value in 2035 will be 34.8 µg/m^3, a 0.7 µg/m^3 increase from the 2021 value and still maintains the standard (Figure 4). This is likely an upper limit given all the conservative approaches made in the process. The main source of reduction is from the decrease in the projected NOx emissions in 2035.

PM2.5 Monitoring Network Plan

The Yuba City-Marysville area has one monitoring site at Yuba City-Almond Street (site number 06-101-0003) that collects PM2.5 air quality data that is operated by CARB (**Error! Reference source not found.**). The monitoring site used to be equipped with a Federal Reference Monitor (FRM) that collected daily PM2.5 until April 9, 2020, when it was replaced with a Federal Equivalence Method (FEM) Beta Attenuation Monitor (BAM) 1020 continuous monitor. Currently, the BAM monitor provides 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. The District and CARB are committed to the continued operation of the monitoring site and compliance with federal law on Ambient Air Quality Surveillance (40 CFR Part 58).

Verification of Continued Attainment

CARB is responsible for monitoring PM2.5 air quality within the Yuba City-Marysville area. CARB 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 District and CARB commit 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 35 µg/m^3 24-hour PM2.5 standard, CARB will continue to conduct PM2.5 monitoring and expeditiously review data as it becomes available to evaluate any risk of impending violations.

The District will track the progress of the maintenance plan through the acquisition of ambient and source emission data. All permitted stationary sources within the District are required to submit annual throughput data that the District uses to compile the emission inventory. The District will commit to review the emission inventory for unexpected growth in primary PM2.5 or NOx that may jeopardize the maintenance of the standard. The District also delivers a comprehensive stationary source emission inventory every three years to CARB for submission under 40 CFR Part 51, Subpart A.

Contingency Plans

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 plans are adopted once they are triggered.

The District will use the 24-hour design value of 35.0 µg/m^3 as the contingency plan action trigger. The District will use the annual data certification date (usually May 1st every year) to start an annual data report process. The District and CARB will examine the certified data from the past three years to calculate the design value for the past year. If the design value exceeds the standard, within 60 days the District will commence review and submit a report to CARB on whether the primary continency plan has been triggered. If the District believes that the standard is exceeded due to exceptional events, the District and CARB will prepare an Initial Notification Submittal and submit it to U.S. EPA. If U.S. EPA agrees with the submittal, the exceptional events will be removed from the design value calculation, and contingency plans will not be triggered. If U.S. EPA disagrees with the submittal, contingency plans will be triggered. The District will complete sufficient analyses to determine the cause of the exceedance and begin the necessary steps for ensuring the attainment and maintenance of the standard. If new rules are necessary, they would be adopted by August 31st of the year following the completed analysis. This approach is consistent with a previously approved PM2.5 maintenance plan.[3]

The contingency measures that will be considered for adoption upon a trigger of the contingency plan include voluntary measures, reasonably available control technology on stationary sources, additional open burning restrictions on agricultural or residential burning, fugitive dust and opacity restrictions, and imposing mandatory restrictions on wood burning devices during forecasted high PM2.5 days. CARB staff believes the contingency plan in this Plan are adequate to protect air quality in the area.

[3] EPA Region 9 approved a similar approach for Arizona's Nogales PM2.5 Maintenance Plan & Redesignation Request, available in Section 5.5. at *ADEQ Letterhead (azdeq.gov)*, approved by EPA on August 15, 2022 at 87 FR 49997.

California Environmental Quality Act

The California Environmental Quality Act (CEQA) requires that State and local agency projects be assessed for potential environmental impacts. An air quality plan may be a "project" that is potentially subject to CEQA requirements. The District found that the proposed Plan will not result in any potentially significant adverse effects on the environment and is exempt from CEQA pursuant to CEQA Guidelines Sections (14 CCR 15061(b)(3) and 15308).

CARB has determined that the Plan is exempt from CEQA under the general rule or "common sense" exemption (14 CCR 15061(b)(3)). CEQA Guidelines states "the activity is covered by the general rule that CEQA applies only to projects which have the potential for causing a significant effect on the environment. Where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA".

CARB has also determined that the Plan is categorically exempt from CEQA under the "Class 8" exemption (14 CCR 15308) because it is an action taken by a regulatory agency for the protection of the environment. The contingency measures included in the Plan, if triggered, are expected to further reduce the emissions of primary PM2.5 and PM2.5 precursors and improve air quality.

Based on CARB's review, it can be seen with certainty that there is no possibility that the Plan may result in a significant adverse impact on the environment. Further, the Plan is designed to protect the environment and CARB found no substantial evidence indicating the Plan could adversely affect air quality or any other environmental resource area, or that any of the exceptions to the exemption applies (14 CCR 15300.2). Therefore, this Plan is exempt from CEQA.

V. Staff Recommendation

CARB staff has reviewed the Plan for the Yuba City-Marysville area and has consulted with District and U.S. EPA staff during this review. CARB staff finds that the Plan meets all applicable Act requirements. The monitoring data shows that the area has maintained attainment of the 35 $\mu g/m^3$ 24-hour PM2.5 standard, and the maintenance demonstration shows that the standard will be maintained through 2035. Therefore, CARB staff recommends that the Executive Officer adopt the Yuba City-Marysville PM2.5 2nd Maintenance Plan as a revision to the California SIP for submittal to U.S. EPA.