

State of California



California Environmental Protection Agency

Staff Report

**Minor Updates to Yuba City-Marysville
PM2.5 Maintenance Plan and Redesignation
Request**

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I. BACKGROUND

In December 2006, the U.S. Environmental Protection Agency (U.S. EPA) lowered the 24-hour national ambient air quality standard (standard) for PM_{2.5} from 65 µg/m³ to 35 µg/m³. Effective December 14, 2009, U.S. EPA designated the Yuba City-Marysville Area as nonattainment for this more stringent 24-hour PM_{2.5} standard. The federal Clean Air Act (CAA) establishes planning requirements for those areas that exceed the health-based standards. These nonattainment areas must develop and implement a State Implementation Plan (SIP) that demonstrates how they will attain the standards by specified dates.

Since the Yuba City-Marysville nonattainment area attained the 24-hour PM_{2.5} 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 Feather River Air Quality Management District (District) addressed the remaining SIP requirements in the *Yuba City-Marysville PM_{2.5} Nonattainment Area Redesignation Request and Maintenance Plan* (Redesignation Request/Maintenance Plan). The Redesignation Request/Maintenance Plan was approved by the District Board and by the Air Resource Board (ARB) on April 1, 2013 and April 25, 2013, respectively. On May 23, 2013, ARB submitted the plan to U.S. EPA.

In 2013, U.S. EPA was directed by the Courts to implement the PM_{2.5} standard under subpart 4 of the Clean Air Act (Act) rather than subpart 1. In order to evaluate and approve the Redesignation Request/Maintenance Plan under subpart 4 of the Act, U.S. EPA staff requested additional technical information on several elements of the Plan. The *Minor Updates to Yuba City-Marysville PM_{2.5} Maintenance Plan and Redesignation Request* (Minor Updates) provides U.S. EPA with the additional information to approve the Redesignation Request/Maintenance Plan and redesignate the Yuba City-Marysville PM_{2.5} nonattainment area to attainment for the PM_{2.5} standard.

II. REVISED EMISSION INVENTORY

In order to address subpart 4 requirements, emission inventories that were originally submitted as part of the Redesignation Request/Maintenance Plan are expanded to include ammonia (NH₃) and Volatile Organic Carbon (VOC). To support the maintenance demonstration and document the emission reductions that provided for attainment, the 2011 attainment year emission inventory was augmented with an earlier year inventory, 2005, when the region was still over the 24-hour PM_{2.5} standard. Table 1 lists NO_x, PM_{2.5}, SO_x, NH₃, and VOCs emissions for 2005, 2011, 2017, and 2024.

Table 1. Yuba City-Marysville PM2.5 Nonattainment Area Emission Inventories*

Category	2005	2011	2017	2024
NOx				
Stationary Sources	4.4941	4.3908	4.7717	4.3239
Areawide Sources	1.1075	1.0876	1.2791	1.2748
Mobile Total	20.9369	13.8089	9.7553	6.3056
On-Road Mobile	12.8955	8.3763	5.3**	3.1**
Other Mobile	8.0414	5.4326	4.6179	3.3593
Grand Total	26.5385	19.2873	15.9687	12.0580
PM2.5				
Stationary Sources	0.9812	0.8732	1.0446	1.1248
Areawide Sources	4.0302	3.8288	4.0732	3.9642
Mobile Total	0.7698	0.5568	0.389	0.3171
On-Road Mobile	0.3557	0.2688	0.2**	0.2**
Other Mobile	0.4141	0.288	0.2182	0.1438
Grand Total	5.7812	5.2588	5.5360	5.4328
SOx				
Stationary Sources	0.1295	0.1254	0.2375	0.2387
Areawide Sources	0.1555	0.1478	0.2518	0.2471
Mobile Total	0.2887	0.0806	0.0845	0.0848
On-Road Mobile	0.0887	0.0246	0.028	0.28
Other Mobile	0.2	0.056	0.0563	0.0567
Grand Total	0.5737	0.3538	0.5738	0.5706
NH3				
Stationary Sources	0.306	0.3575	0.4131	0.483
Areawide Sources	4.5568	4.4945	4.3461	4.2563
Mobile Total	0.2245	0.1946	0.1702	0.1629
On-Road Mobile	0.2225	0.1926	0.1682	0.1609
Other Mobile	0.002	0.002	0.002	0.002
Grand Total	5.0873	5.0466	4.9294	4.9022
VOCs				
Stationary Sources	3.8225	4.0252	4.5383	4.107
Areawide Sources	5.754	5.4627	6.2757	6.4784
Mobile Total	6.6997	5.1509	3.4347	2.8421
On-Road Mobile	3.7252	2.8017	1.4752	1.1129
Other Mobile	2.9745	2.3492	1.9595	1.7292
Grand Total	16.2762	14.6388	14.2487	13.4275

* Displayed to ten thousandths place to show change in emission.

** Future year on-road mobile inventory for NOx and PM2.5 replaced with motor vehicle emission budgets.

III. ADDITIONAL ANALYSES SUPPORTING ATTAINMENT RESULTS FROM PERMANENT AND ENFORCEABLE EMISSION REDUCTIONS

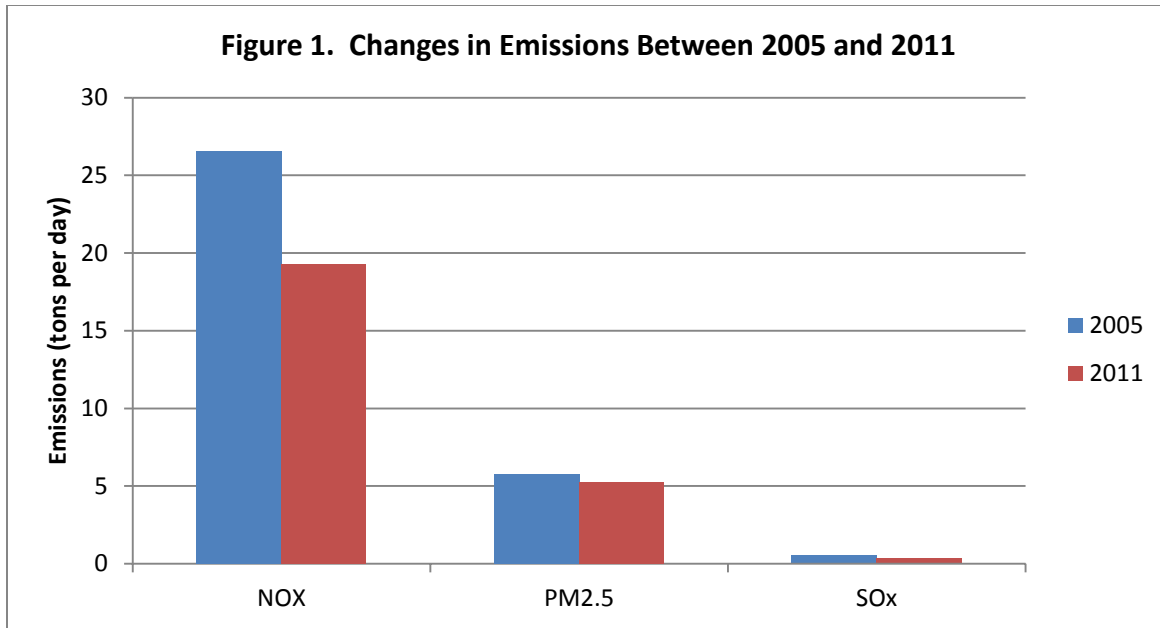
The CAA requires demonstration that the air quality improvement that resulted in attainment of the standard can be reasonably attributed to permanent and enforceable emission reductions. The Yuba City-Marysville Area first attained the standard in 2008 and continues to attain through 2012. The 24-hour design value decreased from 36 $\mu\text{g}/\text{m}^3$ in 2005 to 26 $\mu\text{g}/\text{m}^3$ in 2012. This is a 10 $\mu\text{g}/\text{m}^3$ decrease, which represents a 28 percent reduction. The 2012 design value is 26 percent below the standard.

The analyses presented in this section provides additional information requested by U.S. EPA that the improvement in PM_{2.5} air quality can be reasonably attributed to permanent and enforceable emission reductions of directly emitted PM_{2.5} and PM_{2.5} precursors and was not a result of adverse economy or unusually favorable meteorological conditions.

Permanent and enforceable emission reductions

Between 2005 and 2011, emissions of directly emitted PM_{2.5} and PM_{2.5} precursors declined significantly as a result of control measures listed in Tables VI-5 and VI-6 of the Redesignation Request/Maintenance Plan. These permanent and enforceable reductions in directly emitted PM_{2.5} and PM_{2.5} precursors resulted in improvements in air quality. The majority of reductions are a result of ARB's statewide motor vehicle regulations listed in Table VI-6, including NO_x control programs and fleet rules to reduce both NO_x and PM from diesel engines.

Tables 2 through 8 and Figure 1 compare 2005 and 2011 emission year inventories, demonstrating that the controls listed in Tables VI-5 and VI-6 of the Redesignation Request/Maintenance Plan contributed to reductions in PM_{2.5} emissions, which in turn lead to reductions in PM_{2.5} concentrations. Table 2 summarizes 2005 and 2011 emissions by major source category and by pollutant. Comparison of the 2005 and 2011 inventories reveals that directly emitted PM_{2.5} emissions decreased 9 percent, NO_x emissions decreased 27 percent, and SO_x emissions decreased 38 percent. These reductions were primarily associated with mobile source categories, both on-road and off-road. Tables 3 through 8 show changes in these two categories.



Data in Tables 2 through 8 displayed to ten thousandths place to show change in emissions.

Table 2. Yuba City-Marysville PM2.5 Nonattainment Area 2005 and 2011 Emission Changes

Source Category	2005 tpd	2011 tpd	2005-2011 Reductions	
			tpd	%
NOx				
Stationary Sources	4.4941	4.3908	0.103	2
Areawide Sources	1.1075	1.0876	0.020	2
On-Road Mobile Sources	12.8955	8.3763	4.519	35
Other Mobile Sources	8.0414	5.4326	2.609	32
All Sectors	26.5385	19.2873	7.251	27
PM2.5				
Stationary Sources	0.9812	0.8732	0.108	11
Areawide Sources	4.0302	3.8288	0.201	5
On-Road Mobile Sources	0.3557	0.2688	0.087	24
Other Mobile Sources	0.4141	0.288	0.126	30
All Sectors	5.7812	5.2588	0.522	9
SOx				
Stationary Sources	0.1295	0.1254	0.004	3
Areawide Sources	0.1555	0.1478	0.008	5
On-Road Mobile Sources	0.0887	0.0246	0.064	72
Other Mobile Sources	0.2	0.056	0.144	72
All Sectors	0.5737	0.3538	0.220	38

Table 3. 2005-2011 NOx Emission Changes in On-Road Mobile Source Categories

On-Road Mobile Source Categories	2005	2011	2005-2011 Reductions	
	tpd	tpd	tpd	%
HEAVY HEAVY DUTY DIESEL TRUCKS (HHDV)	6.3103	3.5449	2.7654	44
LIGHT DUTY TRUCKS - 1 (LDT1)	0.2318	0.1342	0.0976	42
OTHER BUSES - MOTOR COACH - DIESEL (OBC)	0.0439	0.0266	0.0173	39
MEDIUM HEAVY DUTY DIESEL TRUCKS (MHDV)	1.1794	0.7189	0.4605	39
LIGHT DUTY PASSENGER (LDA)	1.0787	0.6751	0.4036	37
ALL OTHER BUSES - DIESEL (OBD)	0.0278	0.0185	0.0093	33
LIGHT DUTY TRUCKS - 2 (LDT2)	1.0969	0.74	0.3569	33
SCHOOL BUSES - DIESEL (SBD)	0.0662	0.0481	0.0181	27
LIGHT HEAVY DUTY GAS TRUCKS - 2 (LHDV2)	0.018	0.014	0.0040	22
MEDIUM DUTY TRUCKS (MDV)	0.9216	0.7769	0.1447	16
LIGHT HEAVY DUTY DIESEL TRUCKS - 1 (LHDV1)	1.2607	1.0665	0.1942	15
HEAVY DUTY DIESEL URBAN BUSES (UB)	0.0377	0.0325	0.0052	14
LIGHT HEAVY DUTY DIESEL TRUCKS - 2 (LHDV2)	0.1761	0.1526	0.0235	13
OTHER BUSES - GAS (OBG)	0.0094	0.0083	0.0011	12
MEDIUM HEAVY DUTY GAS TRUCKS (MHDV)	0.0507	0.0453	0.0054	11
LIGHT HEAVY DUTY GAS TRUCKS - 1 (LHDV1)	0.271	0.2487	0.0223	8
HEAVY DUTY GAS URBAN BUSES (UB)	0.009	0.0084	0.0006	7
MOTOR HOMES (MH)	0.0412	0.0385	0.0027	7
SCHOOL BUSES - GAS (SBG)	0.0034	0.0032	0.0002	6

Table 4. 2005-2011 NOx Emission Changes in 'Other Mobile Source Categories'

Other Mobile Source Categories	2005	2011	2005-2011 Reductions	
	tpd	tpd	tpd	%
OFF-ROAD EQUIPMENT	2.3139	1.1788	1.135	49
TRAINS	1.9447	1.2534	0.699	36
FARM EQUIPMENT	3.3499	2.5708	0.779	23
RECREATIONAL BOATS	0.0575	0.0536	0.004	7

Table 5. 2005-2011 PM2.5 Emission Changes in On-Road Mobile Source Categories

On-Road Mobile Source Categories	2005	2011	2005-2011 Reductions	
	tpd	tpd	tpd	%
MEDIUM HEAVY DUTY DIESEL TRUCKS (MHDV)	0.0459	0.028	0.0179	39
ALL OTHER BUSES - DIESEL (OBD)	0.0013	0.0008	0.0005	38
HEAVY HEAVY DUTY DIESEL TRUCKS (HHDV)	0.1941	0.1273	0.0668	34
OTHER BUSES - MOTOR COACH - DIESEL (OBC)	0.0012	0.0008	0.0004	33
SCHOOL BUSES - DIESEL (SBD)	0.0041	0.0029	0.0012	29
LIGHT HEAVY DUTY DIESEL TRUCKS - 1 (LHDV1)	0.0187	0.0175	0.0012	6
MEDIUM DUTY TRUCKS (MDV)	0.0181	0.0174	0.0007	4

Table 6. 2005-2011 PM2.5 Emission Changes in 'Other Mobile Source Categories'

Other Mobile Sources	2005	2011	2005-2011 Reductions	
	tpd	tpd	tpd	%
OFF-ROAD EQUIPMENT	0.1135	0.0586	0.055	48
TRAINS	0.0517	0.0323	0.019	38
FARM EQUIPMENT	0.1903	0.1424	0.048	25
RECREATIONAL BOATS	0.0181	0.0145	0.004	20
OFF-ROAD RECREATIONAL VEHICLES	0.0015	0.0012	<0.001	20

Table 7. 2005-2011 SOx Emission Changes in On-Road Mobile Source Categories

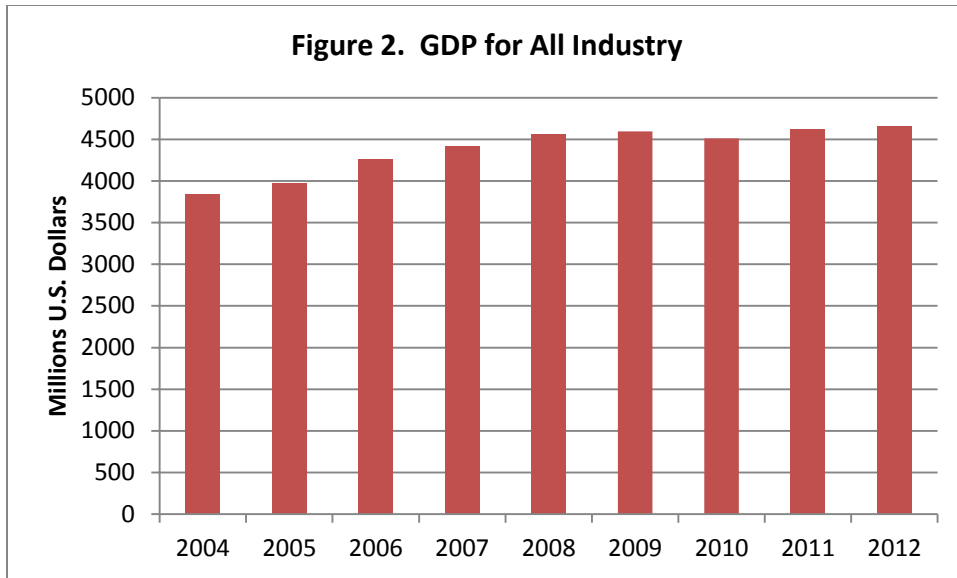
On-Road Mobile Source Categories	2005	2011	2005-2011 Reductions	
	tpd	tpd	tpd	%
SCHOOL BUSES - DIESEL (SBD)	0.0005	<0.0001	>0.0004	>90
OTHER BUSES - MOTOR COACH - DIESEL (OBC)	0.0003	<0.0001	>0.0002	>90
ALL OTHER BUSES - DIESEL (OBD)	0.0003	<0.0001	>0.0002	>90
MOTOR HOMES (MH)	0.0002	<0.0001	>0.0001	>90
MEDIUM HEAVY DUTY DIESEL TRUCKS (MHDV)	0.0101	0.0009	0.0092	91
HEAVY HEAVY DUTY DIESEL TRUCKS (HHDV)	0.0511	0.0048	0.0463	91
LIGHT HEAVY DUTY DIESEL TRUCKS - 1 (LHDV1)	0.009	0.0010	0.0080	89
LIGHT HEAVY DUTY DIESEL TRUCKS - 2 (LHDV2)	0.0013	0.0002	0.0011	85
HEAVY DUTY DIESEL URBAN BUSES (UB)	0.0005	0.0001	0.0004	80

Table 8. 2005-2011 SOx Emission Changes in 'Other Mobile Source Categories'

Other Mobile Source Categories	2005	2011	2005-2011 Reductions	
	tpd	tpd	tpd	%
TRAINS	0.1113	0.0010	0.110	99
OFF-ROAD EQUIPMENT	0.0105	0.0003	0.010	97
FARM EQUIPMENT	0.0263	0.0028	0.024	89

Role of economic conditions and meteorology

The improvement in air quality was not due to a decline in the economy. On the contrary, the economy grew about 20 percent between 2004 and 2012. Figure 2 shows Gross Domestic Product (GDP) for the Yuba City-Marysville Metropolitan Statistical Area. The increase in GDP between 2004 and 2012 is an indicator of economic progress.



Data source: U.S. Department of Commerce, Bureau of Economic Analysis

In addition, the air quality improvement was not due to favorable meteorological conditions. During the five year period, when the design values were below the standard, the area experienced a variety of meteorological conditions. For example, 2011 was extremely conducive to PM_{2.5} pollution, including a stagnation period that persisted for over 20 days. Despite this, 2011 and 2012 design values are significantly below the standard. The standard meteorological parameters, including annual average temperature and precipitation, were similar during the three recent years showing attainment (2010-2012) as well as the 2004-2006 nonattainment period (Table 9).

Table 9. Average Temperature and Precipitation

Year	Avg Temp (°F)	Avg Precipitation (in/year)
2004	62.6	20
2005	62.6	26
2006	62.6	20
2007	62.6	12
2008	62.6	16
2009	66.2	17
2010	62.6	23
2011	59.0	20
2012	62.6	25
2004-2006 Avg	62.6	22
2010-2012 Avg	62.6	23

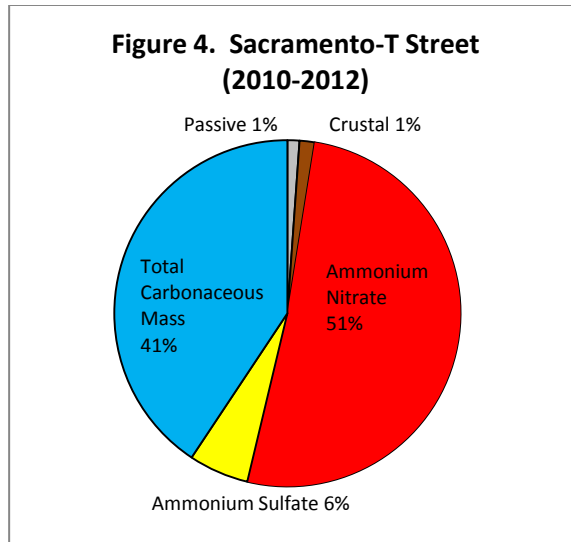
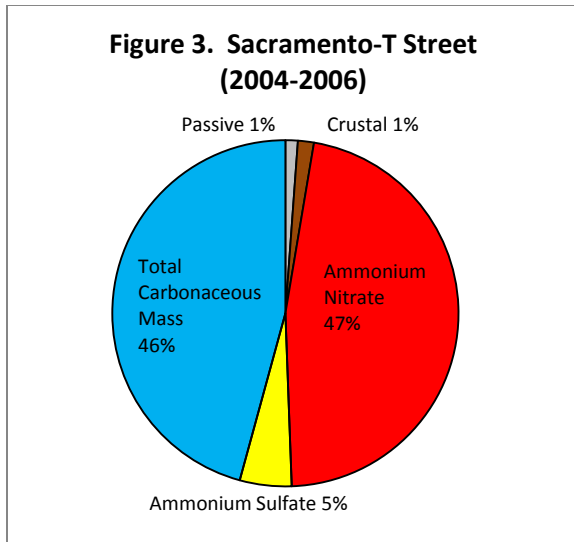
IV. DISCUSSION OF FUTURE YEAR COMPOSITION USED IN CALCULATION OF THE 2024 DESIGN VALUE

In the Redesignation Request/Maintenance Plan, the District assumed that the PM_{2.5} composition on high concentration days did not change between 2004-2006 and 2011. Due to the nature of the PM_{2.5} problem in the Yuba City-Marysville Area and the form of the standard, it is appropriate to assume that composition would not change significantly. Furthermore, control programs targeting all key contributors to PM_{2.5} mass lead to fairly equivalent reduction in key components.

Chemical composition data are not routinely collected at the Yuba City monitor. The only chemical composition data available for this area are 2004-2006 data analyzed by U.S. EPA to support the initial designations. Staff expect that despite a significant decline in emissions between 2005 and 2011, the chemical composition on a typical exceedance day would not change significantly. The meteorological phenomenon leading to high PM_{2.5} concentrations is the same today as it was in 2005. Under stagnant winter weather, elevated concentrations are due to the formation of secondary pollutants and the accumulation of primary-emitted PM_{2.5}. The declines in emissions reduced the frequency and magnitude of high concentration day events, but are expected to have little impact on exceedance day composition.

In addition, control programs targeted all key contributors to the PM_{2.5} mass. The two largest contributors to PM_{2.5} mass in the Yuba City-Marysville area are wood burning and ammonium nitrate. Concurrent reductions in both directly emitted PM_{2.5} and NO_x emission that contribute to these components. Therefore composition remains the same despite the decrease in PM_{2.5} levels.

Figures 3 and 4 show the changes in chemical composition on a typical exceedance at the Sacramento-T Street site (the closest site with chemical composition data and similar meteorological conditions) between 2004-2006 and 2010-2012. Despite the decrease in emissions over the years the composition in 2010-2012 is very similar to that in 2004-2006.



IV. CONTINGENCY PLAN

U.S. EPA requested additional clarification from the District related to timing associated with the contingency plan if the area were to fall out of attainment. On December 19, 2013, the District clarified several aspects of the contingency measure commitment in a letter to U.S. EPA and ARB. The District letter is included in Appendix A.

V. STAFF RECOMMENDATION

The *Minor Updates to Yuba City-Marysville PM_{2.5} Maintenance Plan and Redesignation Request* include additional supporting information and analysis as requested by U.S. EPA to facilitate their approval and redesignation to attainment for the PM_{2.5} standard. ARB staff recommends that the Board adopt the *Minor Updates* as a revision to the California SIP for submittal to U.S. EPA.

Appendix A

Feather River Air Quality Management District Letter



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December 19, 2013

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Richard Corey, Executive Officer
Air Resources Board
PO Box 2815
Sacramento, CA 95812

Dear Ms. Jordan and Mr. Corey,

The Feather River Air Quality Management District would like to clarify the contingency plan in the Yuba City-Marysville PM_{2.5} Nonattainment Area Redesignation Request and Maintenance Plan (Plan) adopted by the District's Board of Directors on April 1, 2013.

The Clean Air Act requires that each maintenance plan contain provisions to assure that the District will promptly correct any violation of the standard which occurs after the redesignation of the area as an attainment area (42 USC 7505a (d)). The contingency measures in the Plan are included in Chapter VII. In the Plan, the District described a process and timeline to occur should the standard be violated. The District identified the 24-hour PM_{2.5} design value as the "trigger" that would initiate the contingency plan. Within 60 days of the trigger the District shall commence analysis to determine if the exceedance was caused by an exceptional event or instrument malfunction, and also evaluate the meteorological conditions and the emissions inventory. Following the analysis, the contingency plan stated that the District shall consult with interested parties, community organizations, and industry to identify voluntary and incentive based measures to reduce directly emitted PM_{2.5} or precursor emissions that can be implemented prior to the next January 1st. If it is determined that the violation occurred due to sources within the District, then by November 1 of the year following the year in which the trigger was activated, the District will begin adoption of rules for ensuring attainment. The Plan committed to adopting rules by the following August 31 and required compliance within two years of rule adoption.

The U.S. Environmental Protection Agency Region 9 (US EPA R9) has requested clarification regarding the contingency plan measures. The District would like to clarify the contingency plan by committing to actions occurring within a number of months rather than calendar dates.

The voluntary and incentive based measures would be implemented within nine (9) months after the trigger activation.

The District would like to clarify that, if new or revised rules are necessary to ensure attainment, each rule would be adopted and implemented promptly and expediently, but not later than 18 to 24 months after trigger activation. The intent of this clarification is for the 18-24 month time frame described immediately above to replace the time frame described in the maintenance plan adopted on April 1, 2013.

The District contingency plan also listed several measures that may be considered for adoption upon trigger activation. These included: Reasonably Available Control Technology on stationary sources, opening burning restrictions, fugitive dust and opacity restrictions, and restrictions on residential wood burning devices. The US EPA R9 asked the District to clarify which measures would be considered. The District would consider the following measures in its analysis:

Source Category:	Control Measures To Consider:
Stationary Sources	Combustion Devices (Boilers, incinerators, engines, and turbines)
	Industrial Processes (Manufacturing, industrial, agricultural, oil and gas)
Opening Burning Restrictions	Managed Burning (Agricultural and residential opening burning)
	Prescribed Burning
Fugitive Dust	Paved Roads (Truck covering, construction site measures, storm water drainage)
	Unpaved Roads (Paving and surface improvements, chemical stabilization, speed reduction)
	Construction and Demolition (Truck covering, access areas, watering)
	Storage Piles (wet suppression and dust control)
	Agricultural Processes (Reducing dust from tilling, harvesting, processing; also conservation)
Opacity Restrictions	Visible emissions limitations
Residential Wood Burning Devices	Mandatory curtailment, conversion/upgrade of existing devices, restrictions on new devices)

The list is for clarification purposes and would not limit the District in considering additional rules based on the results of the analysis as to the source of the exceedance.

The District is committed to working with US EPA R9 staff to provide any additional clarifying information you may need to ensure expeditious approval of the Maintenance Plan and Redesignation Request for the Yuba City-Marysville PM2.5 Nonattainment Area. If you have questions or would like additional information, please have your staff contact Ms. Sondra Spaethe, Air Quality Planner, at (530) 634-7659 ext. 210.

Regards,



Christopher D. Brown, AICP
Air Pollution Control Officer

CDB/sls
File: Chron

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