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TABLE OF CONTENTS

TABLE OF TABLES

Chapter 5: Emissions Inventory

Emissions inventories are one of the fundamental building blocks in the development of an attainment plan. Emissions inventories serve as 1) a primary input to air quality modeling used in attainment demonstrations; 2) the emissions data used for developing control strategies; and 3) a means to track progress in meeting the emission reduction commitments. The inventories in this appendix are used to study and propose control measures, to track emissions for Reasonable Further Progress (RFP), to establish motor vehicle conformity budgets for transportation planning, and to assist in demonstrating attainment.

Emissions inventories are an estimate of the air pollution emissions that are actually released into the environment. They are not measurements of ambient concentrations. The following are examples of pollution sources by key sectors:

- Industrial or stationary point sources (e.g., power plants and oil refineries);
- Area-wide sources (e.g., consumer products and residential fuel combustion);
- On-road sources (e.g., passenger vehicles and heavy-duty trucks);
- Off-road mobile sources (e.g., aircraft, trains, ships, recreational boats, construction equipment and farm equipment); and
- Non-anthropogenic (natural) sources (e.g., biogenic or vegetation, geogenic (petroleum seeps), and wildfires).

Emissions inventories are usually developed at various geographical resolutions encompassing district, air basin, and county levels. The inventories presented in this appendix are the emissions for the San Joaquin Valley Air Basin.

This section includes emissions for the San Joaquin Valley Air Basin for the years 2017 through 2031.[1] The tables in this section include:

- Table 5-1 Directly Emitted PM2.5
- Table 5-2 NOx
- Table 5-3 SOx
- Table 5-4 VOC
- Table 5-5 Ammonia

Tables 5-1 through 5-5 are followed by an overview of emissions inventory calculations and revisions.

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[1] Emission Inventory data source is CEPAM v.1.00.

5.1   EMISSIONS INVENTORY TABLES

Table 5-1 Directly Emitted PM2.5

SUMMARY CATEGORY NAME	PM2.5													
	Annual Average (tons/day)							Winter Average (tons/day)						
	2017	2019	2022	2025	2028	2030	2031	2017	2019	2022	2025	2028	2030	2031
STATIONARY SOURCES														
FUEL COMBUSTION														
ELECTRIC UTILITIES	1.1	1.0	1.0	0.9	0.8	0.7	0.7	1.1	1.0	1.0	0.9	0.8	0.7	0.7
COGENERATION	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
OIL AND GAS PRODUCTION (COMBUSTION)	1.9	1.8	1.6	1.5	1.4	1.3	1.3	1.9	1.8	1.6	1.5	1.4	1.3	1.3
PETROLEUM REFINING (COMBUSTION)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
MANUFACTURING AND INDUSTRIAL	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2
FOOD AND AGRICULTURAL PROCESSING	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4
SERVICE AND COMMERCIAL	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5
OTHER (FUEL COMBUSTION)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL FUEL COMBUSTION	**4.7**	**4.5**	**4.2**	**4.0**	**3.8**	**3.6**	**3.6**	**4.6**	**4.4**	**4.1**	**3.9**	**3.7**	**3.5**	**3.5**
WASTE DISPOSAL														
SEWAGE TREATMENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LANDFILLS	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
INCINERATORS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOIL REMEDIATION	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER (WASTE DISPOSAL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL WASTE DISPOSAL	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**
CLEANING AND SURFACE COATINGS														
LAUNDERING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEGREASING	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

PM2.5													
SUMMARY CATEGORY NAME	**Annual Average (tons/day)**							**Winter Average (tons/day)**						
	2017	**2019**	**2022**	**2025**	**2028**	**2030**	**2031**	**2017**	**2019**	**2022**	**2025**	**2028**	**2030**	**2031**
COATINGS AND RELATED PROCESS SOLVENTS	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
PRINTING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ADHESIVES AND SEALANTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER (CLEANING AND SURFACE COATINGS)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL CLEANING AND SURFACE COATINGS	**0.3**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.3**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**
PETROLEUM PRODUCTION AND MARKETING														
OIL AND GAS PRODUCTION	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PETROLEUM REFINING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PETROLEUM MARKETING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER (PETROLEUM PRODUCTION AND MARKETING)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL PETROLEUM PRODUCTION AND MARKETING	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**
INDUSTRIAL PROCESSES														
CHEMICAL	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
FOOD AND AGRICULTURE	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.4	0.4	0.4	0.5	0.5	0.5	0.5
MINERAL PROCESSES	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
METAL PROCESSES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WOOD AND PAPER	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
GLASS AND RELATED PRODUCTS	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1
ELECTRONICS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER (INDUSTRIAL PROCESSES)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
* TOTAL INDUSTRIAL PROCESSES	**2.6**	**2.6**	**2.5**	**2.5**	**2.5**	**2.5**	**2.6**	**2.3**	**2.3**	**2.3**	**2.2**	**2.2**	**2.3**	**2.3**
** TOTAL STATIONARY	**7.9**	**7.6**	**7.4**	**7.1**	**6.9**	**6.8**	**6.8**	**7.5**	**7.3**	**7.1**	**6.7**	**6.5**	**6.4**	**6.4**

PM2.5													
SUMMARY CATEGORY NAME	Annual Average (tons/day)							Winter Average (tons/day)						
	2017	2019	2022	2025	2028	2030	2031	2017	2019	2022	2025	2028	2030	2031
AREAWIDE SOURCES														
SOLVENT EVAPORATION														
CONSUMER PRODUCTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ARCHITECTURAL COATINGS AND RELATED PROCESS SOLVENTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES/FERTILIZERS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ASPHALT PAVING / ROOFING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL SOLVENT EVAPORATION	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
MISCELLANEOUS PROCESSES														
RESIDENTIAL FUEL COMBUSTION	3.3	3.1	3.0	3.0	3.0	3.0	3.0	6.1	5.6	5.5	5.5	5.5	5.5	5.5
FARMING OPERATIONS	13.2	13.1	13.0	12.9	12.8	12.7	12.7	9.4	9.3	9.2	9.1	9.0	9.0	9.0
CONSTRUCTION AND DEMOLITION	1.3	1.4	1.5	1.7	1.7	2.8	1.8	1.2	1.3	1.4	1.6	1.5	2.6	1.7
PAVED ROAD DUST	4.7	4.9	5.0	5.2	5.4	5.5	5.6	4.5	4.6	4.8	5.0	5.2	5.3	5.3
UNPAVED ROAD DUST	3.7	3.7	3.7	3.7	3.7	3.7	3.7	2.6	2.6	2.6	2.6	2.6	2.6	2.6
FUGITIVE WINDBLOWN DUST	7.4	7.3	7.3	7.2	7.1	7.1	7.1	4.7	4.6	4.6	4.5	4.4	4.4	4.4
FIRES	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
MANAGED BURNING AND DISPOSAL	13.2	16.1	13.2	6.0	6.0	5.9	5.9	15.8	21.1	14.9	5.1	5.1	5.0	5.0
COOKING	3.8	3.9	3.9	4.1	4.2	4.3	4.3	3.8	3.9	3.9	4.1	4.2	4.3	4.3
OTHER (MISCELLANEOUS PROCESSES)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL MISCELLANEOUS PROCESSES	**50.9**	**53.7**	**50.9**	**44.0**	**44.0**	**45.3**	**44.3**	**48.3**	**53.3**	**47.1**	**37.7**	**37.7**	**38.9**	**38.0**
** TOTAL AREAWIDE	**50.9**	**53.7**	**50.9**	**44.0**	**44.0**	**45.3**	**44.3**	**48.3**	**53.3**	**47.1**	**37.7**	**37.7**	**38.9**	**38.0**

	PM2.5													
SUMMARY CATEGORY NAME	Annual Average (tons/day)							Winter Average (tons/day)						
	2017	2019	2022	2025	2028	2030	2031	2017	2019	2022	2025	2028	2030	2031
MOBILE SOURCES														
ON-ROAD MOTOR VEHICLES														
LIGHT DUTY PASSENGER (LDA)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
LIGHT DUTY TRUCKS - 1 (LDT1)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LIGHT DUTY TRUCKS - 2 (LDT2)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
MEDIUM DUTY TRUCKS (MDV)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
LIGHT HEAVY DUTY TRUCKS - 1 (LHDT1)	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.3	0.2	0.2	0.2	0.2	0.2	0.1
LIGHT HEAVY DUTY TRUCKS - 2 (LHDT2)	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0
MEDIUM HEAVY DUTY TRUCKS (MHDT)	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.3	0.2	0.1	0.0	0.0	0.0	0.0
HEAVY HEAVY DUTY TRUCKS (HHDT)	1.5	1.1	0.6	0.5	0.5	0.5	0.6	1.5	1.1	0.6	0.5	0.5	0.5	0.6
MOTORCYCLES (MCY)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BUSES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MOTOR HOMES (MH)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL ON-ROAD MOTOR VEHICLES	2.7	2.2	1.6	1.4	1.3	1.3	1.3	2.7	2.3	1.6	1.4	1.3	1.3	1.3
OTHER MOBILE SOURCES														
AIRCRAFT	1.2	1.7	1.7	1.7	1.7	1.7	1.7	1.2	1.7	1.7	1.7	1.7	1.7	1.7
TRAINS	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
OCEAN GOING VESSELS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
COMMERCIAL HARBOR CRAFT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RECREATIONAL BOATS	0.6	0.6	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2
OFF-ROAD RECREATIONAL VEHICLES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OFF-ROAD EQUIPMENT	0.9	0.8	0.8	0.6	0.5	0.5	0.4	0.8	0.7	0.7	0.6	0.5	0.4	0.4
OFF-ROAD EQUIPMENT (PERP)	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1
FARM EQUIPMENT	2.4	1.9	1.6	1.3	1.1	0.9	0.9	1.5	1.2	1.0	0.8	0.7	0.6	0.6

PM2.5													
SUMMARY CATEGORY NAME	Annual Average (tons/day)							Winter Average (tons/day)						
	2017	2019	2022	2025	2028	2030	2031	2017	2019	2022	2025	2028	2030	2031
FUEL STORAGE AND HANDLING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL OTHER MOBILE SOURCES	**5.7**	**5.5**	**5.0**	**4.5**	**4.1**	**3.9**	**3.8**	**4.4**	**4.4**	**4.1**	**3.7**	**3.4**	**3.3**	**3.2**
** TOTAL MOBILE	**8.4**	**7.7**	**6.6**	**5.9**	**5.4**	**5.2**	**5.1**	**7.1**	**6.6**	**5.6**	**5.1**	**4.8**	**4.6**	**4.5**

GRAND TOTAL FOR SAN JOAQUIN VALLEY	2017	2019	2022	2025	2028	2030	2031	2017	2019	2022	2025	2028	2030	2031
	67.1	69.1	64.9	56.9	56.3	57.2	56.1	62.9	67.3	59.8	49.5	49.1	49.9	48.9

Table 5-2 NOx

SUMMARY CATEGORY NAME	NOx													
	Annual Average (tons/day)							Winter Average (tons/day)						
	2017	2019	2022	2025	2028	2030	2031	2017	2019	2022	2025	2028	2030	2031
STATIONARY SOURCES														
FUEL COMBUSTION														
ELECTRIC UTILITIES	2.8	2.6	2.5	2.5	2.3	2.2	2.2	2.8	2.6	2.5	2.4	2.3	2.2	2.2
COGENERATION	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
OIL AND GAS PRODUCTION (COMBUSTION)	2.8	2.5	2.2	1.8	1.6	1.4	1.4	2.7	2.5	2.2	1.8	1.6	1.4	1.4
PETROLEUM REFINING (COMBUSTION)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
MANUFACTURING AND INDUSTRIAL	1.4	1.4	1.4	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2
FOOD AND AGRICULTURAL PROCESSING	5.5	5.0	4.4	3.8	3.3	3.0	2.9	3.9	3.6	3.1	2.7	2.4	2.2	2.1
SERVICE AND COMMERCIAL	4.7	4.9	4.8	4.3	4.2	4.1	4.1	5.1	5.3	5.2	4.7	4.6	4.5	4.5
OTHER (FUEL COMBUSTION)	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4
* **TOTAL FUEL COMBUSTION**	**18.7**	**18.0**	**16.8**	**15.1**	**14.1**	**13.5**	**13.3**	**17.3**	**16.7**	**15.7**	**14.2**	**13.3**	**12.8**	**12.6**
WASTE DISPOSAL														
SEWAGE TREATMENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LANDFILLS	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
INCINERATORS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOIL REMEDIATION	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER (WASTE DISPOSAL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* **TOTAL WASTE DISPOSAL**	**0.3**	**0.3**	**0.3**	**0.2**	**0.2**	**0.2**	**0.2**	**0.3**	**0.3**	**0.3**	**0.2**	**0.2**	**0.2**	**0.2**
CLEANING AND SURFACE COATINGS														
LAUNDERING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEGREASING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
COATINGS AND RELATED PROCESS SOLVENTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PRINTING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

NOx													
SUMMARY CATEGORY NAME	Annual Average (tons/day)							Winter Average (tons/day)						
	2017	2019	2022	2025	2028	2030	2031	2017	2019	2022	2025	2028	2030	2031
ADHESIVES AND SEALANTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER (CLEANING AND SURFACE COATINGS)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL CLEANING AND SURFACE COATINGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PETROLEUM PRODUCTION AND MARKETING														
OIL AND GAS PRODUCTION	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1
PETROLEUM REFINING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PETROLEUM MARKETING	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
OTHER (PETROLEUM PRODUCTION AND MARKETING)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL PETROLEUM PRODUCTION AND MARKETING	0.3	0.3	0.3	0.2	0.2	0.2	0.1	0.3	0.3	0.3	0.2	0.2	0.2	0.1
INDUSTRIAL PROCESSES														
CHEMICAL	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
FOOD AND AGRICULTURE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MINERAL PROCESSES	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
METAL PROCESSES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WOOD AND PAPER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GLASS AND RELATED PRODUCTS	3.1	3.1	3.4	2.8	2.8	1.7	1.7	3.1	3.1	3.4	2.8	2.8	1.7	1.7
ELECTRONICS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER (INDUSTRIAL PROCESSES)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL INDUSTRIAL PROCESSES	3.6	3.7	3.9	3.3	3.3	2.3	2.3	3.6	3.7	3.9	3.3	3.3	2.3	2.3
** TOTAL STATIONARY	23.0	22.3	21.3	18.8	17.8	16.2	16.0	21.5	21.0	20.2	17.9	17.0	15.5	15.3

	NOx													
SUMMARY CATEGORY NAME	Annual Average (tons/day)							Winter Average (tons/day)						
	2017	2019	2022	2025	2028	2030	2031	2017	2019	2022	2025	2028	2030	2031
AREAWIDE SOURCES														
SOLVENT EVAPORATION														
CONSUMER PRODUCTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ARCHITECTURAL COATINGS AND RELATED PROCESS SOLVENTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES/FERTILIZERS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ASPHALT PAVING / ROOFING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL SOLVENT EVAPORATION	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
MISCELLANEOUS PROCESSES														
RESIDENTIAL FUEL COMBUSTION	5.3	5.2	4.9	4.7	4.6	4.5	4.4	7.5	7.4	6.9	6.6	6.4	6.3	6.3
FARMING OPERATIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONSTRUCTION AND DEMOLITION	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAVED ROAD DUST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UNPAVED ROAD DUST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FUGITIVE WINDBLOWN DUST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIRES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MANAGED BURNING AND DISPOSAL	6.9	7.2	6.8	1.8	1.8	1.8	1.8	9.1	9.6	8.9	2.3	2.2	2.2	2.2
COOKING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER (MISCELLANEOUS PROCESSES)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL MISCELLANEOUS PROCESSES	**12.3**	**12.4**	**11.7**	**6.5**	**6.4**	**6.3**	**6.2**	**16.7**	**17.0**	**15.9**	**8.9**	**8.7**	**8.6**	**8.5**
** TOTAL AREAWIDE	**12.3**	**12.4**	**11.7**	**6.5**	**6.4**	**6.3**	**6.2**	**16.7**	**17.0**	**15.9**	**8.9**	**8.7**	**8.6**	**8.5**

SUMMARY CATEGORY NAME	NOx													
	Annual Average (tons/day)							Winter Average (tons/day)						
	2017	2019	2022	2025	2028	2030	2031	2017	2019	2022	2025	2028	2030	2031
MOBILE SOURCES														
ON-ROAD MOTOR VEHICLES														
LIGHT DUTY PASSENGER (LDA)	7.3	5.8	4.2	3.2	2.6	2.2	2.1	8.1	6.4	4.7	3.6	2.9	2.5	2.3
LIGHT DUTY TRUCKS - 1 (LDT1)	2.0	1.8	1.2	0.8	0.6	0.4	0.4	2.2	2.0	1.4	0.9	0.6	0.5	0.4
LIGHT DUTY TRUCKS - 2 (LDT2)	5.9	4.3	3.2	2.4	2.0	1.7	1.6	6.5	4.8	3.6	2.7	2.2	1.9	1.8
MEDIUM DUTY TRUCKS (MDV)	7.7	6.4	4.6	3.1	2.2	1.8	1.6	8.6	7.2	5.1	3.5	2.4	2.0	1.8
LIGHT HEAVY DUTY TRUCKS - 1 (LHDT1)	8.4	7.4	6.0	4.5	3.3	2.7	2.4	8.6	7.6	6.2	4.6	3.4	2.8	2.5
LIGHT HEAVY DUTY TRUCKS - 2 (LHDT2)	2.1	1.9	1.6	1.2	1.0	0.8	0.8	2.2	2.0	1.6	1.3	1.0	0.8	0.8
MEDIUM HEAVY DUTY TRUCKS (MHDT)	9.6	7.7	3.6	2.3	1.7	1.5	1.3	9.8	7.8	3.7	2.3	1.8	1.5	1.4
HEAVY HEAVY DUTY TRUCKS (HHDT)	59.2	45.4	28.7	13.8	11.0	10.2	9.9	60.3	46.3	29.3	14.1	11.3	10.4	10.2
MOTORCYCLES (MCY)	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.4	0.3	0.3	0.3	0.2	0.2	0.2
BUSES	1.6	1.2	0.8	0.6	0.5	0.4	0.4	1.6	1.2	0.8	0.6	0.5	0.4	0.4
MOTOR HOMES (MH)	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.3	0.3	0.2	0.2	0.2	0.1	0.1
* TOTAL ON-ROAD MOTOR VEHICLES	**104.3**	**82.4**	**54.4**	**32.4**	**25.1**	**22.0**	**20.8**	**108.5**	**85.8**	**56.9**	**34.1**	**26.4**	**23.2**	**21.8**
OTHER MOBILE SOURCES														
AIRCRAFT	2.5	4.6	4.5	4.5	4.5	4.5	4.5	2.4	4.5	4.5	4.5	4.5	4.5	4.5
TRAINS	13.1	14.3	15.0	15.5	16.1	16.5	16.6	13.1	14.3	15.0	15.5	16.1	16.5	16.6
OCEAN GOING VESSELS	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1
COMMERCIAL HARBOR CRAFT	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
RECREATIONAL BOATS	2.7	2.6	2.5	2.4	2.4	2.4	2.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2
OFF-ROAD RECREATIONAL VEHICLES	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
OFF-ROAD EQUIPMENT	21.2	19.4	16.6	13.8	11.7	10.6	10.2	18.5	17.0	14.6	12.2	10.5	9.6	9.2
OFF-ROAD EQUIPMENT (PERP)	5.9	5.1	3.3	2.6	2.2	2.2	2.2	5.9	5.1	3.3	2.6	2.2	2.2	2.2
FARM EQUIPMENT	41.5	36.1	29.6	24.2	19.7	17.3	16.2	25.8	22.6	18.5	15.1	12.3	10.8	10.1

NOx													
SUMMARY CATEGORY NAME	Annual Average (tons/day)							Winter Average (tons/day)						
	2017	2019	2022	2025	2028	2030	2031	2017	2019	2022	2025	2028	2030	2031
FUEL STORAGE AND HANDLING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL OTHER MOBILE SOURCES	87.1	82.3	71.7	63.3	56.8	53.7	52.2	67.2	64.9	57.3	51.4	47.0	45.0	44.0
** TOTAL MOBILE	191.4	164.7	126.1	95.7	82.0	75.7	73.0	175.7	150.7	114.1	85.5	73.4	68.1	65.8

GRAND TOTAL FOR SAN JOAQUIN VALLEY	2017	2019	2022	2025	2028	2030	2031	2017	2019	2022	2025	2028	2030	2031
	226.7	199.5	159.1	121.1	106.2	98.2	95.2	213.9	188.8	150.2	112.3	99.2	92.2	89.6

Table 5-3 SOx

SUMMARY CATEGORY NAME	SOx													
	Annual Average (tons/day)							Winter Average (tons/day)						
	2017	2019	2022	2025	2028	2030	2031	2017	2019	2022	2025	2028	2030	2031
STATIONARY SOURCES														
FUEL COMBUSTION														
ELECTRIC UTILITIES	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
COGENERATION	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OIL AND GAS PRODUCTION (COMBUSTION)	0.7	0.6	0.6	0.5	0.5	0.5	0.4	0.7	0.6	0.6	0.5	0.5	0.5	0.4
PETROLEUM REFINING (COMBUSTION)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MANUFACTURING AND INDUSTRIAL	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
FOOD AND AGRICULTURAL PROCESSING	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2
SERVICE AND COMMERCIAL	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
OTHER (FUEL COMBUSTION)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL FUEL COMBUSTION	**1.6**	**1.6**	**1.5**	**1.4**	**1.4**	**1.3**	**1.3**	**1.6**	**1.6**	**1.5**	**1.4**	**1.4**	**1.3**	**1.3**
WASTE DISPOSAL														
SEWAGE TREATMENT	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
LANDFILLS	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
INCINERATORS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOIL REMEDIATION	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER (WASTE DISPOSAL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL WASTE DISPOSAL	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**
CLEANING AND SURFACE COATINGS														
LAUNDERING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEGREASING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
COATINGS AND RELATED PROCESS SOLVENTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PRINTING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	SOx													
SUMMARY CATEGORY NAME	Annual Average (tons/day)							Winter Average (tons/day)						
	2017	2019	2022	2025	2028	2030	2031	2017	2019	2022	2025	2028	2030	2031
ADHESIVES AND SEALANTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER (CLEANING AND SURFACE COATINGS)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL CLEANING AND SURFACE COATINGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PETROLEUM PRODUCTION AND MARKETING														
OIL AND GAS PRODUCTION	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.5	0.4	0.4	0.4	0.3	0.3	0.3
PETROLEUM REFINING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PETROLEUM MARKETING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER (PETROLEUM PRODUCTION AND MARKETING)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL PETROLEUM PRODUCTION AND MARKETING	0.5	0.5	0.4	0.4	0.3	0.3	0.3	0.5	0.5	0.4	0.4	0.3	0.3	0.3
INDUSTRIAL PROCESSES														
CHEMICAL	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
FOOD AND AGRICULTURE	0.5	0.4	0.4	0.5	0.5	0.5	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2
MINERAL PROCESSES	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
METAL PROCESSES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WOOD AND PAPER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GLASS AND RELATED PRODUCTS	1.5	1.5	1.6	1.5	1.5	1.5	1.5	1.5	1.5	1.6	1.5	1.5	1.5	1.5
ELECTRONICS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER (INDUSTRIAL PROCESSES)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1
* TOTAL INDUSTRIAL PROCESSES	2.8	2.8	2.8	2.8	2.8	2.9	2.9	2.5	2.5	2.6	2.5	2.6	2.6	2.6
** TOTAL STATIONARY	5.1	5.0	5.0	4.8	4.8	4.8	4.8	4.8	4.8	4.7	4.6	4.5	4.5	4.5

SUMMARY CATEGORY NAME	SOx													
	Annual Average (tons/day)							Winter Average (tons/day)						
	2017	2019	2022	2025	2028	2030	2031	2017	2019	2022	2025	2028	2030	2031
AREAWIDE SOURCES														
SOLVENT EVAPORATION														
CONSUMER PRODUCTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ARCHITECTURAL COATINGS AND RELATED PROCESS SOLVENTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES/FERTILIZERS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ASPHALT PAVING / ROOFING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL SOLVENT EVAPORATION	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
MISCELLANEOUS PROCESSES														
RESIDENTIAL FUEL COMBUSTION	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4
FARMING OPERATIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONSTRUCTION AND DEMOLITION	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAVED ROAD DUST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UNPAVED ROAD DUST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FUGITIVE WINDBLOWN DUST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIRES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MANAGED BURNING AND DISPOSAL	0.3	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.6	0.3	0.2	0.2	0.2	0.2
COOKING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER (MISCELLANEOUS PROCESSES)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL MISCELLANEOUS PROCESSES	**0.6**	**0.7**	**0.6**	**0.5**	**0.5**	**0.5**	**0.5**	**0.7**	**1.0**	**0.6**	**0.5**	**0.5**	**0.5**	**0.5**
** TOTAL AREAWIDE	***0.6***	***0.7***	***0.6***	***0.5***	***0.5***	***0.5***	***0.5***	***0.7***	***1.0***	***0.6***	***0.5***	***0.5***	***0.5***	***0.5***

	SOx													
SUMMARY CATEGORY NAME	**Annual Average (tons/day)**							**Winter Average (tons/day)**						
	2017	**2019**	**2022**	**2025**	**2028**	**2030**	**2031**	**2017**	**2019**	**2022**	**2025**	**2028**	**2030**	**2031**
MOBILE SOURCES														
ON-ROAD MOTOR VEHICLES														
LIGHT DUTY PASSENGER (LDA)	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
LIGHT DUTY TRUCKS - 1 (LDT1)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LIGHT DUTY TRUCKS - 2 (LDT2)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
MEDIUM DUTY TRUCKS (MDV)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
LIGHT HEAVY DUTY TRUCKS - 1 (LHDT1)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LIGHT HEAVY DUTY TRUCKS - 2 (LHDT2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MEDIUM HEAVY DUTY TRUCKS (MHDT)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HEAVY HEAVY DUTY TRUCKS (HHDT)	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.1
MOTORCYCLES (MCY)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BUSES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MOTOR HOMES (MH)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL ON-ROAD MOTOR VEHICLES	**0.6**	**0.6**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**
OTHER MOBILE SOURCES														
AIRCRAFT	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2
TRAINS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OCEAN GOING VESSELS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
COMMERCIAL HARBOR CRAFT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RECREATIONAL BOATS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OFF-ROAD RECREATIONAL VEHICLES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OFF-ROAD EQUIPMENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OFF-ROAD EQUIPMENT (PERP)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FARM EQUIPMENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOx													
SUMMARY CATEGORY NAME	**Annual Average (tons/day)**							**Winter Average (tons/day)**						
	2017	**2019**	**2022**	**2025**	**2028**	**2030**	**2031**	**2017**	**2019**	**2022**	**2025**	**2028**	**2030**	**2031**
FUEL STORAGE AND HANDLING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL OTHER MOBILE SOURCES	**0.2**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.2**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**
** TOTAL MOBILE	**0.8**	**0.9**	**0.8**	**0.8**	**0.8**	**0.8**	**0.8**	**0.7**	**0.8**	**0.8**	**0.8**	**0.8**	**0.7**	**0.7**

GRAND TOTAL FOR SAN JOAQUIN VALLEY	**2017**	**2019**	**2022**	**2025**	**2028**	**2030**	**2031**	**2017**	**2019**	**2022**	**2025**	**2028**	**2030**	**2031**
	6.43	**6.64**	**6.39**	**6.15**	**6.08**	**6.04**	**6.04**	**6.24**	**6.58**	**6.15**	**5.87**	**5.79**	**5.75**	**5.74**

Table 5-4 VOC

SUMMARY CATEGORY NAME	VOC													
	Annual Average (tons/day)							Winter Average (tons/day)						
	2017	2019	2022	2025	2028	2030	2031	2017	2019	2022	2025	2028	2030	2031
STATIONARY SOURCES														
FUEL COMBUSTION														
ELECTRIC UTILITIES	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1
COGENERATION	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
OIL AND GAS PRODUCTION (COMBUSTION)	1.1	1.1	1.0	0.9	0.8	0.8	0.8	1.1	1.1	1.0	0.9	0.8	0.8	0.8
PETROLEUM REFINING (COMBUSTION)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MANUFACTURING AND INDUSTRIAL	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2
FOOD AND AGRICULTURAL PROCESSING	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
SERVICE AND COMMERCIAL	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.7
OTHER (FUEL COMBUSTION)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL FUEL COMBUSTION	**3.3**	**3.2**	**3.1**	**2.9**	**2.8**	**2.7**	**2.7**	**3.2**	**3.1**	**3.0**	**2.8**	**2.7**	**2.6**	**2.6**
WASTE DISPOSAL														
SEWAGE TREATMENT	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
LANDFILLS	1.5	1.5	1.6	1.6	1.6	1.7	1.7	1.5	1.5	1.6	1.6	1.6	1.7	1.7
INCINERATORS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOIL REMEDIATION	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
OTHER (WASTE DISPOSAL)	21.6	21.9	21.7	22.7	23.5	24.2	24.6	21.5	21.9	21.7	22.7	23.5	24.2	24.6
* TOTAL WASTE DISPOSAL	**23.2**	**23.6**	**23.4**	**24.5**	**25.3**	**26.0**	**26.4**	**23.2**	**23.6**	**23.4**	**24.5**	**25.3**	**26.0**	**26.4**
CLEANING AND SURFACE COATINGS														
LAUNDERING	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
DEGREASING	1.8	1.8	1.8	1.9	2.0	2.0	2.1	1.8	1.8	1.8	1.9	2.0	2.0	2.1
COATINGS AND RELATED PROCESS SOLVENTS	8.8	8.9	9.5	10.1	10.3	10.5	10.6	8.8	8.9	9.5	10.1	10.3	10.5	10.6
PRINTING	5.6	5.5	5.3	5.3	5.3	5.4	5.4	5.6	5.5	5.3	5.3	5.3	5.4	5.4

VOC													
SUMMARY CATEGORY NAME	Annual Average (tons/day)							Winter Average (tons/day)						
	2017	2019	2022	2025	2028	2030	2031	2017	2019	2022	2025	2028	2030	2031
ADHESIVES AND SEALANTS	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
OTHER (CLEANING AND SURFACE COATINGS)	7.0	7.0	7.5	8.0	8.0	8.1	8.1	7.0	7.0	7.5	8.0	8.0	8.1	8.1
* TOTAL CLEANING AND SURFACE COATINGS	24.0	24.0	24.9	26.1	26.4	26.7	27.0	24.0	24.0	24.9	26.1	26.3	26.7	27.0
PETROLEUM PRODUCTION AND MARKETING														
OIL AND GAS PRODUCTION	11.5	10.8	9.9	9.0	8.2	7.8	7.6	11.5	10.8	9.9	9.0	8.2	7.8	7.5
PETROLEUM REFINING	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
PETROLEUM MARKETING	5.1	4.8	4.4	4.1	3.9	3.8	3.8	5.1	4.8	4.4	4.1	3.9	3.8	3.8
OTHER (PETROLEUM PRODUCTION AND MARKETING)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL PETROLEUM PRODUCTION AND MARKETING	17.0	16.0	14.8	13.6	12.6	12.1	11.8	17.0	16.0	14.7	13.6	12.6	12.1	11.8
INDUSTRIAL PROCESSES														
CHEMICAL	2.6	2.6	2.5	2.6	2.6	2.7	2.8	2.6	2.6	2.4	2.6	2.6	2.7	2.7
FOOD AND AGRICULTURE	12.4	12.4	12.6	13.3	13.9	14.4	14.7	11.9	12.0	12.2	12.8	13.4	13.9	14.2
MINERAL PROCESSES	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1
METAL PROCESSES	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
WOOD AND PAPER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GLASS AND RELATED PRODUCTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ELECTRONICS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER (INDUSTRIAL PROCESSES)	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.9	0.9	0.9
* TOTAL INDUSTRIAL PROCESSES	16.0	16.0	16.1	16.9	17.6	18.2	18.6	15.7	15.7	15.8	16.6	17.3	17.9	18.2
** TOTAL STATIONARY	83.5	82.9	82.2	84.0	84.7	85.7	86.5	83.0	82.5	81.8	83.6	84.2	85.3	86.0

VOC													
SUMMARY CATEGORY NAME	Annual Average (tons/day)							Winter Average (tons/day)						
	2017	2019	2022	2025	2028	2030	2031	2017	2019	2022	2025	2028	2030	2031
AREAWIDE SOURCES														
SOLVENT EVAPORATION														
CONSUMER PRODUCTS	25.8	26.7	27.2	28.4	29.5	30.4	30.9	25.8	26.7	27.2	28.4	29.5	30.4	30.9
ARCHITECTURAL COATINGS AND RELATED PROCESS SOLVENTS	6.0	6.1	6.3	6.5	6.7	6.8	6.9	5.3	5.4	5.6	5.7	5.9	6.0	6.1
PESTICIDES/FERTILIZERS	18.1	17.4	17.7	17.6	17.4	17.3	17.3	15.4	14.3	16.5	16.4	16.2	16.2	16.1
ASPHALT PAVING / ROOFING	1.0	1.1	1.2	1.2	1.3	1.3	1.3	1.0	1.1	1.2	1.2	1.3	1.3	1.3
* TOTAL SOLVENT EVAPORATION	**51.0**	**51.4**	**52.4**	**53.7**	**54.9**	**55.9**	**56.4**	**47.5**	**47.6**	**50.5**	**51.7**	**52.9**	**53.9**	**54.5**
MISCELLANEOUS PROCESSES														
RESIDENTIAL FUEL COMBUSTION	3.7	3.4	3.3	3.3	3.3	3.3	3.3	6.9	6.4	6.2	6.2	6.3	6.3	6.3
FARMING OPERATIONS	93.8	93.7	93.6	93.5	93.5	93.4	93.4	93.8	93.7	93.6	93.5	93.4	93.4	93.4
CONSTRUCTION AND DEMOLITION	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAVED ROAD DUST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UNPAVED ROAD DUST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FUGITIVE WINDBLOWN DUST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIRES	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2
MANAGED BURNING AND DISPOSAL	17.3	24.4	17.6	11.2	11.2	11.2	11.2	18.3	31.3	16.2	7.7	7.7	7.7	7.7
COOKING	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.7	0.7	0.7
OTHER (MISCELLANEOUS PROCESSES)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL MISCELLANEOUS PROCESSES	**115.5**	**122.2**	**115.3**	**108.9**	**108.8**	**108.8**	**108.8**	**119.7**	**132.0**	**116.8**	**108.2**	**108.1**	**108.1**	**108.1**
** TOTAL AREAWIDE	**166.5**	**173.7**	**167.7**	**162.5**	**163.7**	**164.7**	**165.2**	**167.2**	**179.6**	**167.2**	**159.9**	**161.1**	**162.0**	**162.6**

	VOC													
SUMMARY CATEGORY NAME	**Annual Average (tons/day)**							**Winter Average (tons/day)**						
	2017	**2019**	**2022**	**2025**	**2028**	**2030**	**2031**	**2017**	**2019**	**2022**	**2025**	**2028**	**2030**	**2031**
MOBILE SOURCES														
ON-ROAD MOTOR VEHICLES														
LIGHT DUTY PASSENGER (LDA)	9.6	8.3	7.0	5.9	5.2	4.7	4.4	9.5	8.2	6.9	5.8	5.1	4.7	4.4
LIGHT DUTY TRUCKS - 1 (LDT1)	2.5	2.4	1.9	1.3	1.0	0.8	0.8	2.5	2.4	1.8	1.3	1.0	0.8	0.7
LIGHT DUTY TRUCKS - 2 (LDT2)	4.8	3.9	3.5	3.1	2.8	2.6	2.5	4.8	3.9	3.5	3.1	2.9	2.6	2.5
MEDIUM DUTY TRUCKS (MDV)	6.0	5.5	4.7	3.9	3.3	2.9	2.7	6.2	5.7	4.8	4.0	3.3	2.9	2.8
LIGHT HEAVY DUTY TRUCKS - 1 (LHDT1)	1.6	1.5	1.3	1.0	0.9	0.7	0.7	1.6	1.5	1.3	1.0	0.8	0.7	0.6
LIGHT HEAVY DUTY TRUCKS - 2 (LHDT2)	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.2	0.2	0.2	0.2
MEDIUM HEAVY DUTY TRUCKS (MHDT)	0.7	0.6	0.2	0.1	0.1	0.1	0.1	0.7	0.6	0.2	0.1	0.1	0.1	0.1
HEAVY HEAVY DUTY TRUCKS (HHDT)	2.2	1.6	0.7	0.6	0.6	0.6	0.6	2.2	1.6	0.7	0.6	0.6	0.6	0.6
MOTORCYCLES (MCY)	2.2	2.1	2.0	1.9	1.8	1.7	1.7	2.2	2.1	2.0	1.8	1.7	1.7	1.6
BUSES	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0
MOTOR HOMES (MH)	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0
* TOTAL ON-ROAD MOTOR VEHICLES	**30.2**	**26.5**	**21.6**	**18.2**	**15.9**	**14.4**	**13.7**	**30.2**	**26.4**	**21.5**	**18.1**	**15.8**	**14.3**	**13.6**
OTHER MOBILE SOURCES														
AIRCRAFT	3.0	3.9	3.9	3.9	3.9	3.9	3.9	3.0	3.9	3.9	3.9	3.9	3.9	3.9
TRAINS	0.6	0.6	0.7	0.6	0.7	0.7	0.7	0.6	0.6	0.7	0.6	0.7	0.7	0.7
OCEAN GOING VESSELS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
COMMERCIAL HARBOR CRAFT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RECREATIONAL BOATS	14.1	12.9	11.3	10.0	8.9	8.2	7.9	6.8	6.2	5.4	4.8	4.3	4.0	3.8
OFF-ROAD RECREATIONAL VEHICLES	2.4	2.3	2.2	2.0	1.7	1.5	1.5	2.8	2.7	2.5	2.2	1.9	1.7	1.7
OFF-ROAD EQUIPMENT	12.4	12.0	11.8	10.6	8.3	7.1	6.6	11.8	11.4	11.2	10.0	7.9	6.8	6.3
OFF-ROAD EQUIPMENT (PERP)	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.5	0.4	0.3	0.3	0.3	0.3	0.3
FARM EQUIPMENT	7.4	6.8	5.7	4.9	4.1	3.7	3.5	5.0	4.5	3.8	3.2	2.7	2.4	2.3

VOC													
SUMMARY CATEGORY NAME	**Annual Average (tons/day)**							**Winter Average (tons/day)**						
	2017	**2019**	**2022**	**2025**	**2028**	**2030**	**2031**	**2017**	**2019**	**2022**	**2025**	**2028**	**2030**	**2031**
FUEL STORAGE AND HANDLING	1.5	1.4	1.3	1.2	1.2	1.2	1.2	1.3	1.3	1.2	1.1	1.1	1.1	1.1
* TOTAL OTHER MOBILE SOURCES	41.9	40.3	37.2	33.5	29.0	26.6	25.6	31.9	31.0	29.0	26.2	22.7	20.8	20.0
** TOTAL MOBILE	72.2	66.8	58.8	51.7	44.9	41.0	39.3	62.0	57.4	50.4	44.3	38.5	35.1	33.7

	2017	2019	2022	2025	2028	2030	2031	2017	2019	2022	2025	2028	2030	2031
GRAND TOTAL FOR SAN JOAQUIN VALLEY	322.1	323.4	308.7	298.3	293.3	291.4	291.0	312.2	319.5	299.5	287.8	283.8	282.4	282.2

Table 5-5 Ammonia

SUMMARY CATEGORY NAME	Ammonia													
	Annual Average (tons/day)							Winter Average (tons/day)						
	2017	2019	2022	2025	2028	2030	2031	2017	2019	2022	2025	2028	2030	2031
STATIONARY SOURCES														
FUEL COMBUSTION														
ELECTRIC UTILITIES	0.8	0.7	0.7	0.6	0.6	0.5	0.5	0.7	0.7	0.7	0.6	0.6	0.5	0.5
COGENERATION	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3
OIL AND GAS PRODUCTION (COMBUSTION)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PETROLEUM REFINING (COMBUSTION)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MANUFACTURING AND INDUSTRIAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FOOD AND AGRICULTURAL PROCESSING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SERVICE AND COMMERCIAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER (FUEL COMBUSTION)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL FUEL COMBUSTION	**1.2**	**1.1**	**1.1**	**1.1**	**1.0**	**1.0**	**1.0**	**1.2**	**1.1**	**1.1**	**1.0**	**1.0**	**0.9**	**0.9**
WASTE DISPOSAL														
SEWAGE TREATMENT	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
LANDFILLS	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.8	0.8	0.8	0.8	0.8
INCINERATORS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOIL REMEDIATION	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER (WASTE DISPOSAL)	10.9	11.1	11.1	11.5	11.9	12.2	12.4	10.9	11.1	11.1	11.5	11.9	12.2	12.4
* TOTAL WASTE DISPOSAL	**11.7**	**11.9**	**11.9**	**12.4**	**12.8**	**13.1**	**13.3**	**11.7**	**11.9**	**11.9**	**12.4**	**12.8**	**13.1**	**13.3**
CLEANING AND SURFACE COATINGS														
LAUNDERING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEGREASING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
COATINGS AND RELATED PROCESS SOLVENTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PRINTING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Ammonia													
SUMMARY CATEGORY NAME	Annual Average (tons/day)							Winter Average (tons/day)						
	2017	2019	2022	2025	2028	2030	2031	2017	2019	2022	2025	2028	2030	2031
ADHESIVES AND SEALANTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER (CLEANING AND SURFACE COATINGS)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL CLEANING AND SURFACE COATINGS	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
PETROLEUM PRODUCTION AND MARKETING														
OIL AND GAS PRODUCTION	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PETROLEUM REFINING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PETROLEUM MARKETING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER (PETROLEUM PRODUCTION AND MARKETING)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL PETROLEUM PRODUCTION AND MARKETING	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
INDUSTRIAL PROCESSES														
CHEMICAL	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
FOOD AND AGRICULTURE	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MINERAL PROCESSES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
METAL PROCESSES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WOOD AND PAPER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GLASS AND RELATED PRODUCTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ELECTRONICS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER (INDUSTRIAL PROCESSES)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL INDUSTRIAL PROCESSES	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**
** TOTAL STATIONARY	*13.0*	*13.1*	*13.1*	*13.6*	*13.9*	*14.2*	*14.4*	*13.0*	*13.1*	*13.0*	*13.5*	*13.9*	*14.2*	*14.3*

Ammonia														
SUMMARY CATEGORY NAME	**Annual Average (tons/day)**							**Winter Average (tons/day)**						
	2017	**2019**	**2022**	**2025**	**2028**	**2030**	**2031**	**2017**	**2019**	**2022**	**2025**	**2028**	**2030**	**2031**
AREAWIDE SOURCES														
SOLVENT EVAPORATION														
CONSUMER PRODUCTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ARCHITECTURAL COATINGS AND RELATED PROCESS SOLVENTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES/FERTILIZERS	115.2	114.3	113.0	111.7	110.6	109.9	109.5	95.8	95.0	93.9	92.8	91.8	91.2	90.9
ASPHALT PAVING / ROOFING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL SOLVENT EVAPORATION	**115.2**	**114.3**	**113.0**	**111.7**	**110.6**	**109.9**	**109.5**	**95.8**	**95.0**	**93.9**	**92.8**	**91.8**	**91.2**	**90.9**
MISCELLANEOUS PROCESSES														
RESIDENTIAL FUEL COMBUSTION	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.7	0.7	0.7	0.7	0.7	0.7	0.7
FARMING OPERATIONS	169.9	169.3	168.6	168.0	167.4	167.2	167.0	169.8	169.2	168.5	167.9	167.4	167.1	166.9
CONSTRUCTION AND DEMOLITION	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAVED ROAD DUST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UNPAVED ROAD DUST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FUGITIVE WINDBLOWN DUST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIRES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MANAGED BURNING AND DISPOSAL	0.6	1.0	0.6	0.6	0.6	0.6	0.6	0.5	1.2	0.4	0.4	0.4	0.4	0.4
COOKING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER (MISCELLANEOUS PROCESSES)	6.5	6.6	6.7	6.9	7.1	7.3	7.3	6.5	6.6	6.7	6.9	7.1	7.3	7.3
* TOTAL MISCELLANEOUS PROCESSES	**177.3**	**177.2**	**176.3**	**175.9**	**175.6**	**175.4**	**175.3**	**177.6**	**177.8**	**176.4**	**176.0**	**175.7**	**175.5**	**175.5**
** TOTAL AREAWIDE	**292.6**	**291.5**	**289.3**	**287.6**	**286.2**	**285.3**	**284.9**	**273.4**	**272.8**	**270.3**	**268.8**	**267.5**	**266.7**	**266.4**

	Ammonia													
SUMMARY CATEGORY NAME	Annual Average (tons/day)							Winter Average (tons/day)						
	2017	2019	2022	2025	2028	2030	2031	2017	2019	2022	2025	2028	2030	2031
MOBILE SOURCES														
ON-ROAD MOTOR VEHICLES														
LIGHT DUTY PASSENGER (LDA)	1.3	1.5	1.6	1.7	1.9	2.0	2.0	1.3	1.5	1.6	1.7	1.9	2.0	2.0
LIGHT DUTY TRUCKS - 1 (LDT1)	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1
LIGHT DUTY TRUCKS - 2 (LDT2)	0.5	0.6	0.7	0.8	0.9	1.0	1.0	0.5	0.6	0.7	0.8	0.9	1.0	1.0
MEDIUM DUTY TRUCKS (MDV)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
LIGHT HEAVY DUTY TRUCKS - 1 (LHDT1)	0.3	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.3	0.3	0.3
LIGHT HEAVY DUTY TRUCKS - 2 (LHDT2)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
MEDIUM HEAVY DUTY TRUCKS (MHDT)	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.2	0.2	0.3	0.3	0.4	0.4	0.4
HEAVY HEAVY DUTY TRUCKS (HHDT)	1.5	1.7	2.0	2.2	2.3	2.3	2.4	1.5	1.7	2.0	2.2	2.3	2.3	2.4
MOTORCYCLES (MCY)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BUSES	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
MOTOR HOMES (MH)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL ON-ROAD MOTOR VEHICLES	**4.8**	**5.3**	**6.0**	**6.5**	**6.8**	**6.9**	**7.0**	**4.8**	**5.3**	**6.0**	**6.5**	**6.8**	**6.9**	**7.0**
OTHER MOBILE SOURCES														
AIRCRAFT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRAINS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OCEAN GOING VESSELS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
COMMERCIAL HARBOR CRAFT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RECREATIONAL BOATS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OFF-ROAD RECREATIONAL VEHICLES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OFF-ROAD EQUIPMENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OFF-ROAD EQUIPMENT (PERP)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FARM EQUIPMENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Ammonia													
SUMMARY CATEGORY NAME	**Annual Average (tons/day)**							**Winter Average (tons/day)**					
	2017	**2019**	**2022**	**2025**	**2028**	**2030**	**2031**	**2017**	**2019**	**2022**	**2025**	**2028**	**2030**	**2031**
FUEL STORAGE AND HANDLING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* TOTAL OTHER MOBILE SOURCES	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**
** *TOTAL MOBILE*	***4.8***	***5.4***	***6.1***	***6.5***	***6.9***	***7.0***	***7.1***	***4.8***	***5.4***	***6.1***	***6.5***	***6.8***	***7.0***	***7.1***

GRAND TOTAL FOR SAN JOAQUIN VALLEY	2017	2019	2022	2025	2028	2030	2031	2017	2019	2022	2025	2028	2030	2031
	310.4	310.1	308.5	307.7	306.9	306.5	306.3	291.2	291.3	289.4	288.9	288.2	287.9	287.8

[The following sections provided by the California Air Resources Board]

5.2   EMISSIONS INVENTORY BACKGROUND

Emissions inventories are required by the Clean Air Act (Act) and the PM2.5 SIP Requirements Rule for the 2012 12 µg/m^3 annual PM2.5 National Ambient Air Quality Standards (NAAQS) (PM2.5 Implementation Rule). Specifically, they are required for those areas that exceed the health-based NAAQS. These areas are designated as nonattainment based on monitored exceedances of these standards. These nonattainment areas must develop an emissions inventory as the basis of a State Implementation Plan (SIP) that demonstrates how they will attain the standards by specified dates. This document describes the emissions inventory included in the San Joaquin Valley (SJV or Valley) 12 µg/m^3 annual PM2.5 SIP (2023 PM2.5 SIP).

5.3   EMISSIONS INVENTORY OVERVIEW

Emissions inventories are estimates of the amount and type of pollutants emitted into the atmosphere by facilities, mobile sources, and areawide sources. They are fundamental components of an air quality plan and serve critical functions such as:

1. the primary input to air quality modeling used in attainment demonstrations;
2. the emissions data used for developing control strategies; and
3. a means to track progress in meeting the emission reduction commitments.

The California Air Resources Board (CARB) and the San Joaquin Valley Air Pollution Control District (District) have developed a comprehensive current emissions inventory consistent with the requirements set forth in Section 182(a)-(f) of the Act[2]. CARB and District staff conducted a thorough review of the inventory to ensure that the emission estimates reflect accurate emissions reports for point sources and that estimates for mobile and areawide sources are based on the most recent approved models and methodologies.

CARB also reviewed the growth profiles for point and areawide source categories and updated them as necessary to ensure that the emission projections are based on data that reflect historical trends, current conditions, and recent economic and demographic forecasts.

The United States Environmental Protection Agency (U.S. EPA) regulations require that the emissions inventory for a PM2.5 SIP contains emissions data for directly emitted PM2.5 and its precursors; oxides of nitrogen (NOx), oxides of sulfur (SOx), volatile organic compounds (VOC)[3] and ammonia (NH3). The inventory included in this plan substitutes VOC with reactive organic gases (ROG), which, in general, represent a slightly broader group of compounds than those in U.S. EPA's list of VOCs.

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[2] Section 182(a)-(f) of the Act. https://www.govinfo.gov/content/pkg/USCODE-2013-title42/html/USCODE-2013-title42-chap85-subchapI-partD-subpart2-sec7511a.htm
[3] Section 182(a)(1) of the Act. https://www.govinfo.gov/content/pkg/USCODE-2013-title42/html/USCODE-2013-title42-chap85-subchapI-partD-subpart2-sec7511a.htm

5.3.1 Inventory Base Year

40 CFR 51.1315(a) requires that the inventory year be selected consistent with the baseline year for the reasonable further progress (RFP) plan as required by 40 CFR 51.1310(b)[4], which states that the base year emissions inventory shall be the emissions inventory for the most recent calendar year of which a complete triennial inventory is required to be submitted to U.S. EPA under the provisions of subpart A of 40 CFR part 51, Air Emissions Reporting Requirements, 40 CFR 51.1– 50. States may also use an alternative baseline emissions inventory provided that the year selected corresponds with the year of the effective date of designation as nonattainment for that NAAQS[5].

2017 Base Year Inventory Justification for 2023 PM2.5 SIP

CARB and the District are selecting 2017 as the planning inventory base year for the 2023 PM2.5 Plan for the 12 µg/m³ PM2.5 standard. The PM2.5 Implementation Rule specifies that the inventory base year can be one of the years for the PM2.5 design values used to reclassify the area to Serious or the State can justify the use of a different technically appropriate inventory base year if those years are not appropriate[6].
U.S. EPA's final action to reclassify the San Joaquin Valley PM2.5 nonattainment area from Moderate to Serious nonattainment for the 2012 annual PM2.5 standard was based on the agency's determination that the Valley could not practicably attain the standard by the Moderate area attainment date of December 31, 2021. The base year of the Serious area SIP could therefore be any of the three years used to make the determination of impracticability—in this case, 2019, 2020, and 2021; however, CARB and the District believe that 2019, 2020, and 2021 are not technically appropriate base years for the emission inventory and instead determined that 2017 is technically appropriate to use as the base year inventory. In selecting 2017 as the base year, CARB and the District relied on the Emission Inventory Guidance[7], which allows agencies to consider the availability of data, the implementation of rule requirements, and consistency in the base year across planning and modeling inventories in choosing an appropriate baseline inventory year.

Availability of Data
The PM2.5 Implementation Rule specifies that the base year inventory must be actual emissions; follow the Air Emissions Reporting Requirements (AERR), 40 CFR part 51, subpart A for the emissions thresholds for point sources; and use the level of detail as prescribed by the AERR. The National Emissions Inventory (NEI) years follow the AERR reporting requirements for point sources and are the most robust inventories of actual emissions available from stationary point sources and area sources. NEI years also undergo a thorough quality assurance/quality control (QA/QC) review performed by

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[4] 40 CFR 51.1315(a). https://www.govinfo.gov/content/pkg/CFR-2021-title40-vol2/pdf/CFR-2021-title40-vol2-sec51-1315.pdf.

[5] 40 CFR 51.1310(b). https://www.govinfo.gov/content/pkg/CFR-2020-title40-vol2/pdf/CFR-2020-title40-vol2-sec51-1310.pdf.

[6] 2016 PM2.5 SIP Requirements Rule, 40 CFR 51
https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-51/subpart-Z
51.1008(a)(1)(i) and in (b)(2) for Serious areas Emissions inventory requirements. 51.1011 (a)(3) and (b)(3)

[7] Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations (epa.gov)

U.S. EPA. For these reasons, CARB and the District would prefer to use an NEI year as the base year for the inventory. The two most recent NEI years are 2020 and 2017. In 2020, the COVID-19 pandemic affected a range of industries economy-wide, making 2020 emissions atypical; therefore, 2020 is unsuitable for use as a base year for the inventory. 2017 did not experience any similar disruption and reflects typical emissions, while retaining the benefits of being an NEI year with actual data thoroughly QA/QC'd by U.S. EPA. The rigor associated with an NEI year does not apply to 2019 or 2021, the other two years eligible for consideration as a base year for the 2023 PM2.5 Plan.

Implementation of Rule Requirements
On June 20, 2019, the District adopted amendments to Rule 4901 (Wood Burning Fireplaces and Wood Burning Heaters) which addresses emissions from residential wood combustion. Residential wood burning is a significant source of emissions in the San Joaquin Valley, and Rule 4901 provides critical controls for this key emission source. The June 2019 amendments strengthened the rule by:
- Enhancing requirements for significant remodels of a fireplace and chimney that require the removal of open-hearth fireplaces or replacement to cleaner devices;
- Requiring only seasoned wood to be burned;
- Enhancing compliance during transfers of residential real property;
- Restricting installations of new wood burning devices;
- Enhancing visible emission limitations; and
- Establishing lower curtailment thresholds for hot spot counties (Madera, Fresno, and Kern.

Amendments to Rule 4901 went into effect in the fall of 2019. Because of the importance of the emissions source and the control measure, the full year's worth of emission reduction benefits from Rule 4901 are critical to predicting future PM2.5 concentrations. Selecting a base year prior to implementation of these important rule amendments ensures that this rule is accurately reflected in the inventory and credited appropriately for Reasonable Further Progress (RFP). Use of the 2017 NEI year as the inventory base year would meet this criterion.

Consistency in Planning and Modeling Inventories
The Emission Inventory Guidance indicates that a common reason for choosing an alternate base year is the desire to have the base year for planning inventories be consistent with the base year for modeling inventories. The modeling base year is determined in part by meteorology that is conducive to formation of ambient levels of PM2.5 that are above the 12 µg/m^3 PM2.5 standard. For modeling purposes, 2019, 2020, and 2021 are not years with representative air quality suitable for modeling future air quality. Modeled attainment demonstrations are based on a five-year weighted design value centered around the base year inventory, giving the base year the most weight. To ensure the model is accurately predicting air quality, it is best to have the base year not be a year of extensive wildfires. Wildfires have become more intense in California. The two largest wildfire years on record occurred in 2020 and 2021. In the San Joaquin Valley, these extensive wildfires impacted air quality throughout the Valley for months. 2020 and 2021 are also unusual, non-representative years due to COVID-19 impacts. Furthermore, in 2020, Valley sites collected incomplete speciation data—which are critical

for PM2.5 modeling—due to laboratory and monitoring site shutdowns because of the pandemic.

While 2019 is not impacted by wildfires or COVID-19, the five-year weighted PM2.5 design value with a 2019 base year would include 2020 and 2021, capturing those years' significant wildfire and COVID-19 impacts. With a 2017 base modeling year, the five-year weighted PM2.5 design value would include 2017, 2018, and 2019. 2018 did have some wildfire days but not to the extent of 2020 and 2021. Using 2017 as the base modeling year ensures that anthropogenic emissions are accurately reflected, speciation data are available and robust, and the model can more accurately reflect the impacts of control strategies; therefore, CARB is using 2017 as the base modeling year for the attainment demonstration. Selecting 2017 for the planning inventory base year would allow for more consistency across the planning and modeling inventories used in the 2023 PM2.5 Plan.

After consideration of all the above, CARB has determined that the 2017 base year inventory is technically appropriate for the San Joaquin Valley 2023 PM2.5 Plan since it is based on actual data, reflects typical emission conditions, can account for the benefits of a new rule related to residential wood burning, and is consistent with the modeling base year inventory.

5.3.2 Forecasted Inventories

In addition to base year emissions, emissions projections are needed for a variety of reasons, including redesignation maintenance plans, the attainment projected inventory for a nonattainment area (NAA), and air quality modeling for attainment plans[8].

For stationary and area sources, forecasted inventories are a projection of the base year inventory that reflects expected growth trends for each source category and emissions reductions due to adopted control measures. CARB develops emission forecasts by applying growth and control profiles to the base year inventory. The stationary and area source emissions inventories for the 2023 PM2.5 SIP are modeled by the California Emission Projection Analysis Model (CEPAM), 2022 PM2.5 Plans Emission Projections, Version 1.00.

Growth profiles for point and areawide sources are derived from surrogates, such as economic activity, fuel usage, population, and housing units, that best reflect the expected growth trends for each specific source category. Growth projections were obtained primarily from government entities with expertise in developing forecasts for specific sectors, or, in some cases, from econometric models. Control profiles, which account for emission reductions resulting from adopted rules and regulations, are derived from data provided by the regulatory agencies responsible for the affected emission categories.

Projections for on-road mobile source emissions are generated by CARB's EMFAC2021 model, which predicts activity rates and vehicle fleet turnover by vehicle model year, along with activity inputs from the metropolitan planning organizations (MPOs). Off-road

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[8] 40 CFR 51.114. https://www.govinfo.gov/content/pkg/CFR-2000-title40-vol2/pdf/CFR-2000-title40-vol2-sec51-114.pdf.

mobile sources are forecasted with category-specific models or, where not available, CARB's OFFROAD2007. CEPAM integrates the emission projections derived from these mobile source models to develop a comprehensive forecasted emission inventory. As with stationary sources, the mobile source models include control algorithms that account for adopted regulatory actions.

5.3.3 Temporal Resolution

The 12 ug/m3 NAAQS is an annual average standard; therefore, the emission inventory employed for this 2023 PM2.5 SIP is an annual average basis.

5.3.4 Quality Assurance and Quality Control

CARB has established a quality assurance and quality control (QA/QC) process to ensure the integrity and accuracy of the emission inventories used in the development of air quality plans. QA/QC occurs at the various stages of SIP emission inventory development. Base year emissions are assembled and maintained in the California Emission Inventory Development and Reporting System (CEIDARS). CARB inventory staff works with air districts, which are responsible for developing and reporting point source emission estimates, to verify these data are accurate. The locations of point sources, including stacks, are checked to ensure they are valid. Area-wide source emissions estimates are developed by both CARB and district staff, and the methodologies are reviewed by both agencies before their inclusion in the emissions inventory. Mobile categories are verified with CARB mobile source staff for consistency with the on-road and off-road emission models. Additionally, CEIDARS is designed with automatic system checks to prevent errors, such as double counting of emission sources. At the final stage, CEPAM is thoroughly reviewed to validate the accuracy of growth and control application, and the output emissions are compared against prior approved versions of CEPAM to identify data anomalies.

5.4   EMISSION INVENTORY COMPONENTS

A summary of the components that make up 2023 PM2.5 SIP emissions inventory is presented in the following sections. These include mobile (on- and off-road) sources, stationary point sources, areawide sources, and natural sources.

5.4.1 Mobile Source Emissions

CARB develops the emission inventory for the mobile sources using various modeling methods. These models account for the effects of various adopted regulations, technology types, fleet turnover, and seasonal conditions on emissions. Mobile sources in the emission inventory are composed of both on-road and off-road sources, described in the sections below.

On-Road Mobile Source Emissions

Emissions from on-road mobile sources, which include passenger vehicles, buses, and trucks, were estimated using outputs from CARB's EMFAC2021 v1.0.2 model. The on-

road emissions were calculated by applying EMFAC2021 emission factors to the transportation activity data provided by the local MPOs based on the 2022 Regional Transportation Plan.

The EMFAC2021 model incorporates data on California's car and truck fleets, as well as travel activity. The light-duty motor vehicle fleet age, vehicle type, and vehicle population were updated based on 2019 California Department of Motor Vehicles (DMV) data. Moreover, the model also reflects the emissions benefits of CARB's recent rulemakings such as the Advanced Clean Trucks, Heavy-Duty Omnibus, as well as CARB's Truck and Bus Rule and previously adopted rules for other on-road diesel fleets.

EMFAC2021 utilizes a socio-econometric regression modeling approach to forecast new vehicle sales and to estimate future fleet mix. Light-duty passenger vehicle population includes 2019 DMV registration data along with updates to emission rates based on test data and the inclusion of plug-in hybrid electric vehicles. For heavy-duty vehicles, model year specific emission factors based on new test data were used, along with population estimates using DMV data for in-state trucks and International Registration Plan (IRP) data for out-of-state vehicles.

Additional information and documentation on the EMFAC2021 model are available at: *https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/msei-road-documentation*

EMFAC2021 Heavy-Duty Inspection and Maintenance Off-Model Adjustment
On December 9, 2021, CARB adopted the Heavy-Duty Inspection and Maintenance (HD I/M) program, which controls emissions effectively from non-gasoline on-road heavy-duty vehicles with a gross vehicle weight rating (GVWR) greater than 14,000 pounds. Starting from calendar year 2023, the program drastically reduces NOx and PM2.5 emissions by enforcing periodic testing and inspections for heavy-duty trucks operating in California.

The HD I/M regulation impacts some of the underlying assumptions in CARB's EMFAC2021 model, which was used to assess emissions from on-road mobile sources. Therefore, CARB developed off-model adjustment factors based on off-model analysis with EMFAC2021 to reflect the regulation. More information on this analysis is provided in Appendix D of the HD I/M staff report. Since this regulation was adopted after the release of EMFAC2021, these adjustment factors were calculated based on emission estimates under two scenarios: (1) EMFAC2021 default, plus HD I/M factors applied; and (2) EMFAC2021 default, which is the baseline before HD I/M. These adjustments, provided in the form of multipliers, were applied to emissions outputs from the EMFAC2021 model by the CEPAM external adjustment module to account for the impact of HD I/M. These off-model adjustment factors were applied to all heavy-duty diesel categories.

EMFAC2021 Advanced Clean Cars II
On November 30, 2022, CARB adopted Advanced Clean Cars II (ACC II), which requires all light-duty cars, trucks, and SUVs sold in California be zero emission vehicles by 2035. ACC II will be implemented in 2026 and is projected to substantially reduce NOx,

PM2.5, and ROG emissions by decreasing the number of internal combustion engines in the light-duty fleet.

ACC II impacts some of the underlying assumptions in CARB's EMFAC2021 model, which was used to assess emissions from on-road mobile sources. Therefore, CARB developed off-model adjustment factors based on off-model analysis with EMFAC2021 to reflect the regulation. More information on this analysis is provided in Appendix D of the ACC II staff report. Since this regulation was adopted after the release of EMFAC2021, these adjustment factors were calculated based on emission estimates under two scenarios: (1) EMFAC2021 default, plus ACC II factors applied; and (2) EMFAC2021 default, which is the baseline before ACC II. These adjustments, provided in the form of multipliers, were applied to emissions outputs from the EMFAC2021 model by the CEPAM external adjustment module to account for the impact of ACC II. These off-model adjustment factors were applied to all light-duty categories.

5.4.2 Off-Road Mobile Source Emissions

Emissions from off-road sources are estimated using a suite of category-specific models or, where a new model was not available, the OFFROAD2007 model. Many of the newer models are developed to support recent regulations, including in-use off-road equipment, ocean-going vessels, and others. The sections below summarize the updates made by CARB to specific off-road categories.

Recreational Marine Vessels

Pleasure craft or recreational marine vessel (RMV) is a broad category of marine vessel that includes gasoline-powered spark-ignition marine watercraft (SIMW) and diesel-powered marine watercraft. It includes outboards, sterndrives, personal watercraft, jet boats, and sailboats with auxiliary engines. This emissions inventory was last updated in 2014 to support the evaporative control measures. The population, activity, and emission factors were revised using new surveys, DMV registration information, and emissions testing.

Staff used economic data from a 2014 UCLA Economic Forecast to estimate the near-term annual sales of RMV (2014 to 2019). To forecast long-term annual sales (2020 and later), CARB staff used an estimate of California's annual population growth as a surrogate.

Additional information is available at:
https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/road-documentation/msei-documentation-offroad

Recreational Vehicles

Off-highway recreational vehicles include off-highway motorcycles (OHMC), all-terrain vehicles (ATV), off-road sport vehicles, off-road utility vehicles, sand cars, golf carts, and snowmobiles. A new model was developed in 2018 to update emissions from recreational vehicles. Input factors such as population, activity, and emission factors

were re-assessed using new surveys, DMV registration information, and emissions testing. OHMC population growth is determined from two factors: incoming population as estimated by future annual sales and the scrapped vehicle population as estimated by the survival rate.

Additional information is available at:
https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/road-documentation/msei-documentation-offroad

Fuel Storage and Handling

Emissions from portable fuel containers (gas cans) were estimated based on past surveys and CARB in-house testing. This inventory uses a composite growth rate that depends on occupied household (or business units), percent of households (or businesses) with gas cans, and average number of gas cans per household (or business) units.

Additional information is available at:
https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/road-documentation/msei-documentation-offroad

Small Off-Road Engines (SORE)

Small off-road engines (SORE) are spark-ignition engines rated at or below 19 kilowatts (i.e., 25 horsepower). Typical engines in this category are used in lawn and garden equipment as well as other outdoor power equipment and cover a broad range of equipment. The majority of this equipment belongs to the Lawn & Garden (e.g., lawnmower, leaf blower, trimmer) and Light Commercial (e.g., compressor, pressure washer, generator) categories of CARB's SORE emissions inventory model.
The newly developed, stand-alone SORE2020 Model reflects the recovering California economy from the 2008 economic recession and incorporates emission results from CARB's recent in-house testing as well as CARB's most recent Certification Database. CARB also has conducted an extensive survey of SORE operating within California through the Social Science Research Center (SSRC) at the California State University, Fullerton (CSUF). Data collected through this survey provides the most up-to-date information regarding the population and activity of SORE equipment in California. The final SORE emissions included the adopted SORE rule in December 2021 as well as the 15-day changes after the CARB hearing which allowed the pressure washers (greater than 5 hp) extra time for meeting the regulation. The SORE annual sales were forecasted using historic growth of the number of California households (DOF household forecasts, 2000 – 2008 and 2009 - 2018).

Additional information on SORE baseline emissions (without the adopted rule and 15-day changes) is available at:
https://ww2.arb.ca.gov/sites/default/files/2020-09/SORE2020_Technical_Documentation_2020_09_09_Final_Cleaned_ADA.pdf

Ocean Going Vessels

Ocean going vessels (OGVs) were updated in 2021 based on AIS (transponder) data. This data, along with vessel information supplied by South Coast AQMD and IHS Fairplay provides vessel visit counts, speed, engine size, and other vessel characteristics. The inventory adopts US EPA's methodology for emissions based on vessel speed, engine model year and horsepower. The inventory includes transit, maneuvering, anchorage and at-berth emissions, updating the 2019 at-berth-only inventory. The comprehensive national model Freight Analysis Framework (FAF) was used to develop growth rates for forecasting.

Additional information on CARB's general OGV update is available at:
https://ww2.arb.ca.gov/sites/default/files/2022-03/CARB_2021_OGV_Documentation_ADA.pdf

Commercial Harbor Craft

Commercial Harbor Crafts (CHC) are grouped into 18 vessel types: articulated tug barge (ATB), bunker barge, towed petrochemical barge, other barge, dredge, commercial passenger fishing, commercial fishing, crew and supply, catamaran ferry, monohull ferry, short run ferry, excursion, ATB tug, push and tow tug, escort/ship assist tug, pilot boat, research boat, and work boat.

The CHC inventory was updated in 2021 and includes vessels used around harbors such as tug and tow boats, fishing vessels, research vessels, barges, and similar. The inventory was updated based on CARB's reporting data for these vessels, as well as inventories from the Ports of Los Angeles and Long Beach and Oakland and Richmond. This supplied vessel characteristics, and the population was scaled up to match U.S. Coast Guard data on the annual number of vessels in California waters. Activity and load factors were based on a mix of reporting data and port-specific inventories. Emission factors were based on certification data for harbor craft engines. Population and activity growth factors were estimated based on historical trends in the past decade.

Additional information on this methodology is available at:
https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2021/chc2021/apph.pdf

Locomotives

All locomotive inventories were updated in 2020 and include linehaul (large national companies), switchers (used in railyards), passenger, and Class 3 locomotives (smaller regional companies). Data for each sector was supplied by rail operations, including Union Pacific and Burlington Northern, and Santa Fe Railway (BNSF) for linehaul and switcher operations. Data for other categories was supplied by the locomotive owners. Emission factors for all categories were based on U.S. EPA emission factors for locomotives. The inventory reflects the 2005 memorandum of understanding (MOU) with Union Pacific and BNSF. Growth rates were primarily developed from the FAF.

More information is available at:

https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/road-documentation/msei-documentation-road

Military and Industry Locomotives

This new category includes military and Industrial (M&I) locomotive emission inventory and relies on the annual fuel consumption and engine information collected from 2011 to 2018. The M&I locomotive data was supplied by 39 private companies and 4 military rail groups, with a total of 85 locomotives. The subject locomotives typically consist of smaller, older switchers and medium horsepower (MHP, 2,301 to 3,999 hp) locomotives operating within the boundaries of a granary, plant, or industrial facility.

The methodology is available at:
https://ww2.arb.ca.gov/sites/default/files/2022-07/2022%20MI%20Locomotive%20Emission%20Inventory%20Document%2007112022%20ADA%20Checked.pdf

Diesel Agricultural Equipment

The agricultural equipment inventory covers all off-road vehicles used on farms or first processing facilities (of all fuel types). It was updated in 2021 using a 2019 survey of California farmers and rental facilities, and the 2017 U.S. Department of Agriculture (USDA) agricultural census. Emission factors are based on the 2017 off-road diesel emission factor update. The inventory reflects incentive programs for agricultural equipment that were implemented earlier than August 2019. Agricultural growth rates were developed using historical data from the County Agricultural Commissioners' reports.

Additional information is available at:
https://ww2.arb.ca.gov/sites/default/files/2021-08/AG2021_Technical_Documentation_0.pdf

In-Use Off-Road Equipment

This category covers off-road diesel vehicles over 25 horsepower in construction, mining, industrial, and oiling drilling categories. The inventory was updated in 2022 based on the DOORS registration program. Activity was updated based on a 2021 survey of registered equipment owners, and emission factors were based on the 2017 off-road diesel emission factor update. The inventory reflects the In-Use Off-Road Equipment Regulations, as amended in 2011.

The methodology is available at:
https://ww2.arb.ca.gov/sites/default/files/2022-10/2022InUseDieselInventory.pdf

Cargo Handling Equipment

The Cargo Handling Equipment (CHE) inventory covers equipment (of all fuels) used at California ports and intermodal railyards, such as cranes, forklifts, container handling

equipment, and more. The inventory population and activity were updated in 2021 based on the port inventories for the Ports of Los Angeles and Long Beach and Richmond, and the CARB reporting data for other ports and railyards, which had a more comprehensive inventory than available through reporting. Load factors were based on the previous inventory in 2007, and emission factors were based on the 2017 off-road diesel emission factor update. The inventory reflects the CHE Airborne Toxic Control Measures (ATCM), adopted in 2005 and completed in 2017.

The updated methodology is currently in the process of being posted online. When it is completed, the methodology will be available at:

https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/road-documentation/msei-documentation-road

Transportation Refrigeration Units

The Transportation Refrigeration Units (TRU) inventory was updated in 2020 based on the TRU reporting program at CARB. The activity was developed based on 2010 surveys of facilities served by TRUs and 2017 to 2019 telematics data purchased from TRU manufacturers. Emission factors were developed specifically for TRUs based on TRU engine certification data reported to U.S. EPA as of 2018. The inventory reflects the TRU ATCM and 2021 amendments. Forecasting was based on IBISWorld reports forecast for related industries, and turnover forecasting was based on the past 20 years equipment population trends.

Additional information is available at:
https://ww2.arb.ca.gov/sites/default/files/barcu/board/rulemaking/tru2021/apph.pdf

Portable Equipment

Portable equipment inventory includes non-mobile diesel, such as generators, pumps, air compressors, chippers, and other miscellaneous equipment over 50 horsepower. This inventory was developed in 2017 based on CARB's registration program, 2017 survey of registered owners for activity and fuel, and the 2017 off-road diesel emission factor update. The inventory also reflects the Portable ATCM and 2017 amendments.

Because registration in Portable Equipment Registration Program (PERP) is voluntary, the PERP registration data was used as the basis for equipment population, with an adjustment factor used to represent the remaining portable equipment in the state. Estimates of future emissions beyond the base year were made by adjusting base year estimates for population growth, activity growth, and the purchases of new equipment (i.e. natural and accelerated turnover).

Additional information is available at:
https://ww3.arb.ca.gov/msei/ordiesel/perp2017report.pdf

Large Spark Ignition/Forklifts

The large spark ignition (LSI) inventory includes gasoline and propane forklifts, sweeper/scrubbers, and tow tractors. The inventory was updated in 2020 based on the LSI/forklift registration in the DOORS reporting system at CARB, and the sales data was provided by the Industrial Truck Association (ITA). Activity was based on a survey of equipment owners in the DOORS system, and emission factors were based on U.S. EPA's latest guidance for gasoline and propane engines. The inventory reflects the LSI regulation requirements and 2016 amendments.
The updated methodology is currently in the process of being posted online. When it is completed, the methodology will be available at:
https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/road-documentation/msei-documentation-road

Forestry Equipment

The new 2021 forestry diesel equipment emissions inventory was developed to replace the previous emissions inventory for diesel forestry equipment based on OFFROAD2007. This inventory includes equipment used in forestry and in milling. This includes foresting operations, such as feller/bunchers and dragline operations,   equipment used to build roads to reach forested areas, and forklifts or loaders used in milling operations. The inventory was based on a 2019 survey of forestry operations and mills (for calendar year 2017), as well as the 2019 California Department of Tax and Fee Administration data on the annual timber harvest, with emission factors from the 2017 off-road diesel emission factor update. This sector does not include any emission reduction measures or strategies. The model projects forestry equipment population and emissions in future years by predicting the retirement and purchasing habits of forestry equipment. The model attempts to predict a business as usual (BAU) behavior based on the 2017 survey data.

Additional information is available at:
https://ww2.arb.ca.gov/sites/default/files/2021-10/2021_Forestry_Inventory_Technical_Document_FINAL_09302021.pdf

5.4.3 Stationary Point and Stationary Aggregated Sources

The stationary source inventory is composed of point sources and area-wide sources. The data elements in the inventory are consistent with the data elements required by the AERR. The inventory reflects actual emissions from industrial point sources reported to the District by the facility operators through calendar year 2017.

More information regarding the District's facility point source inventory is available at:
https://www.valleyair.org/busind/pto/Tox_Resources/emissions_inventory.htm

Stationary point sources also include smaller point sources, such as gasoline dispensing facilities and laundering, that are not inventoried individually, but are estimated as a group and reported as a single source category, Stationary Aggregated. Emissions from these sources are estimated using various models and methodologies. Estimation methods

include source testing, direct measurement by continuous emissions monitoring systems, or engineering calculations. Emissions for these categories are estimated by both CARB and the District.

The District's methodologies are available at:
http://www.valleyair.org/Air_Quality_Plans/EmissionsMethods/EmissionsMethods.htm

Estimates for the categories below were developed by CARB and have been reviewed by CARB staff to reflect the most up-to-date information.

Stationary Nonagricultural Diesel Engines

This category includes emissions from backup and prime generators and pumps, air compressors, and other miscellaneous stationary diesel engines that are widely used throughout the industrial, service, institutional, and commercial sectors. The emission estimates, including emission forecasts, are based on a 2003 CARB methodology derived from the OFFROAD2007 model.

Additional information on this methodology is available at:
https://ww3.arb.ca.gov/ei/areasrc/arbfuelcombother.htm

Agricultural Diesel Irrigation Pumps

This category includes emissions from the operation of diesel-fueled stationary and mobile agricultural irrigation pumps. The emission estimates are based on a 2003 CARB methodology using statewide population and include replacements due to the Carl Moyer Program. Emissions are grown based on projected acreage for irrigated farmland from the California Department of Conservation's Farmland Mapping and Monitoring Program (FMMP), 2008.

Additional information on this category is available at:
https://ww3.arb.ca.gov/ei/areasrc/fullpdf/full1-1.pdf

Wine Fermentation and Aging

This category includes emissions from the fermentation and aging of wine. Wine fermentation volumes in California are reported by the U.S. Alcohol and Tobacco Tax and Trade Bureau. CARB staff derived the emission factors from a computer model developed by Williams and Boulton. Emissions were initially estimated for 2002 and grown to later years using beverage manufacturing (Alcoholic & Non-Alcoholic) economic output.

An emission factor for brandy was derived by Hugh Cook of the Wine Institute. Emissions were initially estimated for 1992 then grown to 2012 using economic output for food manufacturing. Emissions were grown from 2012 to 2017 using beverage manufacturing economic output per Regional Economic Models, Inc. (REMI). Growth for future years is based on REMI forecast version 2.4.5.

Additional information on this methodology is available at:
http://www.arb.ca.gov/ei/areasrc/arbindprofandag.htm

Laundering

This category includes emissions from perchloroethylene (perc) dry cleaning establishments. The emission estimates are based on a 2002 CARB methodology that used nationwide perc consumption rates allocated to the county level based on population and an emission factor of 10.125 pounds per gallon used. Emissions were grown based on the California Department of Finance (DOF) population forecasts, 2020.

Additional information on this methodology is available at:
https://ww3.arb.ca.gov/ei/areasrc/arbcleanlaund.htm

Degreasing

This category includes emissions from solvents in degreasing operations in the manufacturing and maintenance industries. The emissions estimates are based on a 2000 CARB methodology using survey and industry data, activity factors, emission factors and a user's fraction. Emissions were grown based on CARB/REMI industry-specific economic output, version 2.4.5.

Additional information on this methodology is available at:
https://ww3.arb.ca.gov/ei/areasrc/arbcleandegreas.htm

Coatings and Thinners

This category includes emissions from coatings and related process solvents. Auto refinishing emissions estimates are based on a CARB methodology using production data and a composite emission factor derived from a 2002 survey. These estimates were grown based on CARB's on-road mobile sources model version EMFAC2017. Estimates for industrial coatings emissions are based on a 1990 CARB methodology using production and survey data, and emission factors derived from surveys. Estimates for thinning and cleaning solvents are based on a 1991 CARB methodology, census data and a default emission factor developed by CARB. These estimates were grown based on REMI county economic forecasts, version 2.4.5.

Additional information on these methodologies is available at:
https://ww3.arb.ca.gov/ei/areasrc/arbcleancoatreproc.htm

Adhesives and Sealants

This category includes emissions from solvent-based and water-based solvents contained in adhesives and sealants. Emissions are estimated based on a 1990 CARB methodology using production data and default emission factors. Estimates were grown based on REMI county economic forecasts, version 2.4.5.

Additional information on this methodology is available at:

https://ww2.arb.ca.gov/carb-cleaning-and-surface-coating-methodologies-adhesives-and-sealants

Gasoline Dispensing Facilities

This category uses a 2015 CARB methodology to estimate emissions from fuel transfer and storage operations at gasoline dispensing facilities (GDFs). The methodology addresses emissions from underground storage tanks, vapor displacement during vehicle refueling, customer spillage, and hose permeation. The updated methodology uses emission factors developed by CARB staff that reflect more current in-use test data and also accounts for the emission reduction benefits of onboard refueling vapor recovery (ORVR) systems. The emission estimates are based on 2012 statewide gasoline sales data from the California Board of Equalization that were apportioned to the county level using fuel consumption estimates from EMFAC 2014. Emissions were grown based on the EMFAC2017 version model.

Additional information on this category is available at:
https://ww2.arb.ca.gov/arb-petroleum-production-and-marketing-methodologies-petroleum-marketing

Gasoline Cargo Tank

This category uses a 2002 CARB methodology to estimate emissions from gasoline cargo tanks. These emissions do not include the emissions from loading and unloading of gasoline cargo tank product; they are included in the gasoline terminal inventory and gasoline service station inventory. Pressure-related fugitive emissions are volatile organic vapors leaking from three points: fittings, valves, and other connecting points in the vapor collection system on a cargo tank. 1997 total gasoline sales were obtained from the California Department of Transportation. The emission factors are derived from the data in the report, "Emissions from Gasoline Cargo Tanks, First Edition," published by the Air and Waste Management Association in 2002.

The initial emission estimates for 1997 were grown to 2012 using a growth parameter developed by Pechan based on gasoline and oil expenditures data. Emissions were grown to 2017 and beyond according to fuel consumption from CARB's EMFAC 2017 mobile sources emission factors model.

Additional information on this methodology is available at:
https://ww2.arb.ca.gov/arb-petroleum-production-and-marketing-methodologies-petroleum-marketing

Marine Petroleum Loading

These categories are used to inventory 1987 hydrocarbon emissions associated with loading crude oil, residual oil, gasoline, and jet fuel into marine tankers and gasoline into barges. Emissions result from the displacement of vapors existing in the tank before loading and those generated as new product is loaded.

The amounts of crude oil, gasoline, jet fuel, and residual oil shipped off from California ports were obtained from a United States Army Corps of Engineers report "Waterborne Commerce of the United States, Calendar Year 1986" Part 4.

The emission factor for crude oil loading into tankers was obtained from the report "Hydrocarbon Emissions During Marine Loading of Crude Oils" from Western Oil and Gas Association (1977). The gasoline emission factors for loading into tankers and barges and jet fuel into tankers were obtained from CARB's "Report to the Legislature on Air Pollutant Emissions from Marine Vessels" (1984). The emission factor for residual oil loading into tankers was obtained from the "Inventory of Emissions from Marine Operations within California Coastal Waters, Preliminary Draft" report by Scott Environmental Technology, Inc. (1980). No growth was assumed for these emissions.

Additional information on this methodology is available at:
https://ww2.arb.ca.gov/arb-petroleum-production-and-marketing-methodologies-petroleum-marketing

Marine Petroleum Unloading

These categories are used to estimate hydrocarbon emissions associated with lightering crude oil and ballasting marine vessels after unloading crude oil or gasoline.

The amounts of crude oil and gasoline unloaded at California ports were obtained from the United States Army Corps of Engineers report "Waterborne Commerce of the United States, Calendar Year 1986" Part 4.

Crude oil lightering data was obtained from the Bay Area AQMD for 1987. Crude oil and gasoline ballasting data for San Luis Obispo for 1987 was obtained from the Army Corps of Engineers. The volume of water used for ballasting following a cargo discharge was obtained from CARB's "Report to the Legislature on Air Pollutant Emissions from Marine Vessels" (1984).

The crude oil lightering emission factor was obtained from "Hydrocarbon Emissions During Marine Loading of Crude Oils," Western Oil and Gas Association (1977).

Ballasting crude oil and gasoline vessels emission factors were obtained from "Inventory of Emissions from Marine Operations within the California Coastal waters," by Scott Environmental Technology, Inc. (1981). No growth is assumed for this category.

Additional information on this methodology is available at:
https://ww2.arb.ca.gov/arb-petroleum-production-and-marketing-methodologies-petroleum-marketing

Oil and Gas Production

The oil and natural gas production inventory is estimated by a 2015 CARB methodology. This category is related to fugitive emissions from production-related fuel consumption, fugitive losses (sumps, pits, pumps, compressors, well heads, separators, valves, and

fittings), vapor recovery and flares, tank and truck working and breathing losses, wastewater treatment, tertiary production, and wet and dry gas stripping. Emissions were calculated using U.S. EPA's Oil and Natural Gas Tool v1.4 with default emissions factors from ENVIRON Int'l Corp's 2012 report, "2011 Oil and Gas Emission Inventory Enhancement Project for CenSARA States," and activity data taken from California's Division of Oil, Gas, and Geothermal Resources (DOGGR) (which was renamed to Geologic Energy Management Division (CalGEM) in 2020). CARB also incorporated data from the 2007 Oil and Gas Industry Survey (e.g., typical component counts) and feedback from individual air districts (e.g., minimum controls required to operate in a certain district, with associated control factors) to improve these parameters and further adjust the tool's output. Emissions were grown to 2017 based on CalGEM historical statewide production. Growth in future years an assumed 2.9% annual decline, which reflects the statewide CalGEM trend from 2000 through 2016.

Additional information on this methodology is available at:
https://ww2.arb.ca.gov/resources/documents/oil-and-gas-industry-survey
https://ww3.arb.ca.gov/ei/areasrc/oilandgaseifinalreport.pdf

5.4.4 Area-Wide Sources

Area-wide sources include categories where emissions take place over a wide geographic area, such as consumer products. Emissions from these sources are estimated using various models and methodologies. Estimation methods include source testing, direct measurement by continuous emissions monitoring systems, or engineering calculations. Emissions for these categories are estimated by both CARB and the District.

The District's methodologies are available at:
http://www.valleyair.org/Air_Quality_Plans/EmissionsMethods/EmissionsMethods.htm

Estimates for the categories below were developed by CARB and have been reviewed by CARB staff to reflect the most up-to-date information:

Consumer Products and Aerosol Coatings

The Consumer Product emission estimates utilized sales and formulation data from the CARB's mandatory survey of all consumer products sold in California for calendar years 2013 through 2015 (2015 Consumer Product Survey). The aerosol coatings estimates utilized sales and formulation data from a survey conducted by CARB in 2010. Based on the survey data, CARB staff determined the total product sales and total VOC emissions for the various product categories. Growth for personal care products are based on real disposable personal income projections per REMI version 2.4.5. No growth is assumed for aerosol coatings. Growth for all other consumer products are based on DOF population projections, 2020.

Additional information on CARB's consumer products surveys is available at:
https://ww2.arb.ca.gov/our-work/programs/consumer-products-program/consumer-commercial-product-surveys

The methodology is available at:
[Solvent Evaporation Methodologies - Aerosol Coatings and Consumer Products | California Air Resources Board](#)

Architectural Coatings

Architectural coatings are coatings applied to stationary structures and their accessories. They include house paints, stains, industrial maintenance coatings, traffic coatings, and many other products. Industrial maintenance coatings are high performance architectural coatings formulated for application to substrates, including floors, exposed to extreme environmental conditions (e.g., immersion in water, chronic exposure to corrosive agents, frequent exposure to temperatures above 121°C, repeated heavy abrasion). The architectural coatings category reflects emission estimates based on a 2014 comprehensive CARB survey for the 2013 calendar year. The emission estimates include benefits of the 2007 CARB Suggested Control Measures. These emissions are grown based on DOF households forecast, 2020.

Additional information about CARB's architectural coatings program is available at: *https://ww2.arb.ca.gov/carb-solvent-evaporation-methodologies-architectural-coatings-and-cleaningthinning-solvents*

Pesticides

The California Department of Pesticide Regulation (DPR) develops month-specific emission estimates for agricultural and structural pesticides. Each calendar year, DPR updates the inventory based on the Pesticides Use Report, which provides updated information from 1990 through the 2020 calendar year. Agricultural pesticide emission forecasts for years 2021 and beyond are based on the average of the most recent five years. Growth for agricultural pesticides is based on CARB projections of farmland acres per FMMP, 2016. Growth for structural pesticides is based on DOF households growth projections, 2020.

Additional information about CARB's pesticides program is available at: *https://ww2.arb.ca.gov/carb-solvent-evaporation-methodologies-agricultural-and-non-agricultural-pesticides*

Residential Wood Combustion

Emissions were estimated for 2012 using a 2015 District methodology. The methodology is based on CARB's 2011 methodology, with several refinements based on a 2014 District survey. The inventory reflects the regional distribution and use of wood burning devices, refined fuel usage rates for several types of devices, and emissions reductions from the District's Burn Cleaner Program. The emissions estimates reflect emission factors from U.S. EPA's 2002 National Emission Inventory (NEI). CARB assumes no growth for this category based on the relatively stagnant residential wood fuel use over the past decade (according to the American Community Survey and US Energy Information Administration).

Additional information on CARB's 2011 methodology is available at:
https://ww2.arb.ca.gov/carb-miscellaneous-process-methodologies-residential-fuel-combustion

Residential Natural Gas Combustion

CARB staff updated the methodology to reflect 2017 fuel use from the California Energy Consumption Database. The emissions estimates reflect the most recent emissions factors from U.S. EPA's AP-42 for residential natural gas combustion. Growth is based on California Energy Commission (CEC) projections for natural gas consumption, 2019.

Additional information on this methodology is available at:
https://ww2.arb.ca.gov/carb-miscellaneous-process-methodologies-residential-fuel-combustion

Residential Distillate Oil and Liquefied Petroleum Gas

The residential distillate oil/liquefied petroleum gas (LPG) category includes emissions occurring in the residential sector. Distillate oil for heating is generally used in older homes and remote areas where natural gas lines are not available.

Activity is based on the number of housing units, population, and LPG and distillate oil capacities. The 1991 Fuels Report Working Paper published by the CEC was used to determine energy demand by fuel type in terms of the number of houses heated by a specific fuel in a particular area. Heating degree days (HDD) are used to estimate how many heating days are likely to occur in a particular area.

This category uses emission factors from U.S. EPA's AP-42. The emissions were initially calculated in 1993 then grown to 2012 using housing unit data from the DOF, 2013. Emissions were grown from 2012 to 2017 using a 'no growth' profile developed by Pechan (2012). Emissions post-2017 were grown based on EIA – SEDS, and no growth was assumed.

Additional information on this methodology is available at:
https://ww2.arb.ca.gov/carb-miscellaneous-process-methodologies-residential-fuel-combustion

Farming Operations

Tilling and Harvesting:
Emissions for Agricultural Land Preparation Operations and Agricultural Harvest Operations were updated based on 2012 harvested crop acreage from the USDA's National Agricultural Statistics Service (NASS). NASS data are based on reports compiled by County Agricultural Commissioner staff. Emission estimates for both categories are based on CARB methodologies and reflect crop and operation specific emission factors. Temporal profiles were updated based on crop specific activity profiles. Activity profiles for land preparation operations were developed by CARB, based on

monthly harvesting activity for 20 representative crops. Temporal profiles for harvesting operations were developed by the District, based on monthly harvesting activity for 46 representative crops. The District expanded the number of crop profiles to more completely characterize distinctions among groups of crops.

Activity profiles for harvesting were developed by the District and reflect refinements to Harvesting Growth is based on farmland acres per FMMP farmland acreage which results in a slight annual decline. The inventory also reflects the emission reductions from District Rule 4550.

Livestock:

CARB staff updated the non-cattle Livestock Husbandry methodology to reflect livestock population data based on the USDA's 2017 Census of Agriculture. Cattle emissions are primarily based on the 2012 Census of Agriculture. A seasonal adjustment was added to account for the suppression of dust emissions in months in which rainfall occurs. Growth profiles are based on CARB's projections of Census of Agriculture's historical livestock population trends, 2012. No growth is assumed for dairy and feedlots.

Additional information on CARB's methodology for farming operations is available at:
https://ww2.arb.ca.gov/carb-miscellaneous-process-methodologies-farming-operations

Construction and Demolition

Emission estimates for building construction and road construction operations are based on CARB methodologies. Emissions are estimated by applying emission factors developed by Midwest Research Institute (MRI) to the acreage disturbed by construction.

For building construction, the emission estimates in 2017 were grown from CARB estimates developed in 2002. The growth profile for building construction is based on construction jobs projections from the REMI county economic forecast model.

For road construction, the 2017 emissions were updated based on the average of lane miles constructed between 2005 and 2019 based on the 2019 FTIP data provided by the SJV transportation planning agencies (TPAs). The growth profile for road construction is based on the future planned construction from the 2019 FTIP.

The inventory reflects emission reductions from District Regulation VIII. Additional information on these methodologies is available at:
https://www.arb.ca.gov/ei/areasrc/arbmiscprocconstdem.htm

Paved Road Dust

Paved road dust emissions for 2017 were estimated in 2021 using a CARB methodology consistent with the current U.S. EPA method (AP-42). Data from CARB's EMFAC2017 model, the District, and the Valley MPOs were used to estimate region specific vehicle miles traveled (VMT). VMT were distributed using 2017 travel fractions calculated using California Department of Transportation (Caltrans) Highway Performance Monitoring System (HPMS) data, by COADBIS, for each of five road types: freeway, major, collector,

and local/local urban, and local rural. Emissions were grown using MPO VMT projections.

Additional information on this methodology is available at:
https://ww2.arb.ca.gov/carb-miscellaneous-process-methodologies-paved-road-dust

Unpaved Road Dust – Farm Roads

Emissions for unpaved farm roads are based on CARB's methodology and 2012 harvested crop acreage from NASS. Emissions reflect crop specific VMT rates and an emission factor based on California test data conducted by the University of California, Davis (UC Davis), and the Desert Research Institute (DRI). Temporal profiles are based on crop specific activity profiles. Growth for this category is based on projected FMMP farmland acreage, 2016.

Additional information on this methodology is available at:
https://ww3.arb.ca.gov/ei/areasrc/fullpdf/full7-11_2016.pdfe

Unpaved Nonfarm Road Dust

Emissions from unpaved nonfarm roads were estimated from 2008 unpaved road data collected from the California Statewide Local Streets and Roads Needs Assessment, Caltrans, and local agencies. Dust emissions were calculated using an emission factor derived from tests conducted by UC Davis and DRI. In addition, a rainfall adjustment factor was applied. CARB staff assumed no growth for this category based on the assumption that existing unpaved roads tend to get paved as vehicle traffic on them increases, which counteracts any additional emissions from new unpaved roads.

Additional information on this methodology is available at:
https://ww3.arb.ca.gov/ei/areasrc/fullpdf/full7-10_2012.pdf

Fugitive Windblown Dust from Agriculture Lands (Non-Pasture) and Pasture Lands

Fugitive windblown dust emissions were estimated using CARB's 1997 methodology. The methodology is based on 1993 harvested crop acreage and a wind erosion equation that incorporates climate, soil, and vegetative cover attributes. Emissions for agricultural lands were grown based on projections of acreage from FMMP Acreage, 2016. Emissions for pasture lands were grown from FMMP Grazing, 2016.

Additional information on this methodology is available at:
https://ww3.arb.ca.gov/ei/areasrc/onehtm/one7-12.htm

Windblown Dust from Unpaved Roads and Associated Areas

Emissions for this source category were estimated based on a 1997 CARB methodology reflecting unpaved road mileage and local parameters that affect wind erosion. The estimates assume no growth.

Additional information on this methodology is available at:
https://ww3.arb.ca.gov/ei/areasrc/onehtm/one7-13.htm

Fires

Emissions from structural and automobile fires were estimated based on a 1999 CARB methodology using the number of fires and the associated emission factors. Estimates for structural fires are calculated using the amount of the structure that is burned, the amount and content of the material burned, and emission factors derived from test data. Estimates for automobile fires are calculated using the weight of the car and components and composite emission factors derived from AP-42 emission factors. Structural fire growth is based on DOF households forecasts, 2020, and automobile fire growth is based on DOF population forecasts, 2020.

Additional information on this methodology is available at:
https://ww2.arb.ca.gov/carb-miscellaneous-process-methodologies-fires

Managed Burning & Disposal – Forest Management

Forest Management Managed Burning and Disposal category provides emission estimates from prescribed burning performed in natural vegetation types such as forests and woodlands.

Burn project perimeters and ignition dates are provided by the 2019 California Department of Forestry and Fire Protection (FRAP) geodatabase. Forest management prescribed burning emissions are estimated using the First Order Fire Effects Model (FOFEM 6.7) and a custom geoprocessing tool (Emission Estimation System, EES) developed for CARB by researchers at UC Berkeley. Future year estimates are based on a 10-year average, held flat in the forecast.

Additional information on this methodology is available at:
https://ww2.arb.ca.gov/district-miscellaneous-process-methodologies-managed-burning-and-disposal

Managed Burning & Disposal – Range Improvement

The Range Improvement Managed Burning and Disposal category provides emission estimates from prescribed burning performed in natural vegetation types (principally grasslands) for the purpose of forage or habitat improvement. Burn project parameters and ignition dates are provided by the 2019 California Department of Forestry and Fire Protection (FRAP) geodatabase. Range Improvement prescribed burning emissions are estimated using the First Order Fire Effects Model (FOFEM 6.7) and a custom geoprocessing tool (Emission Estimation System, EES) developed for CARB by researchers at UC Berkeley. Future year estimates are based on a 10-year average, held flat in the forecast.

Additional information on this methodology is available at:

https://ww2.arb.ca.gov/district-miscellaneous-process-methodologies-managed-burning-and-disposal

5.4.5 Natural Sources

Biogenic Vegetation (ROG) and Soil (NOx)

Biogenic emissions were generated using the Model of Emissions of Gases and Aerosols from Nature (MEGAN3.0) biogenics emissions model (https://bai.ess.uci.edu/megan). MEGAN3.0 incorporates a new pre-processor (MEGAN-EFP) for estimating biogenic emission factors based on available landcover and emissions data. The MEGAN3.0 default datasets for plant growth form, eco-type, and emissions were utilized. Leaf Area Index (LAI) for non-urban grid cells was based on the 8-day 500 m resolution Moderate Resolution Imaging Spectroradiometer (MODIS) Terra/Aqua combined product (MCD15A2H) for 2017 (https://earthdata.nasa.gov/). The LAI data was converted to LAIv, which represents the LAI for the vegetated fraction within each grid cell, by dividing the gridded MODIS LAI values by the Maximum Green Vegetation Fraction for each grid cell (https://archive.usgs.gov/archive/sites/landcover.usgs.gov/green_veg.html). The MODIS LAI product does not provide information on LAI in urban regions, so urban LAIv was estimated from the US Forest Service's Forest Inventory and Analysis urban tree plot data, processed through the i-Tree v6 software (*https://www.itreetools.org/tools/i-tree-eco*). Hourly meteorology for MEGAN was provided by the 4 km WRF simulation described above, and all stress factor adjustments were turned off.

MEGAN implemented the parameterized scheme Yiener-Levy (YL95) to estimate soil NOx (Yienger et al., 1995). Main features include separate exponential temperature dependence for wet soils and linear dependence for dry soils. An optimal temperature above which flux becomes temperature independent, scalar adjustments to account for both "pulsing" and canopy reduction, synoptic-scale temperature and precipitation forcing, an explicit linear dependence of emission on fertilizer rate.

References:
Guenther, A. B., X. Jiang, C. L. Heald, T. Sakulyanontvittaya, T. Duhl, L. K. Emmons, and X. Wang (2012). The Model of Emissions of Gases and Aerosols from Nature version 2.1 (MEGAN2.1): an extended and updated framework for modeling biogenic emissions, *Geosci. Model Dev.*, *5*(6), 1471-1492.

Guenther, A., Huang, L., Shah, T., Wentland, A., Jung, J., Beardsley, R., Johnson, J., Hsieh, W., Kemball-cook, S., and Yarwood, G. (2017). A Next Generation Modeling System for Estimating Texas Biogenic VOC Emissions. (AQRP Project 16-011).

Yienger, J. and Levy, H.: Empirical model of global soil-biogenic NOx emissions, J. Geophys. Res.-Atmos., 100, 11447–11464, 1995.

Wildfires

The wildfires category provides emission estimates from wildfires that occurred in natural vegetation types such as forests, woodlands, shrublands and grasslands.

Wildfire perimeters and ignition dates are provided by the 2019 California Department of Forestry and Fire Protection (FRAP) geodatabase. Wildfire emissions are estimated using the First Order Fire Effects Model (FOFEM 6.7) and a custom geoprocessing tool (Emission Estimation System, EES) developed for CARB by researchers at UC Berkeley. Future year estimates are based on a 10-year average, held flat in the forecast.

Additional information on this methodology is available at:
https://ww2.arb.ca.gov/carb-natural-non-anthropogenic-source-methodologies-wildfires

5.4.6   Point and Areawide Source Emissions Forecasting

Emission forecasts (2018 and subsequent years) are based on growth profiles that in many cases incorporate historical trends up to the base year or beyond. The growth surrogates used to forecast the emissions from these categories are presented below in Table 5-6. The emissions inventory also reflects emission reductions from point and areawide sources subject to District rules and CARB regulations. The rules and regulations reflected in the inventory are listed below in Table 5-7.

Table 5-6 Growth Surrogates for Point and Areawide Sources

Source Category	Subcategory	Growth Surrogate
Electric Utilities	Natural Gas	California Energy Commission (CEC) Integrated Energy Policy Report forecast, 2019
	Other Fuels	Energy Information Administration (EIA) Annual Energy Outlook, 2019
Cogeneration	All	CEC forecast, 2019
Oil and Gas Production (Combustion)	All	CalGEM statewide total oil production. Assumed 2.9% annual decline reflecting CalGEM historical trend, 2000 through 2016
Petroleum Refining (Combustion)	All	No growth assumption
Manufacturing and Industrial	Natural Gas	CEC forecast, 2019
	Other Fuels	EIA forecast, 2018
Food and Agricultural Processing	Ag Irrigation I. C. Engines	FMMP irrigated farmland acreage, 2008
	Natural Gas	CEC forecast, 2019
	Others	REMI economic forecast, version 2.4.5; EIA forecast, 2018
Service and Commercial	Natural Gas	CEC forecast, 2019
	Other Fuels	EIA forecast, 2018
Other (Fuel Combustion)	Diesel	Modeled estimate, 2003
	Other than diesel	EIA forecast, 2018
Waste Disposal	All	DOF population forecast, 2020
Laundering	Dry Cleaning	DOF population forecast, 2020
Degreasing	All	CARB/REMI economic forecast, version 2.4.5
Coatings & Thinners	Auto Refinishing	Vehicles from CARB EMFAC2017 model
	Others	REMI economic forecast, version 2.4.5
Printing	All	REMI economic forecast, version 2.4.5
Adhesives & Sealants	All	REMI economic forecast, version 2.4.5
Oil and Gas Production	All	Assumed 2.9% annual decline reflecting CalGEM historical trend, 2000 through 2016
Petroleum Refining	All	No growth assumption
Petroleum Marketing	Natural Gas Transmission	CEC forecast, 2019
	Gas Dispensing Facilities and Cargo Tanks	Fuel use from CARB EMFAC2017 model

Source Category	Subcategory	Growth Surrogate
	Other Point Sources	REMI economic forecast, version 2.4.5
Chemical	All	REMI economic forecast, version 2.4.5
Food & Agriculture	All	REMI economic forecast, version 2.4.5
Mineral Processes	All	REMI version 2.4.5; EIA forecast, 2018
Metal Processes	All	REMI economic forecast, version 2.4.5
Glass and Related Products	Container Glass, Other Glass	No growth assumption
	Flat Glass	Modeled estimate, 2012
Other Industrial Processes	All	REMI economic forecast, version 2.4.5
Consumer Products	Personal Care Products	Real Disposable Personal Income per REMI, version 2.4.5
	Other Consumer Products	DOF population forecast, 2020
	Aerosol Coatings	No growth
Architectural Coatings & Related Process Solvents	All	DOF households forecast, 2020
Pesticides & Fertilizers	Agricultural Pesticides	CARB projection of farmland acres per FMMP, 2016
	Structural Pesticides	DOF households forecast, 2020
Asphalt Paving & Roofing	All	DOF construction jobs forecast, 2020; CARB projection
Residential Fuel Combustion	Natural Gas	CEC forecast, 2019
	Other Fuels	EIA – SEDS – No growth
Farming Operations	Tilling and Harvesting	CARB projection of farmland acres per FMMP, 2016
	Dairy / Feedlots	No growth
	Other Livestock	CARB projection of livestock population per Census of Agriculture, 2012
Construction and Demolition	Building Construction	MI economic forecast, version 2.4.5
	Road Construction	MPOs / 2019 FTIP Planned Lane Miles

Source Category	Subcategory	Growth Surrogate
Paved Road Dust	All	MPO VMT projections, 2019
Unpaved Road Dust	City and County Roads, U.S. Forest, B.L.M	No Growth
	Farm Roads	FMMP Acreage, 2016
Fugitive Windblown Dust	Agricultural Lands (Non-Pasture	FMMP Acreage, 2016 FMMP Grazing, 2016
Fires	Structural	DOF households forecast, 2020
	Automobile	DOF population forecast, 2020
Managed Burning and Disposal	Agricultural Burning, Pruning & Field Crops	FMMP farmland acreage projection, 2016
	Non-Agricultural Open Burning	Rural counties: DOF population forecast, 2020. Urban counties: no growth.
	Unspecified Waste Burning	DOF population forecast, 2020
	Forest Management and Range Improvement	10-year average, held flat
	Others	No growth
Cooking	All	DOF population forecast, 2020
Natural Sources:	Biogenics Vegetation	Held flat in the projection
	Soil NOx	Held flat in the projection. Soil NOx is being presented as a line item in the plan
	Wildfires	10-year average, held flat

Table 5-7 District and CARB Control Rules and Regulations Included in the Inventory for Stationary Sources

Agency	Rule/Reg No.	Rule Title	Source Categories Impacted
SJU_APCD	4103	Open Burning	Agricultural burning
SJU_APCD	4305	Boilers, Process Heaters, and Steam Generators - Phase 2	Fuel combustion / Boilers, Process Heaters, and Steam Generators
SJU_APCD	4306	Boilers, Process Heaters, and Steam Generators - Phase 3	Fuel combustion / Boilers, Process Heaters, and Steam Generators
SJU_APCD	4307	Boilers, Process Heaters, and Steam Generators - 2.0 MMBTU/HR to 5.0 MMBTU/HR	Fuel combustion / Boilers, Process Heaters, and Steam Generators
SJU_APCD	4308	Boilers, Process Heaters, and Steam Generators - 0.075 MMBTU/HR to Less Than 2.0 MMBTU/HR	Fuel combustion / Boilers, Process Heaters, and Steam Generators
SJU_APCD	4309	Dryers, Dehydrators, and Ovens	Industrial processes - dryers, dehydrators and ovens
SJU_APCD	4311	Flares	Oil and gas production- Vapor Recovery
SJU_APCD	4351	Boilers, Process Heaters, and Steam Generators - Phase 1	Fuel combustion / Boilers, Process Heaters, and Steam Generators
SJU_APCD	4352	Solid Fuel Fired Boilers, Steam Generators and Process Heaters	Fuel combustion / Boilers, Process Heaters, and Steam Generators
SJU_APCD	4354	Glass Melting Furnaces	Glass manufacturing
SJU_APCD	4401	Steam-Enhanced Crude Oil Production Wells	Oil and gas production - vapor recovery
SJU_APCD	4402	Crude Oil Production Sumps	Oil and gas production - fugitive losses
SJU_APCD	4408	Glycol Dehydration Systems	Oil and gas production - dehydrators
SJU_APCD	4409	Components at Light Crude Oil Production Facilities, Natural Gas Production Facilities, and Natural Gas Processing Facilities	Oil and gas production - fugitive losses
SJU_APCD	4455	Components at Petroleum Refineries, Gas Liquids Processing Facilities, and Chemical Plants	Petroleum refining - fugitive losses

Agency	Rule/Reg No.	Rule Title	Source Categories Impacted
SJU_APCD	4550	Conservation Management Practices	Tilling and Harvesting, Unpaved Road Dust, and Fugitive Windblown Dust
SJU_APCD	4565	Biosolids, Animal Manure, and Poultry Litter Operations	Composting operations
SJU_APCD	4566	Organic Material Composting Operations	Composting operations
SJU_APCD	4570	Confined Animal Facilities	Livestock operations
SJU_APCD	4601	Architectural Coatings	Architectural coatings and related process solvents
SJU_APCD	4602	Motor Vehicle and Mobile Equipment Coating Operations	Coatings and related process solvents - auto refinishing
SJU_APCD	4603	Surface Coating of Metal Parts and Products, Plastic Parts and Products, and Pleasure Crafts	Coatings and related process solvents - metal parts and products coatings
SJU_APCD	4604	Can and Coil Coating Operations	Coatings and related process solvents - can and coil coatings
SJU_APCD	4605	Aerospace Assembly and Component Coating Operations	Coatings and related process solvents - aerospace assembly and component coatings
SJU_APCD	4606	Wood Coating Operations	Coatings and related process solvents - wood coatings operations
SJU_APCD	4607	Graphic Arts and Paper, Film, Foil and Fabric Coatings	Printing, coatings and related process solvents
SJU_APCD	4610	Glass Coating Operations	Coatings and related process solvents - glass coating operations
SJU_APCD	4612	Automotive Coatings	Coatings and related process solvents - auto refinishing
SJU_APCD	4621	Gasoline Transfer into Stationary Storage Containers, Delivery Vessels, and Bulk Plants	Petroleum marketing - gasoline transfer
SJU_APCD	4622	Gas Transfer into Vehicle Storage Fuel Tanks	Petroleum marketing - vehicle refueling
SJU_APCD	4623	Storage of Organic Liquids	Petroleum refining; petroleum marketing, oil and gas production - organic liquid storage
SJU_APCD	4624	Organic Liquid Loading	Petroleum marketing - organic liquid loading

Agency	Rule/Reg No.	Rule Title	Source Categories Impacted
SJU_APCD	4625	Wastewater Separators	Petroleum refining - waste water treatment
SJU_APCD	4641	Cutback, Slow Cure, and Emulsified Asphalt Paving and Maintenance Operations	Asphalt paving or roofing
SJU_APCD	4642	Solid Waste Disposal Sites	Landfills; waste disposal
SJU_APCD	4651	Volatile Organic Compound Emissions from Decontaminated Soil	Waste disposal / Soil remediation
SJU_APCD	4653	Adhesives and Sealants	Adhesives & sealants
SJU_APCD	4661	Organic Solvents	Coatings and related process solvents; cleaning and surface coatings
SJU_APCD	4662	Organic Solvent Degreasing Operations	Degreasing
SJU_APCD	4663	Organic Solvent Cleaning, Storage and Disposal	Degreasing; cleaning & surface coating
SJU_APCD	4672	Petroleum Solvent Dry Cleaners	Laundering
SJU_APCD	4681	Rubber Tire Manufacturing	Rubber and rubber products manufacturing
SJU_APCD	4682	Polystyrene, Polyethylene, and Polypropylene Products Manufacturing	Plastic and plastic products manufacturing
SJU_APCD	4684	Polyester Resin Operations	Fiberglass and fiberglass products manufacturing
SJU_APCD	4691	Vegetable Oil Processing Operations	Food and agriculture
SJU_APCD	4692	Commercial Charbroiling	Cooking
SJU_APCD	4693	Bakery Ovens	Bakeries
SJU_APCD	4701	Internal Combustion Engines (Phase 1)	Fuel combustion - internal combustion engines
SJU_APCD	4702	Internal Combustion Engines (Phase 2)	Fuel combustion - internal combustion engines
SJU_APCD	4703	Stationary Gas Turbines	Fuel combustion - stationary gas turbines
SJU_APCD	4901	Wood Burning Fireplaces and Wood Burning Heaters	Residential wood combustion
SJU_APCD	4902	Residual Water Heaters	Residential fuel combustion
SJU_APCD	4905	Natural Gas-Fired, Fan-Type Central Furnaces	Service and Commercial / Residential Fuel Combustion - Space Heating

Agency	Rule/Reg No.	Rule Title	Source Categories Impacted
SJU_APCD	REG8	Regulation VIII PM controls	Fugitive Dust
CARB	ARB_R003 & ARB_R003_A	Consumer Product Regulations & Amendments	Consumer products
CARB	ARB_R007	Aerosol Coating Regulations	Aerosol coatings
CARB	GDF_HOSREG	Gasoline Dispensing Facility Hose Emission Regulation	Petroleum marketing - gasoline dispensing facility hoses
CARB	ORVR	Fueling emissions from ORVR vehicles	Petroleum marketing - fueling emissions from ORVR vehicles
CARB	AG_IC_ENG	AG IC Engine Emission Scalars	Agricultural IC Engines
CARB	NONAGICENG	Non-Ag IC Engine Emission Scalars	Non-agricultural IC Engines

5.4.7 External Adjustments

External adjustments were made in CEPAM to account for military growth and other unaccounted regulatory factors. The external adjustments reflected in the CEPAM 2022 PM2.5 Plans v1.00 inventory are listed below in Table 5-8.

Table 5-8 External Adjustment IDs and Descriptions

Adjustment ID	Adjustment Description
HD_I/M	Heavy-Duty Inspection and Maintenance (HD I/M) Regulation adopted by CARB, Dec 2021
ACC_II	Advanced Clean Cars (ACC II) Regulation adopted by CARB, Nov 2022
LEMOORE	External adjustments for NAS Lemoore
NonAg_ICE	Non-ag internal combustion engines adjustment to reflect 2003 ATCM and 2010 rule amendment
SJV_Const	SJV Construction and Mining Equipment -- Recession/Recovery Adjustment (period 2011-2019)

5.5   CONDENSABLE PARTICULATE MATTER

5.5.1 Background

Condensable particulate matter (PM) is material that is vapor phase at stack conditions, but which condenses and/or reacts upon cooling and dilution in the ambient air to form solid or liquid PM immediately after discharge from the stack. Condensable PM is a component of primary PM, which is the sum of condensable and filterable PM. Filterable PM comprises particles that are directly emitted by a source as a solid or liquid [aerosol]

at stack or release conditions. All condensable PM is assumed to be smaller than 2.5 microns (μm) in diameter.

The AERR requires states to report annual emissions of filterable and condensable components of PM2.5 and PM10, "as applicable," for large sources every inventory year and for all sources every third inventory year, beginning with 2011.[9] Subsequent emissions inventory guidance[10] from the U.S. EPA clarifies the meaning of the phrase "as applicable" by providing a list of source types for which condensable PM is expected by the AERR. These source types are stationary point and nonpoint combustion sources that are expected to generate condensable PM and include, for instance, commercial cooking, fuel combustion at electric generating utilities, industrial processes like cement or chemical manufacturing, and flares or incinerators associated with waste disposal. The condensable PM from stationary and areawide sources in this inventory is calculated using the methodology outlined below. Condensable PM is not required to be calculated for mobile sources.

5.5.2 Methodology

For the current inventory, the District has collected data on primary PM only, containing both filterable and condensable components without distinguishing between the two. Consequently, to be able to report emissions of the condensable component of PM2.5 separately as required by the AERR, primary PM2.5 is augmented to condensable PM using recommended fractions from U.S. EPA, which are published within their Emissions Inventory System (EIS) Gateway[11]. Because these factors are assigned to Source Classification Codes (SCC), CARB Emission Inventory Codes (EICs) are crosswalked to SCC codes. These factors are then directly applied (multiplied) to primary PM2.5 to calculate condensable PM.

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[9] 40 CFR §51.15(a)(1) and §51.30(b)(1)

[10] U.S. EPA. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations. May 2017. https://www.epa.gov/sites/production/files/2017-07/documents/ei_guidance_may_2017_final_rev.pdf

[11] EIS Gateway downloaded on 08/20.2022. https://www.epa.gov/air-emissions-inventories/emissions-inventory-system-eis-gateway

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