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2020 Periodic Emissions Inventory for Ozone Precursors

For Maricopa County and the Phoenix-Mesa Nonattainment Areas for the 2008 and 2015 8-Hour Ozone Standards

Maricopa County Air Quality Department

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1. Introduction

1.1 Overview

This 2020 periodic emissions inventory (PEI) for ozone precursors has been developed to meet requirements set forth in Title I of the Clean Air Act Amendments of 1990 (CAAA), which requires the development of a baseline emissions in

ventory and periodic revisions for areas that fail to meet the National Ambient Air Quality Standards (NAAQS). A portion of Maricopa County is classified as nonattainment for the 2008 and the 2015 8-hour ozone standards.

This inventory includes emission estimates for three ozone precursors: volatile organic compounds (VOCs), carbon monoxide (CO) and nitrogen oxides (NO_x). VOC is defined by Maricopa County's Rule 100 as "any organic compound that participates in atmospheric photochemical reactions, except the non-precursor organic compounds." The inventory provides emission estimates from point, area, nonroad mobile, onroad mobile, and biogenic sources. Note that totals shown in tables may not equal the sum of individual values due to independent rounding.

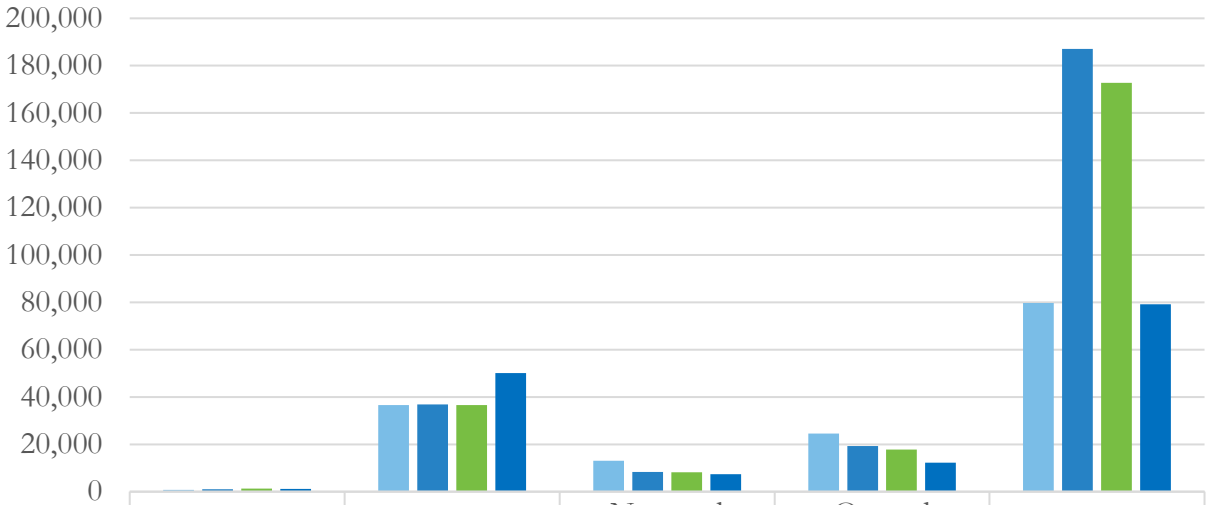
1.2 Comparison Between PEIs

This section provides an analysis between PEI years to show changes in emissions and explain differences. It is important to note that methodologies to calculate emissions and emissions models can change substantially over time. There will always be slight variations in emissions that are due to the changes in assumptions and estimation methodology. Emission estimation methodologies will continue to improve over time as we obtain more accurate local information and emissions models are refined.

1.2.1 Volatile Organic Compounds

Emissions of VOC from point, nonroad mobile, and onroad mobile sources decreased slightly in 2020 compared to previous PEI years. Biogenic VOC emissions decreased significantly compared to 2014 and 2017 but remained similar to biogenic VOC emissions estimates for the 2011 PEI year. VOC emissions from nonpoint sources increased by more than 13,000 tons, or nearly 37%, compared to the 2011, 2014, and 2017 PEI estimates. Figure 1.2–1 shows VOC emissions by source category compared to previous PEI years.

Figure 1.2.1–1: Chart of VOC emissions (tons/year) within Maricopa County by source category in 2011, 2014, 2017, and 2020.



	Point	Nonpoint	Nonroad Mobile	Onroad Mobile	Biogenic
2011	769	36,655	13,060	24,557	79,715
2014	1,042	36,838	8,288	19,309	187,066
2017	1,345	36,548	8,215	17,753	172,732
2020	1,118	50,170	7,364	12,225	79,213

The significant increase in nonpoint VOC emissions was primarily caused by wildfires, where VOC emissions increased from 259 tons in 2017 to 13,784 tons in 2020. The Western United States was heavily impacted by multiple large wildfires in 2020, including the Bush fire that burned over 190,000 acres in Maricopa and Gila Counties. This was the fifth largest wildfire in Arizona history, and it had a tremendous impact on total VOC emissions in Maricopa County for the 2020 PEI.

In addition, new methodology was used by EPA to estimate wildfire emissions for the 2020 National Emissions Inventory (NEI). This methodology is more comprehensive than what has been used for previous PEI estimates, because it considers the actual locations of fires, the density of vegetation present at fire locations, and the heat generated at each location to determine emissions from flaming and smoldering wildfires. Due to the comprehensive methods for estimating wildfire emissions, MCAQD used EPA estimates for wildfire emissions in Maricopa County for the 2020 PEI.

Emissions estimates for commercial cooking and residential wood combustion also increased significantly compared to 2017. The increases in commercial cooking were due to new methodology developed by EPA for estimating emissions. The increases in emissions from residential wood combustion were observed in many states and may have been related to people spending more time at home due to the COVID-19 pandemic.

Emissions from onroad mobile sources decreased significantly in 2020 compared to previous years. The downward trend in onroad mobile source emissions was expected to continue in the 2020 PEI, because newer, cleaner cars are continually added to the fleet and older cars are retired. However, the magnitude of the decrease (30%) cannot be attributed solely to fleet turnover. Rather, it is likely

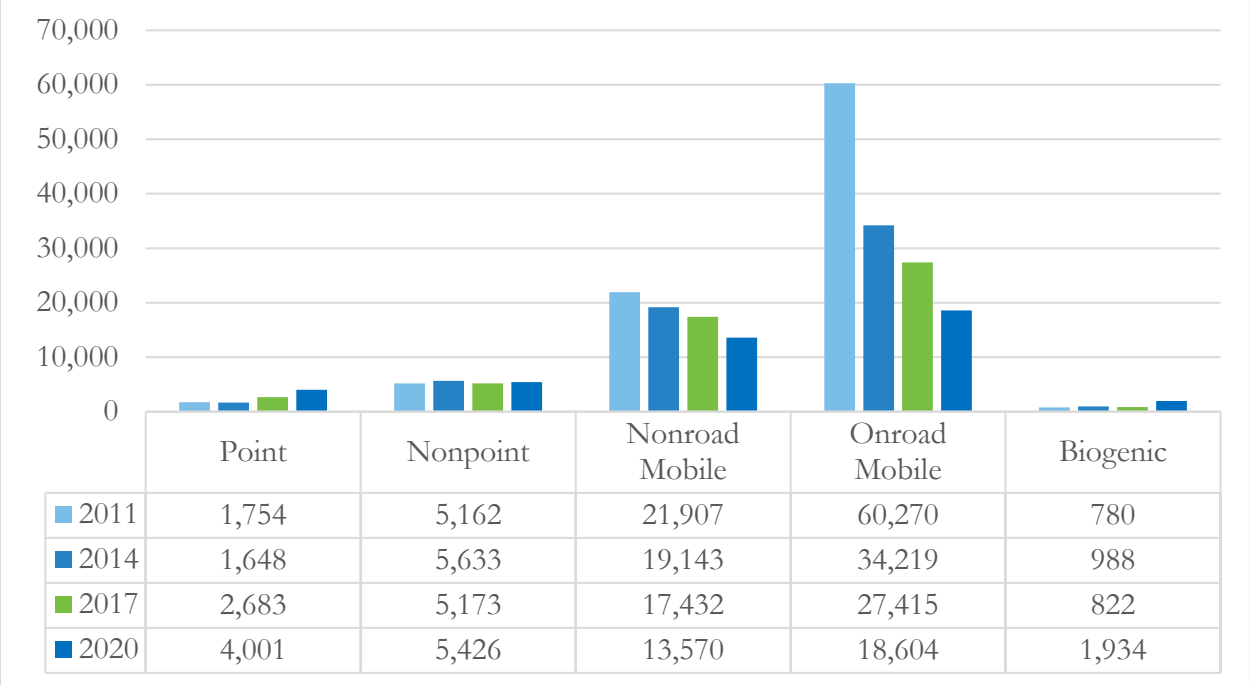
that the COVID-19 pandemic and the associated Stay Home, Stay Connected, Stay Healthy Order (Arizona Executive Order 2020-18) had a significant impact on vehicle miles traveled during 2020.

The changes to biogenic emissions between 2017 and 2020 were caused by changes in meteorology, improvements to the modeling platform, and improvements to how the meteorology field used in the model was generated.

1.2.2 Nitrogen Oxides

Emissions of NO_X from nonroad and onroad mobile sources decreased significantly in 2020 compared to previous PEI years, while point and biogenic NO_X emissions increased significantly compared to the 2017 year. Increased point source NO_X emissions were largely caused by increased power generation and increased activity at several point sources located in Maricopa County. Figure 1.2–2 shows VOC emissions by source category compared to previous PEI years.

Figure 1.2.2–1: Chart of NO_X emissions (tons/year) within Maricopa County by source category in 2011, 2014, 2017, and 2020.



	Point	Nonpoint	Nonroad Mobile	Onroad Mobile	Biogenic
2011	1,754	5,162	21,907	60,270	780
2014	1,648	5,633	19,143	34,219	988
2017	2,683	5,173	17,432	27,415	822
2020	4,001	5,426	13,570	18,604	1,934

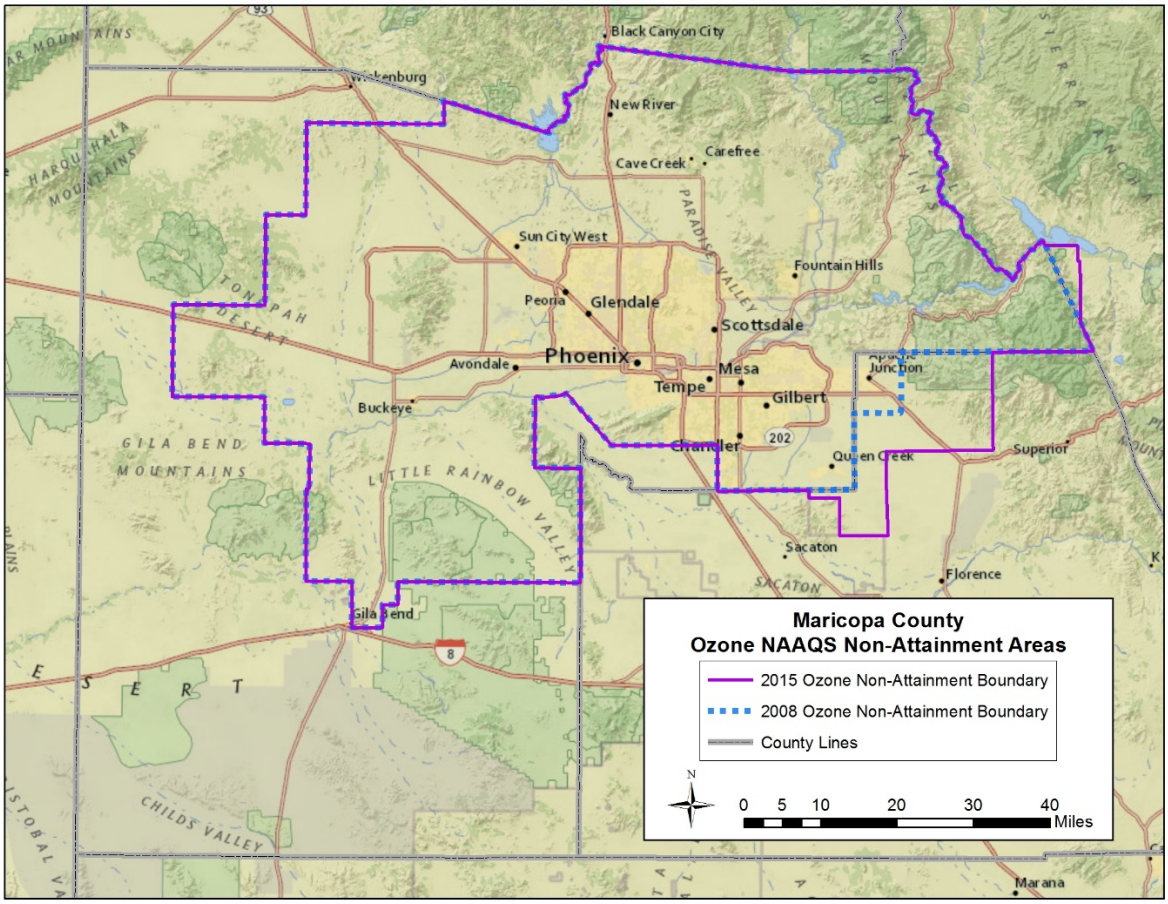
1.3 Temporal Scope

Both annual and ozone season-day emissions were estimated for the year 2020 for both Maricopa County and the 2008 and 2015 ozone nonattainment areas (NAA). The 3-month peak ozone season for the Maricopa County NAA has been defined as the June–August timeframe, which encompasses the period during which the region experiences the highest monitored ozone concentrations, the highest average Air Quality Index (AQI) values, and the most frequent exceedances of the 2008 and 2015 8-hour ozone NAAQS.

1.4 Geographic Scope

This inventory includes emission estimates for Maricopa County and for the 2008 and 2015 8-hour ozone NAAs. Maricopa County encompasses 9,223 square miles of land area, while the 2008 ozone NAA is 5,018 square miles or about 54 percent of the Maricopa County land area, and the 2015 ozone NAA is 5,288 square miles or about 57 percent of the Maricopa County land area. The southeastern portion of the 2008 ozone NAA includes 48 square miles located within Pinal County (0.96% of the 2008 NAA). The southeastern portion of the 2015 ozone NAA includes 296 square miles located within Pinal County (5.6% of the 2015 NAA). A map of Maricopa County and the 2008 and 2015 8-hour ozone NAAs is provided in Figure 1.4–1.

Figure 1.2.2–1: Map of Maricopa County and the 2008 and 2015 8-hour ozone NAAs.



1.5 Overview of Local Demographic and Land Use Data

Many of the emissions estimates generated in this report were calculated using demographic and land use data provided by the Maricopa Association of Governments (MAG). These data were used to apportion and/or scale Maricopa County emissions estimates to the NAAs and vice versa. For example, county-level emissions from residential natural gas usage in Maricopa County were apportioned to the NAAs using the ratio of total population in each area. Detailed explanations of

how emission estimates were apportioned or scaled are presented in each of the following chapters, along with the data sources used.

1.5.1 Demographic Profile

The demographic data provided by MAG included population, employment data, and the percentage of single and multi-family housing units for calendar year 2020 for both Maricopa County and the 8-hour ozone NAAs. Table 1.5–1 provides an overview of the key demographic data used in this report. As noted throughout the text, these data are frequently used to derive estimates of activity or emissions within the 2008 and 2015 8-hour ozone NAAs from county-level calculations. It is important to note, however, that the 2008 8-hour ozone NAA includes a portion of Pinal County, AZ and the 2015 8-hour ozone NAA also contains a portion of Gila County, AZ as shown in Figure 1.2.2–1. The population of NAAs may exceed the population of Maricopa County because the boundaries of the nonattainment areas include portions of other counties

Table 1.5–1: Demographic profile of Maricopa County and the 2008 and 2015 ozone NAAs.

Demographic Variable	Maricopa County	2008 Ozone NAA	2015 Ozone NAA
Population:			
Resident population	4,436,908	4,474,633	4,421,737
Non-resident population	468,352	470,767	456,644
Total population	**4,905,260**	**4,945,400**	**4,878,381**
Employment:			
Retail	490,062	487,306	489,894
Office	589,042	588,571	588,778
Public	139,475	139,806	141,448
Other	266,859	264,855	266,087
Total commercial/institutional*	1,485,438	1,480,538	1,486,207
Industrial	364,488	362,949	723,842
Construction	59,554	59,160	59,330
Work at home	134,235	134,387	135,764
Not site-based	192,632	192,356	193,496
Total employment	**2,236,347**	**2,229,390**	**2,598,639**
Housing units			
Single family	80%	80%	80%
Multi-family	20%	20%	20%

*Retail, office, public, and other employment comprise the commercial/institutional employment sector.

1.5.2 Land Use Data

MAG provided 2020 land use data which are developed from using satellite and Geographic Information System (GIS) techniques. Table 1.5–2 presents a listing of the land use categories used, the acreages of each land use type within Maricopa County, and the 2008 and 2015 8-hour ozone NAAs.

Table 1.5–2: Acreage by land use category of Maricopa County and the 2008 and 2015 ozone NAAs.

Land Use	Maricopa County	2008 8-Hour Ozone NAA	2015 8-Hour Ozone NAA
Residential	490,771	488,162	506,971
Commercial	37,770	37,213	37,606
Industrial	37,689	37,607	37,710
Office	9,634	9,633	9,654
Tourist and Visitor Accommodations	3,446	2,815	2,822
Educational	21,894	21,940	22,556
Institutional	7,989	8,035	8,177
Public Facilities, Military, Special Events	44,420	42,709	43,217
Landfill, Other Employment	35,559	35,209	35,738
Solar Generating Stations	8,523	3,878	3,878
Transportation and Parking	73,948	66,099	66,796
Railroad	6,388	3,430	3,571
Airports	11,062	9,850	9,850
General/Active Open Space	193,864	193,890	194,817
Golf Courses	31,529	30,988	32,485
Passive/Restricted Open Space/Water	3,469,647	1,304,068	1,360,070
Multiple Use/Business Park	361	361	361
Agriculture	252,256	140,737	149,678
Abandoned Agriculture	31,018	18,606	19,316
Dairy/Feedlot	5,528	4,563	4,600
Vacant	1,115,028	737,085	819,134
Developing Residential	13,633	13,606	14,683
Developing Non-residential	903	903	904
Total	5,902,860	3,211,387	3,384,593

1.6 Emissions Overview by Source Category

1.6.1 Point Sources

The point source category includes those stationary sources that emit a significant amount of pollution into the air such as power plants, petroleum product storage and transfer facilities, and large industrial facilities. The Maricopa County Air Quality Department (MCAQD) utilizes the U.S. Environmental Protection Agency (EPA) Annual Emissions Reporting Requirements (AERR) rule to define which stationary sources are reported as point sources. A detailed definition of a point source can be found in Section 2.1 of Chapter 2.

Table 1.6–1 summarizes annual and season-day emissions from point sources and emission reduction credits (ERC) in Maricopa County and the 2008 and 2015 8-hour ozone NAAs. Since all facilities identified as point sources are located within the 2008 and 2015 8-hour ozone NAAs, the

emission values for the three areas are equal. A detailed breakdown of emissions calculations for all point sources is contained in Chapter 2.

Table 1.6–1: Annual and season-day emissions from point sources and ERC in Maricopa County and the 2008 and 2015 8-hour ozone NAAs.

	Annual emissions (tons/year)			Season-day emissions (pounds/day)		
Source Category	**VOC**	**NO_X**	**CO**	**VOC**	**NO_X**	**CO**
Facility emissions	716.7	3,746.4	1,692.4	4,231	31,144	11,604
ERC in Arizona Emissions Bank	312.7	84.2	14.3	1,713	461	78
ERC not in Arizona Emissions Bank	14.9	148.3		82	813	0
Potential ERCs	73.3	22.1		402	121	0
Total	**1,117.6**	**4,001.0**	**1,706.7**	**6,447**	**32,539**	**11,682**

1.6.2 Nonpoint Sources

Nonpoint sources are facilities or activities whose individual emissions do not qualify them as point sources. Nonpoint sources represent numerous facilities or activities that individually release small amounts of a given pollutant, but collectively have the potential to release significant amounts of an air pollutant. Emissions from stationary sources that were not identified as point sources in this report have been included in the nonpoint source inventory. Examples of nonpoint source categories include residential wood burning, commercial cooking, and wildfires.

Tables 1.6–2, 1.6–3, and 1.6–4 summarize annual and season-day emissions of the chief nonpoint source categories for Maricopa County and the 2008 and 2015 8-hour ozone NAAs, respectively. A detailed breakdown of emissions calculations for each nonpoint source category is contained in Chapter 3.

Table 1.6–2: Annual and season-day emissions from nonpoint sources in Maricopa County.

	Annual emissions (tons/year)			Season-day emissions (pounds/day)		
Source Category	**VOC**	**NO_X**	**CO**	**VOC**	**NO_X**	**CO**
Fuel combustion	2,033.0	4,147.0	13,088.9	1,365	22,839	11,248
Industrial processes	2,019.3	80.7	1,622.6	11,920	407	8,753
Miscellaneous nonpoint sources	15,802.5	1,166.7	59,327.2	20,922	21,746	1,147,973
Solvent use	27,401.5			155,530		
Volatile organic liquid storage and transport	2,819.7			15,588		
Waste treatment and disposal	94.0	31.5	193.9	695	184	1,440
Total nonpoint	**50,170.1**	**5,425.8**	**74,232.6**	**206,021**	**45,176**	**1,169,414**

Table 1.6–3: Annual and season-day emissions from nonpoint sources in the 2008 8-hour ozone NAA.

Source Category	Annual emissions (tons/year)			Season-day emissions (pounds/day)		
	VOC	NO_X	CO	VOC	NO_X	CO
Fuel combustion	2,032.8	4,144.0	13,087.0	1,361	22,781	11,219
Industrial processes	2,017.9	72.2	1,633.2	11,909	403	8,817
Miscellaneous nonpoint sources	15,204.2	1,155.5	58,912.1	277,794	21,539	58,703
Solvent use	27,474.1			155,939		
Volatile organic liquid storage and transport	2,280			12,638		
Waste treatment and disposal	87.0	28.2	123.4	774	224	2,145
Total nonpoint	**49,096.0**	**5,399.9**	**73,755.7**	**460,416**	**44,947**	**80,885**

Table 1.6–4: Annual and season-day emissions from nonpoint sources in the 2015 8-hour ozone NAA.

Source Category	Annual emissions (tons/year)			Season-day emissions (pounds/day)		
	VOC	NO_X	CO	VOC	NO_X	CO
Fuel combustion	2,084.1	4,184.1	13,409.2	1,368	22,895	11,276
Industrial processes	2,034.7	72.3	1,673.3	12,002	403	9,035
Miscellaneous nonpoint sources	15,029.9	1,141.7	57,939.4	272,911	21,223	57,889
Solvent use	28,114.7			159,553		
Volatile organic liquid storage and transport	2,294.7			12,719		
Waste treatment and disposal	89.6	28.6	132.8	804	232	2,306
Total nonpoint	**49,647.7**	**5,426.7**	**73,154.7**	**459,356**	**44,753**	**80,506**

1.6.3 Nonroad Mobile Sources

Nonroad mobile sources include off-highway vehicles and engines that move or are moved within a 12-month period. The nonroad mobile source category includes airport ground support equipment (GSE) and auxiliary power units (APU) Tables 1.6–5, 1.6–6 and 1.6–7 summarize annual and season-day emissions from nonroad mobile sources for Maricopa County and the 2008 and 2015 8-hour ozone NAAs, respectively. A detailed breakdown of emissions calculations for each source category is contained in Chapter 4.

Table 1.6–5: Annual and season-day emissions from nonroad mobile sources in Maricopa County.

Category	Annual emissions (tons/year)			Season day emissions (pounds/day)		
	VOC	NO_X	CO	VOC	NO_X	CO
Agricultural	22.6	230.6	238.9	196	1,982	2,108
Airport GSE+APUs	33.9	171.5	931.7	159	797	4,426
Commercial	1,005.3	801.7	28,273.6	6,815	4,846	189,413
Construction	1,487.6	7,354.7	14,977.7	10,340	50,572	106,856
Industrial	122.8	862.1	3,407.9	780	5,113	22,118
Lawn and garden	2,746.6	490.1	47,865.2	26,043	4,232	492,237
Pleasure craft	173.9	65.4	753.3	3,229	1,634	19,497
Railway maintenance	1.0	5.0	14.5	7	34	104
Recreational	453.4	45.7	5,397.5	5,515	513	70,275
Aircraft	1,263.7	2,413.4	8,302.9	6,123	12,041	40,195
Locomotives	52.8	1,129.3	221.8	289	6,171	1,212
Total	**7,363.6**	**13569.5**	**110,385.0**	**59,496**	**87,935**	**948,441**

Table 1.6–6: Annual and season-day emissions from nonroad mobile sources in the 2008 8-hour ozone NAA.

Category	Annual emissions (tons/year)			Season day emissions (pounds/day)		
	VOC	NO_X	CO	VOC	NO_X	CO
Agricultural	12.6	128.7	133.3	109	1,106	1,176
Airport GSE+APUs	33.4	169.9	917.4	156	788	4,348
Commercial	990.4	789.9	27,856.4	6,714	4,774	186,619
Construction	1,477.8	7,306.1	14,878.6	10,272	50,237	106,149
Industrial	122.5	860.2	3,400.5	778	5,102	22,069
Lawn and garden	2,685.4	479.5	46,803.0	25,457	4,139	481,170
Pleasure craft	173.9	65.4	753.3	3,229	1,634	19,497
Railway maintenance	0.6	2.7	7.8	4	18	56
Recreational	242.4	33.0	4,345.1	2,957	366	56,676
Aircraft	1,237.6	2,401.2	8,151.8	5,981	11,975	39,373
Locomotives	42.4	885.7	170.8	232	4,840	933
Total	**7,019.0**	**13,122.3**	**107,418.0**	**55,889**	**84,979**	**437,378**

Table 1.6–7: Annual and season-day emissions from nonroad mobile sources in the 2015 8-hour ozone NAA.

Category	Annual emissions (tons/year)			Season day emissions (pounds/day)		
	VOC	NO_X	CO	VOC	NO_X	CO
Agricultural	13.4	136.8	141.8	116	1,176	1,251
Airport GSE+APUs	33.4	169.9	917.4	156	788	4,348
Commercial	1,000.9	798.2	28,150.7	6,785	4,825	188,590
Construction	1,482.0	7,327.1	14,921.4	10,301	50,381	106,454
Industrial	122.8	862.6	3,409.8	780	5,116	22,130

Category	Annual emissions (tons/year)			Season day emissions (pounds/day)		
	VOC	NO_X	CO	VOC	NO_X	CO
Lawn and garden	2,779.6	494.9	48,420.7	26,376	4,276	498,467
Pleasure craft	176.5	66.4	764.5	3,277	1,659	19,787
Railway maintenance	0.6	2.8	8.1	4	19	58
Recreational	257.4	34.7	4,570.6	3,140	386	59,615
Aircraft	1,237.6	2,401.2	8,151.8	5,981	11,975	39,373
Locomotives	43.0	898.4	173.6	235	4,909	948
Total	**7,147.2**	**13,193.0**	**109,630.4**	**57,151**	**85,510**	**941,021**

1.6.4 Onroad Mobile Sources

Emissions from onroad mobile sources were calculated for Maricopa County, and the 2008 and 2015 8-hour ozone NAAs. A detailed description of emissions calculations is contained in Chapter 5. Table 1.6–8 summarizes annual and season-day emissions from onroad mobile sources in Maricopa County and the 2008 and 2015 8-hour ozone NAAs.

Table 1.6–8: Annual and season-day emissions from onroad mobile sources in Maricopa County, and the 2008 and 2015 8-hour ozone NAAs.

Geographic Area	Annual emissions (tons/year)			Season day emissions (pounds/day)		
	VOC	NO_X	CO	VOC	NO_X	CO
Maricopa County	12,225.3	18,604.8	170,377.8	84,195	107,898	1,213,516
2008 ozone NAA	12,218.1	17,862.9	168,895.8	84,231	103,905	1,202,996
2015 ozone NAA	12,472.5	18,053.2	171,293.0	86,023	105,043	1,219,952

1.6.5 Biogenic Sources

The biogenic source category includes emissions from all vegetation (e.g., crops, indigenous vegetation, landscaping, etc.) in Maricopa County and the 8-hour ozone NAAs. A detailed description of emissions methodology is contained in Chapter 6. Table 1.6–9 summarizes annual and season-day emissions from biogenic sources in Maricopa County and the 2008 and 2015 8-hour ozone NAAs.

Table 1.6–9: Annual and season-day emissions from biogenic sources in Maricopa County, 2008 and 2015 ozone NAAs.

Geographic Area	Annual emissions (tons/year)			Season day emissions (pounds/day)		
	VOC	NOx	CO	VOC	NOx	CO
Maricopa County	79,213.2	1,934.0	4,989.1	1,034,349	13,799	64,132
2008 ozone NAA	54,361.1	1,397.0	3,507.5	716,387	9,903	45,560
2015 ozone NAA	57,372.8	1,477.3	3,707.3	755,606	10,484	48,132

1.7 Summary of all Source Categories

Tables 1.7–1, 1.7–2, and 1.7–3 provide total annual and season-day emissions from all source categories in Maricopa County and the 2008 and 2015 ozone NAAs, respectively. Tables 1.7–1 through 1.7–4 show a breakdown of the 2020 VOC and NO_x emissions in the 2008 and 2015 ozone NAAs.

Table 1.7–1: Annual and season-day emissions from all sources in Maricopa County (including emission reduction credits).

Source Category	Annual emissions (tons/year)			Season day emissions (pounds/day)		
	VOC	NOx	CO	VOC	NOx	CO
Point	1,117.6	4,001.0	1,706.7	6,446	32,539	11,682
Nonpoint	50,170.1	5,425.8	74,232.6	206,021	45,176	1,169,414
Nonroad mobile	7,363.6	13,569.5	110,385.0	59,496	87,935	948,441
Onroad mobile	12,225.3	18,604.8	170,377.8	84,195	107,898	1,213,516
Biogenic	79,213.2	1,934.0	4,989.1	1,034,349	13,799	64,132
Total	**150,089.8**	**43,535.1**	**361,691.2**	**1,393,697**	**287,347**	**3,407,185**

Table 1.7–2: Annual and season-day emissions from all sources in the 2008 8-hour ozone NAA (including emission reduction credits).

Source Category	Annual emissions (tons/year)			Season day emissions (pounds/day)		
	VOC	NOx	CO	VOC	NOx	CO
Point	1,117.6	4,001.0	1,706.7	6,446	32,539	11,682
Nonpoint	49,096.0	5,399.9	73,755.7	460,416	44,947	80,885
Nonroad mobile	7,019.0	13,122.3	107,418.0	55,889	84,979	437,378
Onroad mobile	12,218.1	17,862.9	168,895.8	84,231	103,905	1,202,996
Biogenic	54,361.1	1,397.0	3,507.5	716,387	9,903	45,560
Total	**123,811.9**	**41,783.1**	**355,283.7**	**1,323,369**	**276,273**	**1,778,501**

Table 1.7–3: Annual and season-day emissions from all sources in the 2015 8-hour ozone NAA (including emission reduction credits).

Source Category	Annual emissions (tons/year)			Season day emissions (pounds/day)		
	VOC	NOx	CO	VOC	NOx	CO
Point	1,117.6	4,001.0	1,706.7	6,446	32,539	11,682
Nonpoint	49,647	5,426.7	73,154.7	459,356	44,753	80,506
Nonroad mobile	7,147.2	13,193.0	109,630.4	57,151	85,510	941,021
Onroad mobile	12,472.5	18,053.2	171,293.0	86,023	105,043	1,219,952
Biogenic	57,372.8	1,477.3	3,707.3	755,606	10,484	48,132
Total	**127,757.8**	**42,151.2**	**359,492.1**	**1,364,582**	**278,329**	**2,301,293**

1.8 Agencies Responsible for the Emissions Inventory

MCAQD has primary responsibility for preparing and submitting the 2020 Periodic Emissions Inventory for ozone precursors for Maricopa County and the 2008 and 2015 ozone nonattainment areas. Point and area source, and locomotive emission estimates were prepared by MCAQD. MAG prepared the emission estimates for nonroad mobile sources (excluding locomotives), onroad mobile sources, and biogenic sources. Table 1.8–1 lists those responsible for inventory preparation and quality assurance/quality control activities which are described in the respective chapters.

Table 1.8–1: Chapter authors and quality assurance/quality control (QA/QC) persons.

Chapter	Author(s)	QA/QC Person(s)
Point sources	Kristi Beck, MCAQD	Eric Raisanen, MCAQD and Joshua Uebelherr, MCAQD
Nonpoint sources	Eric Raisanen, MCAQD Joshua Uebelherr, MCAQD Matt Poppen, MAG	Kristi Beck, MCAQD and Matt Poppen, MAG
Nonroad mobile sources	Taejoo Shin, MAG	Matt Poppen, MAG
Onroad mobile sources	Taejoo Shin, MAG	Matt Poppen, MAG
Biogenic sources	Taejoo Shin, MAG	Matt Poppen, MAG

Table 1.8–2: Agency contact information.

Agency	Phone Number	Email Address
MCAQD	602-506-6790	EmissionsInventory@maricopa.gov
MAG	602-254-6300	

2. Point Sources

2.1 Introduction and Scope

This inventory of ozone precursors (VOC, NO_X, and CO) is one of two 2020 periodic emissions inventory reports being prepared to meet EPA reporting requirements. This inventory has been developed concurrently with a similar inventory for particulate matter less than 10 microns in diameter (PM_{10}) to comply with the requirements for nonattainment areas in Title 40, Part 51 of the Code of Federal Regulations (CFR).

In addition to preparing a PEI for the 8-hour ozone NAA, the federal AERR rule (EPA, 2015) requires that state and local agencies prepare emissions estimates for each county and submit that data electronically for inclusion in the National Emissions Inventory (NEI) for calendar year 2020.

2.2 Identifying Point Sources

To provide consistency among various inventories, it was decided to standardize the definition of a "point source" by adopting the designation of point sources as outlined in the *Federal Register* notice for the original AERR:

> *We are basing the requirement for point source format reporting on whether the source is major under 40 CFR part 70 for the pollutants for which reporting is required, i.e., for CO, VOC, NO_X, SO_2, $PM_{2.5}$, PM_{10}, lead and NH_3 but without regard to emissions of HAPs… this approach will result in a more stable universe of reporting point sources, which in turn will facilitate elimination of overlaps and gaps in estimating point source emissions, as compared to nonpoint source emissions. Under this requirement, states will know well in advance of the start of the inventory year which sources will need to be reported (EPA, 2008).*

This chapter contains several tables that provide information on emissions from large stationary point sources. Table 2.2–1 provides an alphabetical listing of all point sources and their location. Table 2.4–1 shows the annual and ozone season-day emissions of VOC, NO_X and CO for those point sources that reported emissions of one or more of these pollutants in 2020. Tables 2.5–1, 2.5–2, and 2.5–3, actual and potential emission reduction credits for the ozone NAAs, while Table 2.7–1 summarizes point source emission totals for both Maricopa County and the 8-hour ozone NAAs. Note that the totals shown in tables may not equal the sum of individual values due to independent rounding.

MCAQD identified point sources within the county through its inventory, permitting, and compliance tracking (IMPACT) database. A total of 21 stationary sources were identified as point sources using the definition described in Section 2.1 above. While the Arizona Department of Environmental Quality (ADEQ) retains permitting authority for a limited number of industrial source categories in Maricopa County, no ADEQ-permitted facilities are considered point sources.

Table 2.2–1 contains an alphabetical listing of all point sources, including a unique facility identification number, North American Industry Classification System code (NAICS), facility name, and physical address.

Table 2.2–1: Name and location of all point sources in Maricopa County

Facility ID	NAICS	Facility name	Address	City	ZIP
F000041	221112	APS Ocotillo Power Plant	1500 E. University Dr.	Tempe	85281
F000040	221112	APS Redhawk Generating Facility	11600 S. 363rd Ave.	Arlington	85322
F000038	221112	APS West Phoenix Power Plant	4606 W. Hadley St.	Phoenix	85043
F002126	221112	Arlington Valley LLC	39027 W. Elliot Rd.	Arlington	85322
F000441	562212	Butterfield Station Facility	40404 S. 99th Ave.	Mobile	85239
F002411	332312	CMC Steel Fabricators Inc.	11444 E. Germann Rd.	Mesa	85212
F001759	221112	Gila River Power Station	1250 E. Watermelon Rd.	Gila Bend	85337
F001529	336412	Honeywell International Inc.	111 S. 34th St.	Phoenix	85034
F000701	334413	Intel Corp-Ocotillo Campus	4500 S. Dobson Rd.	Chandler	85248
F000687	928110	Luke AFB - 56th Fighter Wing	14002 W. Marauder St.	Glendale	85309
F001522	221112	Mesquite Generating Station	37625 W. Elliot Rd	Arlington	85322
F001504	221112	New Harquahala Generating Co.	2530 N. 491st Ave.	Tonopah	85354
F002470	326140	New Wincup Holdings Inc.	7980 W. Buckeye Rd.	Phoenix	85043
F001644	562212	Northwest Regional Landfill	19401 W. Deer Valley Rd.	Surprise	85387
F001653	337122	Oak Canyon Manufacturing Inc.	3021 N. 29th Dr.	Phoenix	85017
F000160	332431	Rexam Beverage Can Company	211 N. 51st Ave.	Phoenix	85043
F002681	424710	SFPP LP Phoenix Terminal	49 N. 53rd Ave.	Phoenix	85043
F000014	221112	SRP Agua Fria Generating Station	7302 W. Northern Ave.	Glendale	85303
F000015	221112	SRP Kyrene Generating Station	7005 S. Kyrene Rd.	Tempe	85283
F000013	221112	SRP Santan Generating Station	1005 S. Val Vista Rd.	Gilbert	85296
F000420	337122	Trendwood Inc.	2402 S. 15th Ave.	Phoenix	85007

Note: All facilities listed above are also located within the 2008 and 2015 ozone NAAs.

2.3 Procedures for Estimating Emissions from Point Sources

Annual and season-day emission estimates were calculated from annual source emissions reports, MCAQD investigation reports, permit files and logs, or telephone contacts with sources. For most sources, material mass balance methods were used for determining emissions. When available, emissions were estimated using Continuous Emissions Monitoring Systems (CEMS), emission factors from performance tests, AP–42 emission factors and equations, engineering calculations, or manufacturers' specifications.

MCAQD requires all Title V and synthetic minor facilities (synthetic minor facilities are those that voluntarily reduce emissions below the level which would classify them as Title V) to electronically submit annual emissions inventories through the AQD Online Portal. The AQD Online Portal is a Cross Media Electronic Reporting Rule (CROMERR) certified system. All facilities are required to

report detailed information on stacks, control devices, operating schedules, and process-level operational and emissions data for each process that emits regulated air p

ollutants (excluding insignificant and trivial activities). Detailed instructions, with examples and explanations, are provided to show facility representatives how to report emissions in the AQD Online Portal. A copy of the 2020 Emissions Inventory Instructions is included in Appendix A.

After a facility has submitted an emissions inventory to MCAQD, emissions inventory staff review the submittal for accuracy and completeness. This ensures that facilities are reporting emissions for all processes and using appropriate methods and emission factors for each process. Staff uses CEMS data, performance test reports, AP–42, the Factor Information and REtrieval (*webFIRE*) software, and other EPA documentation to evaluate emission factors. Control efficiencies are determined by source tests when available, or by AP–42 factors, engineering calculations, or manufacturers' specifications. MCAQD has conducted annual emissions surveys for permitted facilities since 1988, and MCAQD's IMPACT database for inventories, monitoring, permitting, and compliance tracking contains numerous automated quality assurance/quality control checks for data validation.

2.3.1 Application of Rule Effectiveness

Rule effectiveness reflects the actual ability of a regulatory program to achieve the emission reductions required by regulation. The concept of applying rule effectiveness in a SIP emissions inventory has evolved from the observation that regulatory programs may be less than 100 percent effective for some source categories. Rule effectiveness is applied to those sources affected by a regulation for which emissions are determined by means of emission factors and control efficiency estimates.

MCAQD has estimated rule effectiveness for a variety of emissions sources and source categories. For processes that claimed emissions reductions using a control device, rule effectiveness was quantified separately for Title V and non-Title V sources. An overall rule effectiveness value of 89.48% for Title V facilities was calculated and applied to 2020 process-level emissions estimates. Appendix B provides further details on the methods and data used in computing these rule effectiveness rates.

2.4 Detailed Overview of Point Source Emissions

Table 2.4–1 provides a summary of annual and season-day emissions from all 21 facilities that have been categorized as point sources. Sources for which rule effectiveness has been applied are noted. Emissions values of "0.0" and "0" for annual and season-day emissions denote quantities below the level of significance (0.05 tons per year and 0.5 pounds per day, respectively).

Table 2.4–1: Annual and season-day emissions from point source facilities in Maricopa County and the nonattainment areas.

Facility ID	Facility name		Annual emissions (tons/year)			Season-day emissions (pounds/day)		
			VOC	NO_X	CO	VOC	NO_X	CO
F000041	APS Ocotillo Power Plant		1.9	65.6	18.8	11	351	107
F000040	APS Redhawk Generating Facility		19.8	170.9	148.8	137	1135	983

Facility ID	Facility name		Annual emissions (tons/year)			Season-day emissions (pounds/day)		
			VOC	NO_X	CO	VOC	NO_X	CO
F000038	APS West Phoenix Power Plant		26.6	1,484.1	114.0	158	9,360	588
F002126	Arlington Valley LLC		0.4	58.9	54.2	3	443	402
F000441	Butterfield Station Facility	*	13.3	18.3	24.9	73	101	137
F002411	CMC Steel Fabricators Inc.	*	38.0	47.4	680.1	209	260	3,737
F001759	Gila River Power Station		8.8	355.3	44.1	58	2,353	296
F001529	Honeywell International Inc		24.9	36.7	11.3	156	211	64
F000701	Intel Corp-Ocotillo Campus		74.0	80.7	116.8	407	443	642
F000687	Luke AFB - 56th Fighter Wing	*	8.7	4.4	3.6	61	25	21
F001522	Mesquite Generating Station		14.3	225.7	24.5	92	1,451	158
F001504	New Harquahala Generating Co.		0.0	0.4	0.1	0	2	0
F002470	New Wincup Holdings Inc.		93.3	2.8	0.0	518	15	0
F001644	Northwest Regional Landfill	*	30.9	26.0	104.1	170	143	572
F001653	Oak Canyon Manufacturing Inc.		78.3	0.0	0.0	430	0	0
F000160	Rexam Beverage Can Company	*	113.5	4.4	3.7	624	24	20
F002681	SFPP LP Phoenix Terminal		112.0	4.1	9.7	617	30	58
F000014	SRP Agua Fria Generating Station		10.1	738.1	154.4	158	11,633	2,408
F000015	SRP Kyrene Generating Station		1.8	50.7	5.1	12	318	33
F000013	SRP Santan Generating Station		12.7	371.1	173.9	103	2,845	1,376
F000420	Trendwood Inc.		33.1	0.0	0.0	254	0	0
	Total		**716.7**	**3746.4**	**1,692.4**	**4,250**	**31,144**	**11,604**

* = Facility for which rule effectiveness has been applied to one or more reported processes.

2.5 Emission Reduction Credits

A major source or major modification planned in a NAA must obtain emissions reductions as a condition for permit issuance. These emissions reductions, generally obtained from existing sources located in the vicinity of a proposed source, must offset the increased emissions from the new source or modification. The purpose of acquiring emission reduction credits is to allow an area to move towards attainment of the NAAQS while still allowing some economic growth.

For these emission reductions to be available in the future for offsetting, they must: (1) be explicitly included and quantified as growth in projection-year inventories required in rate of progress plans or

attainment demonstrations that were based on 1990 actual inventories and (2) meet the requirements outlined in MCAQD Rule 240. Table 2.5–1 provides a list of certified emission reduction credits that are available in the Arizona Voluntary Emissions Bank for VOC, NO_x, and CO by company (the entity which currently owns the ERC) and place name (the source that generated the ERC).

Table 2.5–1: Certified ERCs in the Arizona Emissions Bank (as of January 3, 2022).

Company name	Place name	Reduction date	ERC (tons/year)		
			VOC	NO_X	CO
Freescale Semiconductor Inc	Broadway 101 Commerce Park	3/1/2004	9.1	6.8	14.3
Intel Corporation	Broadway 101 Commerce Park	3/1/2004	8	3	
Intel Corporation	Bang Energy	3/4/2005	80		
Intel Corporation	Golden Eagle Manufacturing, LLC	11/30/2007	17.6		
Intel Corporation	Penn Athletic Products Division	3/6/2009	98.33	4	
Intel Corporation	South Apache	11/30/2011		9.9	
Intel Corporation	Phoenix Brick Yard	4/30/2012		3	
Intel Corporation	DLS Precision Fab LLC dba Di-Matrix	7/1/2012	17.4		
Intel Corporation	Thornwood Furniture Mfg. Inc	10/8/2012	53.1		
Intel Corporation	Cemex USA	2/25/2013		7.5	
Intel Corporation	Saint-Gobain Glass Corp	7/1/2013	9.9		
Intel Corporation	AP Industrial	7/1/2014	8.4		
Intel Corporation	Southwest Airlines Maintenance Hangar	6/1/2016		2	
Intel Corporation	Hydro Extrusion Fabrication Center	11/30/2018	6.5		
Intel Corporation	Bryant Industries	12/30/2018	4.4		
Intel Corporation	7th Avenue Transfer Station	1/31/2019		4	
Intel Corporation	Granite Express Pioneer	8/1/2021		7.2	
Intel Corporation	San Tan Transfer Station	8/25/2021		18.3	
Intel Corporation	White Tank Transfer Station	8/25/2021		4.1	
Intel Corporation	Deer Valley Transfer Station	8/25/2021		11.2	
Intel Corporation	CalPortland New River Plant	9/30/2021		3.2	
Total			**312.7**	**84.2**	**14.3**

Table 2.5–2 provides a list of emission reduction credits for VOC, NO_X, and CO that have been certified by MCAQD but are not listed in the Arizona Voluntary Emissions Bank. ERC are listed by the facility that generated the ERC.

Table 2.5–2: ERC certified by MCAQD that are not in the Arizona Emissions Bank (as of January 3, 2022).

Permit Number	Facility name	ERC (tons/year)		
		VOC	NO_X	CO
010233	All-Pro Finishes (Closed)	8.4		
090003	Phoenix San-Man Inc (Closed)		9.9	
140090	Marathon (Closed)	6.5		
P0008262	Wood Unlimited		7.4	
P0008273	Custom Landscape – Big Horn		6.4	
P0008276	Custom Landscape – Turner		5.4	
P0008285	Bartlett Lake Marina		16.9	
P0008311	Mayo Clinic Hospital		3.5	
P0008352	JBS – Tolleson		7.1	
P0008353	Kilauea Crushers Inc – Picacho		12.7	
P0008354	Kilauea Crushers Inc – Estrella		16.3	
	Superstition Crushing		51.8	
P0008363	Rummel – Deer Valley			
P0008364	Vulcan Materials; Litchfield Landfill			
P0008365	Cemex – Indian School			
P0008366	Pioneer – Hassayampa			
P0008367	Superstition Crushing - Table Mesa Pit			
P0008368	Vulcan Materials – Indian School			
P0008369	Rummel – Verrado			
P0008370	Granite Construction – Tangerine			
P0008371	Vulcan Sahuarita			
P0008372	CalPortland – Orange Grove			
P0008378	Maxus Construction Materials		10.9	
Total		**14.9**	**148.3**	**0.0**

Several facilities have been identified as potential sources of ERCs for NO_X or VOC, in addition to those listed in Tables 2.5–1 and 2.5–2. The facilities listed in Table 2.5–3 are provided here to maintain the availability of these emissions in this periodic inventory if sufficient documentation can be secured to certify the emissions reductions.

Table 2.5–3: Potential sources of ERCs for VOC or NO_X.

Facility ID	Facility name	City, ZIP	Potential ERCs (tons/year)	
			VOC	NO_X
F005078	Jabil	Tempe, 85281	8.5	
F005186	Artisan Natural Stone Products LLP	Phoenix, 85034	7.8	
F006150	BBB Industries, LLC	Phoenix, 85031	7.8	
F004698	Wells Cargo Inc./Haulmark Industries Inc.	Phoenix, 85043	6.0	
F005156	Preferred Packaging and Container	Phoenix, 85009	4.4	

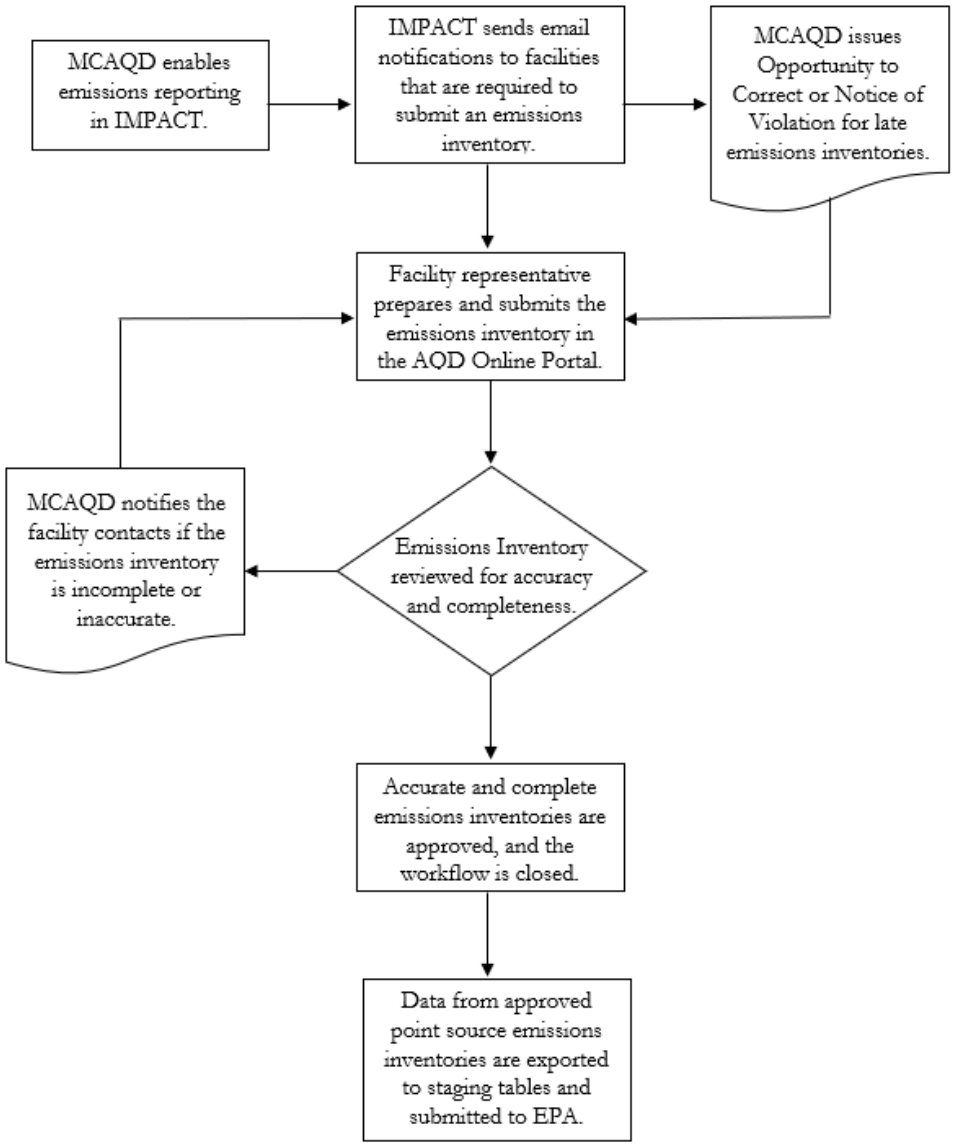
Facility ID	Facility name	City, ZIP	Potential ERCs (tons/year)	
			VOC	NO_X
F004738	Wickenburg Oil Company LLC	Wickenburg, 85390	4.2	
F004695	American Case and Pedestal Mfg. Co.	Phoenix, 85009	4.0	
F004376	Heraeus Materials Technology North Ameri	Chandler, 85226	3.3	
F004484	Redstone Industries, Inc.	Surprise, 85379	2.9	
F001741	Biltmore Shutters Inc	Phoenix, 85007	2.8	
F004953	Benchmark Electronics Phoenix, Inc.	Phoenix, 85023	2.1	
F005317	Gro-Well Brands Inc.	Phoenix, 85009		8.3
F000523	Southwest Airlines	Phoenix, 85034		6.0
F004509	Opt Co	Phoenix, 85120		5.2
F000440	Century Graphics LLC	Phoenix, 85017	3.0	
F002811	Imperial Woodworking LLC	Phoenix, 85019	2.7	
F003169	R and G Custom Crafting LLC	Phoenix, 85009	2.0	
F003174	Mountain View Custom Cabinets, Inc.	Phoenix, 85027	8.9	
F003385	Senergy Petroleum, LLC	Mesa, 85210	2.8	
F002791	Big Surf Waterpark	Tempe, 85281	0.1	2.6
Total			**73.2**	**19.5**

2.6 Quality Assurance/Quality Control Procedures

2.6.1 Emission Inventory Preparation and Data Collection

The MCAQD's Emissions Inventory (EI) Unit annually collects point source criteria air pollutant emission data from sources in the County. MCAQD annually reviews EPA guidance, documents from the Emissions Inventory Improvement Program (EIIP), and other source materials to ensure that the most current emission factors and emission calculation methods are used for each emissions inventory. Each January, the EI Unit enables emissions reporting and sends an email notification to all contacts for facilities that are required to submit an emissions inventory. The email notification includes a link to detailed instructions for completing the forms. (A copy of these instructions is included as Appendix A). Facility contacts then log into the AQD Online Portal and update their facility inventory (equipment list) and complete their emissions inventory. The EI Unit holds numerous workshops each spring to explain reporting requirements and how to complete an emissions inventory in the AQD Online Portal. The general data flow for data collection and inventory preparation is shown in Figure 2.6.1–1.

Figure 2.6.1–1: Data flow for annual point source emissions inventory reporting.



2.6.2 Emissions Reporting in the AQD Online Portal

Facility representatives create an EPA Shared CROMERR Services (SCS) Electronic Signature and MCAQD grants access to the AQD Online Portal. Emissions inventory preparers log into the AQD Online Portal and create an emissions inventory. The emissions inventory consists of three tasks. First, the preparer will update their contact list. Second, the preparer will update the facility inventory (equipment list). Then, the preparer will report emissions for all processes (except for processes that are below reporting requirements). After the facility representative prepares the emissions inventory, it must be validated prior to submission. During validation, quality control (QC) checks are performed, including:

- Throughput, operating schedule, operating hours, and seasonal percentages are entered for every emissions process.
- Emissions of all criteria air pollutants are reported for all emissions processes where throughput and annual hours of operation are not zero.
- Attachments are provided for any emissions inventory where emissions are calculated outside of the AQD Online Portal.
- The design of the AQD Online Portal prevents the selection of invalid source classification codes and NAICS codes.

Once an emissions inventory has been successfully validated, it can be electronically signed and submitted. Title V emissions inventories must be electronically signed and submitted by a responsible official. To electronically sign and submit the emissions inventory, the certifier must enter their password and correctly answer a security question.

2.6.3 Emissions Inventory Review and Processing

Submitted emissions inventories are received in the IMPACT database and a workflow is automatically created for each emissions inventory that is submitted. IMPACT automatically generates an invoice for Title V emissions inventories.

Emissions inventory workflows are assigned to staff who compare the emissions inventory to the permit and the permit technical support to document. Staff verify that emissions were reported for all processes listed in the operating permit, and that accurate emission factors and calculation methods were used to estimate emissions. If confidential business information (CBI) is reported, staff verify that it was reported correctly. For processes that are marked as CBI, throughput and emission factors are not transmitted to EPA.

If the emissions inventory is accurate and complete, it is approved in IMPACT and MCAQD notifies the facility contacts. If an emissions inventory is inaccurate or incomplete, MCAQD notifies the facility contacts that a revised emissions inventory must be submitted. When a revised emissions inventory is received, the original submission is marked as invalid, and the revised emissions inventory is reviewed for accuracy and completeness.

To prepare the inventory for submittal to the NEI, data from approved point source emissions inventories is exported from IMPACT to staging tables that adhere to the EPA's Consolidated Emissions Reporting Schema (CERS). MCAQD uses EPA's Virtual Exchange Services (VES) to automatically transfer data from the staging tables to EPA's emissions inventory system (EIS). If EIS identifies any errors in the submission, the data in the staging tables is exported to an eXtensible markup language (XML) file and EPA's bridge tool is used to correct errors and generate a corrected XML file. The corrected XML file is submitted to EIS.

2.6.4 Analysis of Annual Point Source Emissions Data for this Inventory

Air quality planning staff checked inventory accuracy, reasonableness, and assured that all point sources had been identified. Staff also assured that the methodology used to calculate emissions was appropriate and that the calculations were correct. Other reasonableness checks were conducted by recalculating emissions using methods other than those used to make the initial emissions calculations and then comparing results. QA checks were conducted by reviewing all emissions reports

submitted to MCAQD for the 2020 reporting period for missing and questionable data and by checking the accuracy and reasonableness of all emissions calculations made for such reports.

2.7 Summary of All Point Source Emissions

Table 2.7–1 below summarizes annual and season-day emissions from all point sources, including the certified ERC and potential ERC listed above in Tables 2.5–1, 2.5–2, and 2.5–3. All point sources in Maricopa County are located within the 2008 and 2015 ozone nonattainment areas.

Table 2.7–1: Annual and season-day point source emissions for Maricopa County, and 2008 and 2015 ozone NAAs (including all emission reduction credits).

	Annual emissions (tons/year)			**Season-day emissions (pounds/day)**		
Source Category	**VOC**	**NO_X**	**CO**	**VOC**	**NO_X**	**CO**
Facility emissions	716.7	3,746.4	1,692.4	4,231	31,144	11,604
ERC in Arizona Emissions Bank	312.7	84.2	14.3	1,713	461	78
ERC not in Arizona Emissions Bank	14.9	148.3		82	813	0
Potential ERCs	73.3	22.1		402	121	0
Total	**1,117.6**	**4,001.0**	**1,706.7**	**6,447**	**32,539**	**11,682**

2.8 References

EPA, 2008. Air Emissions Reporting Requirements. 73 FR 76539 (December 17, 2008). *https://federalregister.gov/a/E8-29737*

EPA, 2015. Revisions to the Air Emissions Reporting Requirements: Revisions to Lead (Pb) Reporting Threshold and Clarifications to Technical Reporting Details. 80 FR 8787 (February 19, 2015). *https://federalregister.gov/a/2015-03470*

3. Nonpoint Sources

3.1 Introduction and Scope

This chapter considers all stationary sources that are too small or too numerous to be treated as point sources. A variety of EPA guidance materials were evaluated to identify area source categories meriting inclusion in this inventory, including the 2020 NEI website (EPA, 2022); documentation of the development of the previous NEI in 2017; and the document "Introduction to Area Source Inventory Development" (EPA, 2001a). In addition, permit and emissions data in the MCAQD IMPACT database were analyzed to identify point and area source categories. Some source categories were deemed "insignificant" because there are no large production facilities and/or very few small sources, and thus emissions from these categories were not quantified. Annual emissions for Maricopa County, as well as the 2008 and 2015 8-hour ozone NAAs are presented in Tables 3.5–1, 3.5–2, and 3.5–3.

3.2 Emission Calculation Methodology

The specific emissions estimation methods that MCAQD used to estimate the annual and season-day nonpoint emission inventory for Maricopa County are summarized in Table 3.2-1. The methodologies associated with these calculation methods are described in the following sub-sections.

Table 3.2–1: Calculation methods for all nonpoint (area) sources.

Source	Annual Method	Season-Day Method
Fuel combustion:		
Commercial/institutional distillate oil: boilers	2020 EPA NEMO	Operating schedule
Commercial/institutional distillate oil: engines	2020 EPA NEMO	Operating schedule
Commercial/institutional liquefied petroleum gas (LPG)	2020 EPA NEMO	Operating schedule
Commercial/institutional natural gas	2020 EPA NEMO	Operating schedule
Industrial distillate oil: boilers	2020 EPA NEMO	Operating schedule
Industrial distillate oil: engines	2020 EPA NEMO	Operating schedule
Industrial LPG	2020 EPA NEMO	Operating schedule
Industrial natural gas	2020 EPA NEMO	Operating schedule
Residential distillate oil	2020 EPA NEMO	Heating degree days
Residential LPG	2020 EPA NEMO	Heating degree days
Residential natural gas	2020 EPA NEMO	Uniform usage
Residential wood combustion	2020 EPA NEMO	Heating degree days
Industrial processes:		
Bakeries	Scaling up	Scaling up

Source	Annual Method	Season-Day Method
Commercial cooking	2020 EPA NEMO	Uniform Usage
Commercial sterilization	Annual emission reports	Annual emission reports
Chemical manufacturing	Scaling up	Scaling up
Electrical equipment manufacturing	Scaling up	Scaling up
Fabricated metal product manufacturing	Scaling up	Scaling up
Hospitals	Scaling up	Scaling up
Rubber/plastic product manufacturing	Scaling up	Scaling up
Secondary metal production	Annual emission reports	Annual emission reports
Industrial processes, not elsewhere classified (NEC)	Annual emission reports	Annual emission reports
Miscellaneous nonpoint sources:		
Accidental releases	Self-reported	Self-reported
Aircraft engine testing	Annual emission reports	Annual emission reports
Backyard barbeques	Emissions extrapolation	Uniform usage
Composting	2020 EPA NEMO	Uniform usage
Crematories, human	Annual emission reports	Annual emission reports
Crematories, animal	Annual emission reports	Annual emission reports
Livestock	2020 EPA NEMO	Uniform usage
Prescribed fires	Prescribed Fires	Prescribed Fires
Structure fires	Fire Database and Burn Permits	Uniform usage
Vehicle fires	Fire Database	Uniform usage
Wildfires	2020 EPA NEMO	2020 EPA NEMO
Solvent use:		
Aircraft surface coating	Scaling up	Scaling up
Auto refinishing	2020 EPA NEMO	Uniform usage
Agricultural pesticides	2020 EPA NEMO	Uniform usage
Architectural coatings	2020 EPA NEMO	Uniform usage
Asphalt application, cutback and emulsified	2008 asphalt use extrapolation	Uniform usage
Asphalt application, hot mix and warm mix	2020 EPA NEMO	Uniform usage
Consumer and commercial products	2020 EPA NEMO	Uniform usage
Degreasing	Scaling up	Scaling up
Dry cleaning	2020 EPA NEMO	Operating schedule
Factory finished wood and wood furniture	Scaling up	Scaling up
Graphics arts	Scaling up	Scaling up

Source	Annual Method	Season-Day Method
Industrial surface coating	Scaling up	Scaling up
Manufacturing	2020 EPA NEMO	Operating schedule
Miscellaneous industrial solvent use	Scaling up	Scaling up
Miscellaneous surface coating	Scaling up	Scaling up
Traffic markings	2020 EPA NEMO	Seasonal Factor
Volatile organic liquid storage and transport:		
Airports: aviation gasoline stage 1	2020 EPA NEMO	Uniform usage
Airports: aviation gasoline stage 2	2020 EPA NEMO	Uniform usage
Bulk plants	Annual emission reports	Annual emission reports
Bulk terminals	Annual emission reports	Annual emission reports
Gas stations stage 1: balanced submerged fill	2020 EPA NEMO	2020 EPA NEMO
Gas stations stage 1: submerged fill	2020 EPA NEMO	2020 EPA NEMO
Gas stations stage 1: underground tanks breathing/emptying	2020 EPA NEMO	2020 EPA NEMO
Gas stations: tank trunks in transit	2020 EPA NEMO	2020 EPA NEMO
Pipeline gasoline	2020 EPA NEMO	2020 EPA NEMO
Portable fuel containers	2020 EPA NEMO	Uniform Usage
Volatile organic liquids storage/transport	Annual emission reports	Annual emission reports
Waste treatment and disposal:		
Landfills	Annual Emission Reports	Annual Emission Reports
Leaking underground storage tanks	LUST Remediation	LUST Remediation
Open burning	Burn Permits	Burn Permits
Other waste	Annual Emission Reports	Annual Emission Reports
Publicly owned treatment works	2020 EPA NEMO	Seasonal Factor

3.2.1 Annual Emission Reports

Annual and season-day emissions from facilities were derived using annual emissions reports from permitted facilities. For these categories, it was assumed that there were no significant unpermitted sources within Maricopa County. When all facilities in a source category are located within the 2008 and 2015 ozone NAAs, total emission values for the county and the NAAs are equal.

3.2.2 Scaling Up

When all facilities in a source category were not all surveyed, emissions were calculated by the "scaling up" method as described in EPA emissions inventory guidance (EPA, 2001a). This method combines detailed emissions data from a subset of sources and county-level employment data from the U.S. Census Bureau (2021) to develop a per-employee emission factor that is then used to

estimate emissions from all sources in an industry category. The most recent data from the U.S. Census Bureau's County Business Patterns (CBP) for 2019 employment were used. Where employment estimates were provided as a range of values, the midpoint was used. Some facilities have been categorized as point sources, and thus their emissions are accounted for in Chapter 2. To avoid double-counting, reported total employment at individual point sources is subtracted from estimated county employment levels. Ozone season-day emissions were calculated in the same method as annual emissions, only using surveyed season-day emissions instead of annual totals.

3.2.3 EPA NEMO

Annual emissions for these source categories were derived using county specific data with the EPA Nonpoint Emissions Methodologies and Operator Instructions (NEMO), which are the methodologies used by EPA for the 2020 NEI.

3.2.4 2008 Asphalt Use Extrapolation

The Asphalt Institute no longer compiles asphalt usage data by state. Therefore, 2020 emissions from asphalt applications were calculated by extrapolating 2008 asphalt emissions to 2020 based on vehicle miles traveled (VMT). A VMT-based growth factor was used to grow 2008 cutback and emulsified asphalt emissions to 2020. This was done for each asphalt type by multiplying the 2008 Maricopa County asphalt usage by the ratio of 2020 to 2008 annual Maricopa County VMT. The extrapolated quantity of asphalt use for each type was then multiplied by an emission factor to derive the annual VOC emissions in tons/year. Emission factors were calculated using the VOC limits for cutback and emulsified asphalt in Rule 340 (Cutback and Emulsified Asphalt) of the Maricopa County Air Pollution Control Regulations.

3.2.5 Fire Database

The Arizona Department of Forestry and Fire Management (ADFFM) provided 2020 structure and vehicle fire data. The ADFFM coordinates reporting to the National Fire Incident Reporting System (NFIRS) for fire departments in Arizona. NFIRS is a national reporting system used by fire departments to report fires and other incidents to which they respond to maintain records of these incidents in a uniform manner. Twenty out of forty fire departments in Maricopa County reported over 7,000 fires to NFIRS in 2020. This included 3,397 reported structure fires and 1,614 vehicle fires. Because the ADFFM data only included data reported by twenty out of forty fire departments in Maricopa County, the number of structure fires reported were scaled up based on population served by the fire departments reporting to NFIRS for the total population of Maricopa County and each NAA. Some departments did not report all 12 months of data to NFIRS because it is not mandatory for fire departments to report. Consequently, any partially reporting department had their reported fires scaled up to the annual level based on the number of months reported before being included in the overall scaling calculation to the county and NAA levels. Estimates of material burned in a structure fire were determined by multiplying the number of structure fires by a fuel loading factor of 1.15 tons of material per fire to yield tons of material burned per year, which factors in the estimated percentage of structural and content loss (EPA, 2001c). Annual emissions from vehicle fires were calculated by first multiplying the number of vehicle fires by a fuel loading factor of 0.25 tons per vehicle fire to estimate the annual amount of material burned in vehicle fires (EPA, 2000).

3.2.6 Burn Permits

Emissions from controlled open burning are regulated by Maricopa County Rule 314 (Outdoor Fires and Commercial/Institutional Solid Fuel Burning) which requires a burn permit for many types of open burning in Maricopa County. Burn permits are issued primarily for purposes of agricultural ditch bank and fence row burning, tumbleweed burning, land clearance, and firefighting training. MCAQD's burn permit database was used to identify all burn permits issued in 2020. A total of 18 burn permits were issued during the year. The quantity and reported activity for the burn permits are shown in Table 3.2–2.

Table 3.2–2: Maricopa County burn permit activity in 2020.

Permit Subtype	Permits Issued	Total Reported Activity	Activity Unit Measure
Ditch bank andand fence row	7	103,853	Linear feet
Land clearance	1	15	Acres
Air Curtain	0	0	Tons of material burned
Tumbleweeds	1	0.1	Piles
Firefighting instruction	9	75	Structures

The above activity data (excluding firefighting instruction) were converted to tons material burned using fuel loading factors from AP-42, Table 2.5–5 (EPA, 1992) and assumptions made based on previous Maricopa County emission inventories (MCAQD, 2019). The emission and loading factors used are shown in Table 3.2–3.

Table 3.2–3: Emission and fuel loading factors for open burning.

Category	Emission Factors (pounds/ton burned)			Fuel Loading Factor (tons/acre)
	VOC	NO_X	CO	
Weeds, unspecified	9	4	85	3.2
Russian Thistle (tumbleweeds)	1.5	4	309	0.1
Orchard crops: Citrus	9	4	81	1

Firefighting instruction used the same fuel loading factors as structure fires of 1.15 (tons/fire) to calculate material burned (tons). The material burned was then multiplied by structure fire emission factors to calculate emissions.

3.2.7 Prescribed Fires

Emissions from prescribed fires were estimated using data obtained from ADEQ, which reported that a total of four prescribed fires occurred in Maricopa County during 2020, all of which were within the 2008 and 2015 8-hour ozone NAAs. Because all 2020 prescribed fires were piled fuels, material burned was derived by multiplying the number of acres burned by tons of piles per acre for each fire. Table 3.2–4 shows the data provided by ADEQ, the amount of material burned for each fire, and whether the fire occurred within the NAAs and during the ozone season.

Table 3.2–4: Prescribed fires in Maricopa County during 2020.

Date	Burn ID	Tons per Acre	Acres Burned	Tons Burned	Within 2008 andand 2015 Ozone NAA	During Ozone Season
February 06	TNF302P	1	25	25	Y	N
February 19	TNF302P	1	25	25	Y	N
February 20	TNF302P	1	15	15	Y	N
February 26	TNF0301P	1	1	1	Y	N
Total			**66**	**66**		

To estimate emissions, emission factors for "piled fuels" from the Western Regional Air Partnership's (WRAP) 2002 Fire Emissions Inventory (WGA/WRAP, 2005) were used. Annual emissions from prescribed fires in Maricopa County were derived by multiplying material burned by the emission factor then dividing by 2,000 to convert from pounds to tons. The prescribed fire data provided by ADEQ indicated all the reported prescribed fires were within the 2008 and 2015 8-hour ozone NAAs; thus, annual emissions for both areas are equal. Ozone season-day emissions were evaluated by determining the dates of the prescribed burns, none of occurred during the 2020 ozone season.

MCAQD's records of citizen complaints received during 2020 regarding suspected open or illegal burning were reviewed to assess the potential extent of unpermitted open burning activity. Emissions estimates from permitted burn activity were multiplied by a factor of 26.1 to account for unpermitted burning. This factor was calculated based on the number of unpermitted open burning complaints received divided by the number of enforcement actions.

The reported dates of activity from all burn permits issued were reviewed to estimate the total open burn activity occurring during ozone season (June through August). To estimate season-day emissions, it was assumed that activity in all categories listed above normally occurs, on average, five days per week. Thus, season-day emissions were calculated by dividing total ozone-season emissions by 65 days (five days per week and 13 weeks per ozone season).

Annual and season-day emissions for the NAAs were calculated by multiplying the percentage of vacant land use located in the 2008 and 2015 8-hour ozone NAAs by the Maricopa County emissions estimates. See Section 1.5.2 for a discussion of the land use data used.

3.2.8 Wildfires

EPA obtained data on daily acres burned at specific locations from incident status summary reports, the National Incident Features Service, the NOAA Hazard Mapping System, the U.S. Forest Service activity tracking system, the U.S. Fish and Wildlife Service, and the U.S. Department of Interior.

EPA used a fuel-bed geographical information systems (GIS) database to identify fuel characteristics at wildfire locations. Total fuel consumed at each fire location was estimated based on the fuel characteristics and the type of fire. EPA then used the BlueSky Modeling Framework to estimate daily emissions at each fire location.

MCAQD used the latitude and longitude for each fire location to identify fires located within Maricopa County, and the 2008 and 2015 ozone NAAs. Season-day emissions were calculated based on the date of each fire.

Table 3.2–5: Wildfire incidence, acreage burned, and material burned in 2020.

Geographic area	Number of Fires	Acres Burned	Consumption, Flaming (tons/yr)	Consumption, Smoldering (tons/yr)
Maricopa County	223	237,126	408,761	88,818
2018 ozone NAA	199	230,417	404,277	88,325
2015 ozone NAA	197	228,744	399,438	86,751

3.2.9 Leaking Underground Storage Tank Remediation

Leaking underground storage tanks (LUST) are normally not considered a quantifiable source of air emissions until excavation and remediation efforts begin. Most air emissions from LUST site remediation occur during the initial site activity, which is typically removal of the tank. Emissions from soil occur as the tank is being removed and when soil is deposited on the ground before treatment and disposal occur (EPA, 2001b).

A default emission rate of 28 pounds per day per remediation event was used to estimate VOC emissions from LUST remediation (EPA, 2001b). It was assumed that an initial site action (tank and soil removal) for an average LUST remediation lasts five days. Data on LUST remediation events in 2020 were obtained from ADEQ. This data indicated that 67 LUST remediation events occurred in Maricopa County, and 66 LUST remediation events occurred within the 2008 and 2015 ozone NAAs. The LUST closure dates were used to determine which remediation events occurred during the ozone season.

3.2.10 Self-Reported

Facilities that are subject to an air pollution control permit issued by the MCAQD are required to submit an excess emissions report each time a release occurs. These reports are submitted as a type of compliance report through the AQD Online Portal. Upon receipt, inspectors review these compliance reports and assign "self-report" as the type of compliance report. For 2020, these reports were reviewed to estimate emissions from accidental releases at nonpoint source facilities.

3.2.11 Uniform Usage

Emissions are assumed to occur every day and relatively uniformly throughout the year. Season-day emissions were calculated by dividing the annual emissions by 366 (the number of days in 2020).

3.2.12 Operating Schedule

Activity is assumed to occur a certain number of days per week and is relatively uniform throughout the year. Annual emissions are multiplied by 25 percent to calculate ozone season emissions. Season-day emissions are calculated by dividing ozone season emissions by the product of the number of days per week times the number of weeks in ozone season.

3.2.13 Seasonal Factor

Residential natural gas ozone season day emissions were calculated by apportioning the total annual residential natural gas consumption by the percentage used in June, July, and August of 12%, and then divided by the total number of days in those three months (92 days).

Publicly owned treatment works (POTW) ozone season-day emissions were calculated by multiplying annual emissions by a 35% season adjustment factor and then dividing by 92 days per ozone season (EPA, 2001a).

3.2.14 Heating Degree Days

Ozone season-day emissions are calculated by multiplying the annual emissions by the percentage of heating degree days (i.e., the number of degrees per day that the daily average temperature is below 65 °F) during ozone season (June, July, and August). Data obtained from the NOAA website (NOAA, 2022) indicates that there were no heating degree days during the 2020 ozone season.

3.3 Emission Allocation Methodology

County-level annual emissions for each of the calculation methods are allocated for the 2008 and 2015 ozone NAAs using the methodology presented in this section. When all sources in a given source category are considered to be located within the 2008 and 2015 ozone NAAs, total emission values for the county and the NAAs are considered equal and are listed as "Assumed Same" in Table 3.3-1.

Table 3.3–1: Allocation method for all nonpoint sources.

Source	Allocation Method
Fuel combustion:	
Commercial/institutional distillate oil: boilers	Employment
Commercial/institutional distillate oil: engines	Employment
Commercial/institutional natural gas	Employment
Industrial distillate oil: boilers	Employment
Industrial distillate oil: engines	Employment
Industrial natural gas	Employment
Industrial LPG	Employment
Residential distillate oil	Population
Residential liquefied petroleum gas (LPG)	Population
Residential natural gas	Population
Residential wood combustion	Population
Industrial processes:	
Bakeries	Industrial employment
Commercial cooking	Population
Commercial sterilization	Assumed same

Source	Allocation Method
Chemical manufacturing	Industrial employment
Electrical equipment manufacturing	Industrial employment
Fabricated metal product manufacturing	Industrial employment
Hospitals	Population
Rubber/plastic product manufacturing	Industrial employment
Secondary metal production	Location data
Industrial processes, not elsewhere classified (NEC)	Location data
Misc. area sources:	
Accidental releases	Location data
Aircraft engine testing	Location data
Backyard barbeques	Population
Composting	Population
Crematories, human	Location data
Crematories, animal	Location data
Livestock	Land use
Prescribed fires	Location data
Structure fires	Population
Vehicle fires	Population
Wildfires	Location data
Solvent use:	
Aircraft surface coating	Assumed same
Auto refinishing	Employment
Agricultural pesticides	Land use
Architectural coatings	Employment
Asphalt application, cutback and emulsified	Population
Asphalt application, hot mix and warm mix	Population
Consumer and commercial products	Population
Degreasing	Employment
Dry cleaning	Assumed same
Factory finished wood	Employment
Graphics arts	Employment
Industrial surface coating	Employment
Miscellaneous industrial solvent use	Employment
Miscellaneous surface coating	Employment
Traffic markings	Employment
Storage and transport:	

Source	Allocation Method
Airports: aviation gasoline stage I	General aviation operations
Airports: aviation gasoline stage II	General aviation operations
Bulk plants	Location data
Bulk terminals	Location data
Gas stations stage I: submerged fill	Assumed same
Gas stations stage I: balanced submerged fill	Assumed same
Gas stations stage 1: underground tanks breathing/emptying	Assumed same
Gas stations: tank trunks in transit	Assumed same
Pipeline gasoline	Assumed same
Portable fuel containers - commercial	Employment
Portable fuel containers – residential	Population
Volatile organic liquids storage/transport	Location data
Waste Disposal:	
Landfills	Location data
Leaking underground storage tanks	Location data
Open burning	Land use
Other waste	Location data
Publicly owned treatment works (POTW)	Population

3.3.1 Employment

Annual emissions for the 2008 and 2015 ozone NAAs were estimated by apportioning Maricopa County's emissions to the NAAs, using the ratio of employment, based on the source category. See Section 1.5.1 of this report for a discussion of the employment data used.

3.3.2 Population

Annual emissions for the 2008 and 2015 ozone NAAs were estimated by apportioning Maricopa County's emissions to the NAAs, using the ratio of total resident population in the NAAs to that of Maricopa County. See Section 1.5.1 of this report for a discussion of the population data used.

3.3.3 Land Use

The annual emissions for the 2008 and 2015 ozone NAAs were calculated by multiplying county emission totals by the ratio of land use acreage in the NAAs to the land use acreage in Maricopa County. See Section 1.5.2 for a discussion of the land use data used to allocate emissions to the 2008 and 2015 ozone NAAs.

3.3.4 General Aviation Operations

For aviation gasoline stage I and stage II, the annual and season-day emissions for the 2008 and 2015 ozone NAA were calculated based on the number of landing and takeoff operations that occurred within the NAAs in 2020 (98.2%). Landing and takeoff operations from commercial,

military, and turbine-engine aircraft were not included because these do not use aviation gasoline. See Table 4.2–2 of this report for general aviation aircraft operational data used.

3.3.5 Location Data

Geographic data on the location of each permitted source or incident were used to identify whether they were located inside or outside of the 2008 and 2015 ozone NAAs.

3.4 QA/QC Control Procedures

QA/QC activities for the area source emissions inventory were designed to create a comprehensive, accurate, representative, and comparable inventory of area source emissions for Maricopa County and the NAAs. During each step of creating, building and reviewing the area source emissions inventory, quality checks and assurances were performed to establish confidence in the inventory structure and data.

Area source categories were identified for inclusion in the inventory based on the latest EIIP guidance available. In addition, recent EPA activities to develop county-level emissions estimates for newly created source categories or refined source classification codes were also reviewed and incorporated where relevant. Prior-year inventories for the region were also examined to identify possible additional categories for inclusion in the present inventory. The list of area source categories developed based on these guidance documents was modified to fit the characteristics of Maricopa County, with some area source categories determined to be insignificant (e.g., emissions from combustion of coal, kerosene, and residual oil; oil and natural gas production; and snowmobile use).

Data for area source emission calculations were gathered from a wide universe of resources. Whenever applicable, local surveyed data (such as annual emissions reports) were used as these data best reflect activity in the county and the NAAs. When local data was not available, data from state agencies, such as the Arizona Department of Transportation (ADOT), and regional bodies, such as the Western Regional Air Partnership (WRAP) were used. National-level data (such as those from the U.S. Census Bureau) were used when no local, state, or regional data was available. In addition, the most recent EIIP guidance for area sources was consulted for direction in determining the most relevant data source for use in emissions calculations.

Emissions calculations for area sources were performed by one air quality planner, one senior air quality planner, and one planning supervisor. All nonpoint source emission estimates were calculated in spreadsheets to ensure the calculations could be verified and reproduced. Whenever possible or available, the "preferred method" described in the most recent EIIP guidance documents for nonpoint sources was used to calculate emissions. Emissions were estimated using emission factors from EIIP guidance, AP-42, and local source testing. Local seasonal and activity data were used when available, with EPA and EIIP guidance used when no local seasonal or activity data existed. All calculations were evaluated to ensure that emissions from point sources were not being double-counted and to determine if rule effectiveness applied.

Once nonpoint source emission estimates had been produced, several quality control checks were performed to substantiate the calculations. All nonpoint source calculations were peer reviewed by either another planner or the planning supervisor. Peer review ensured that all emission calculations were reasonable and could be reproduced. Sensitivity analyses and computational method checks were performed on area sources when emissions seemed to be outside the expected ranges. When

errors were found, the appropriate changes were made by the author of the calculations to ensure consistency of the emissions calculations. The peer reviewed emissions estimates were combined into a draft nonpoint source chapter. This draft chapter was read through in its entirety by the planner, senior planner, planning supervisor, and division manager for final review, with any identified errors corrected by the author of the section.

The draft version of the area source chapter was sent to ADEQ, ADOT, and MAG for a quality assurance review. These agencies provided comments that were addressed and incorporated into the final area source chapter. The QA/QC activities described here have produced high levels of confidence in the area source emissions estimates detailed in this chapter and represent the best efforts of the inventory preparers.

3.5 Summary of Nonpoint Source Emissions

Tables 3.5–1, 3.5–2, and 3.5–3 summarize the total annual and average season-day emissions from all area sources addressed in this chapter for Maricopa County as well as the 2008 and 2015 ozone NAA, respectively.

Table 3.5–1: Annual and season-day emissions from all nonpoint sources in Maricopa County.

Source Category	Annual emissions (tons/year)			Season-day emissions (pounds/day)		
	VOC	NO_X	CO	VOC	NO_X	CO
Commercial/institutional distillate oil: boilers	0.1	3.3	0.8	0	23	6
Commercial/institutional distillate oil: engines	0.4	5.2	1.1	3	36	8
Commercial/institutional liquefied petroleum gas (LPG)	4.7	128.6	72.0	33	893	500
Commercial/institutional natural gas	46.5	845.1	709.9	323	5,869	4,930
Industrial distillate oil: boilers	0.7	71.3	17.8	5	495	124
Industrial distillate oil: engines	99.8	1,434.8	308.8	693	9,964	2,144
Industrial LPG	1.7	47.7	26.7	12	332	186
Industrial natural gas	21.5	391.2	328.6	149	2,717	2,282
Residential distillate oil	0.0	0.6	0.2	-	-	-
Residential LPG	2.7	69.3	19.6	-	-	-
Residential natural gas	56.3	962.9	409.7	147	2,512	1,069
Residential wood combustion	1,798.6	187.1	11,193.6	-	-	-
Total fuel combustion	**2,033.0**	**4,147.0**	**13,088.9**	**1,365**	**22,839**	**11,248**
Bakeries	71.3			460		
Commercial cooking	520.7		1,454.2	2,830		7,903
Commercial sterilization	1.6			9		
Chemical manufacturing	149.4			888		
Electrical equipment manufacturing	161.6	37.9	8.5	892	208	47
Fabricated metal product manufacturing	7.2	8.3	1.6	37	8	2

Source Category	Annual emissions (tons/year)			Season-day emissions (pounds/day)		
	VOC	NO_X	CO	VOC	NO_X	CO
Hospitals	18.1			99		
Rubber and plastic product manufacturing	977.8			6,038		
Secondary metal production	46.1	20.5	109.3	293	113	568
Industrial processes, not elsewhere classified (NEC)	65.5	13.9	49.0	373	78	233
Total industrial processes	**2,019.3**	**80.7**	**1,622.6**	**11,920**	**407**	**8,753**
Accidental releases	7.4			3,690		
Aircraft engine testing		2.4		0	0	0
Backyard barbeques	86.9	22.9	1,106.1	475	125	6,044
Composting	752.5			4,135		
Crematories, human	0.3	14.9	1.3	2	89	8
Crematories, animal	0.2	8.8	0.5	1	49	3
Livestock	1,137.1			6,248		
Prescribed fires	0.2	0.2	2.5	104	102	1,226
Structure fires	26.0	3.3	141.9	142	18	775
Vehicle fires	7.7	1.0	30.0	42	5	164
Wildfires	13,784.3	1,113.2	58,045.0	6,083	21,357	1,139,753
Total miscellaneous nonpoint sources	**15,802.5**	**1,166.7**	**59,327.2**	**20,922**	**21,746**	**1,147,973**
Aircraft surface coating	6.7			39		
Architectural coatings	2,404.0			13,209		
Agricultural pesticides	203.6			1,119		
Asphalt application, emulsified	157.5			863		
Asphalt application, hot mix	777.0			4,258		
Asphalt application, warm mix	13.6			74		
Auto refinishing	497.8			2,735		
Consumer and commercial products (CCP): Adhesives and sealants	4,188.7			22,952		
CCP: Automotive aftermarket products	433.9			2,378		
CCP: Coatings and related products	2,181.6			11,954		
CCP: Household products	4,580.7			25,100		
CCP: Insecticide, fungicide, and rodenticide products	4,087.6			22,398		
CCP: Personal care products	4,498.4			24,649		
CCP: Miscellaneous products, NEC	160.7			881		
Degreasing	527.3			3,040		
Dry cleaning	18.1			139		

Source Category	Annual emissions (tons/year)			Season-day emissions (pounds/day)		
	VOC	NO_X	CO	VOC	NO_X	CO
Factory finished wood and wood furniture	829.6			6,184		
Graphics arts	234.5			1,396		
Industrial Maintenance Coatings	755.5			5,812		
Manufacturing electronic and other electrical: SIC 36 - 363	24.3			187		
Manufacturing large appliances: SIC 363	11.4			87		
Manufacturing machinery and equipment: SIC 35	41.3			318		
Manufacturing marine: SIC 373	8.0			61		
Manufacturing metal furniture: SIC 25	49.9			384		
Manufacturing motor vehicles: SIC 371	53.8			414		
Manufacturing paper: SIC 26	19.3			149		
Miscellaneous surface coating	101.2			712		
Miscellaneous industrial solvent use	56.7			357		
Other special purpose coatings	478.7			3,682		
Total solvent use	**27,401.5**			**155,530**		
Airports: aviation gasoline stage 1	1.6			9		
Airports: aviation gasoline stage 2	588.1			3,214		
Bulk plants	25.3			139		
Bulk terminals	129.4			712		
Gas stations stage 1: balanced submerged fill	298.6			1,832		
Gas stations stage 1: submerged fill	92.1			565		
Gas stations: tank trucks in transit	52.2			320		
Gas stations stage 1: underground tanks breathing/emptying	606.2			3,189		
Pipeline gasoline	59.7			327		
Portable fuel containers, commercial	505.0			2,759		
Portable fuel containers, residential	459.8			2,513		
Miscellaneous volatile organic liquid storage and transport	1.7			9		
Total volatile organic liquid storage and transport	**2,819.7**			**15,588**		
Landfills	9.6	16.6	17.6	53	91	97
Leaking underground storage tanks	4.7			34		
Open burning	18.2	8.1	171.8	140	62	1,322
Other waste	2.1	6.8	4.4	11	30	21

Source Category	Annual emissions (tons/year)			Season-day emissions (pounds/day)		
	VOC	NO_X	CO	VOC	NO_X	CO
Publicly owned treatment works	59.5			458		
Total waste treatment and disposal	**94.0**	**31.5**	**193.9**	**695**	**184**	**1,440**
Total nonpoint	**50,170.1**	**5,425.8**	**74,232.6**	**206,021**	**45,176**	**1,169,414**

Table 3.5–2: Annual and season-day emissions from nonpoint sources in the Maricopa County 2008 NAA.

Source Category	Annual emissions (tons/year)			Season-day emissions (pounds/day)		
	VOC	NO_X	CO	VOC	NO_X	CO
Commercial/institutional distillate oil: boilers	0.1	3.3	0.8	0	23	6
Commercial/institutional distillate oil: engines	0.4	5.2	1.1	3	36	8
Commercial/institutional liquefied petroleum gas (LPG)	4.7	128.1	71.8	33	890	498
Commercial/institutional natural gas	46.3	842.3	707.5	322	5,849	4,913
Industrial distillate oil: boilers	0.7	71.0	17.7	5	493	123
Industrial distillate oil: engines	99.3	1,428.7	307.5	690	9,922	2,135
Industrial LPG	1.7	47.5	26.6	12	330	185
Industrial natural gas	21.4	389.6	327.3	149	2,706	2,273
Residential distillate oil	0.0	0.6	0.2			
Residential LPG	2.7	69.8	19.8			
Residential natural gas	56.8	970.8	413.1	148	2,532	1,078
Residential wood combustion	1,798.6	187.1	11,193.6			
Total fuel combustion	**2,032.8**	**4,144.0**	**13,087.0**	**1,361**	**22,781**	**11,219**
Bakeries	71.0			458		
Commercial cooking	525.0	-	1,466.1	2,853	-	7,968.0
Commercial sterilization	1.6			9		
Chemical manufacturing	148.7			884		
Electrical equipment manufacturing	160.9	37.7	8.5	889	207	47
Fabricated metal product manufacturing	7.2	-	0.3	37	8	2

Source Category	Annual emissions (tons/year)			Season-day emissions (pounds/day)		
	VOC	NO_X	CO	VOC	NO_X	CO
Hospitals	18.2			100		
Rubber and plastic product manufacturing	973.7			6,013		
Secondary metal production	46.1	20.5	109.3	293	110	568
Industrial processes, not elsewhere classified (NEC)	65.5	13.9	49.0	373	78	233
All industrial processes	**2,017.9**	**72.2**	**1,633.2**	**11,909**	**403**	**8,817**
Accidental releases						
Aircraft engine testing	0.0	2.4	0.0	0	15	0
Backyard barbeques	87.6	23.1	1,115.1	479	126	6,094
Composting	758.7			4,169		
Crematories, human	0.3	14.9	1.3	2	89	8
Crematories, animal	0.2	8.8	0.5	1	49	3
Livestock	640.9	-	-	3,522	-	-
Prescribed fires	0.2	0.2	2.5	-	-	
Structure fires	26.2	3.3	143.1	143	18	782
Vehicle fires	7.7	1.0	30.2	42	5	165
Wildfires	13,682.4	1,101.9	57,619.4	269,436	21,237	51,652
Total miscellaneous nonpoint sources	**15,204.2**	**1,155.5**	**58,912.1**	**277,794**	**21,539**	**58,703**
Aircraft surface coating	6.7			39		
Architectural coatings	2,393.9			13,153		
Agricultural Pesticides	113.6			624		
Asphalt application, emulsified	158.8			870		
Asphalt application, hot mix	783.4			4,293		
Asphalt application, warm mix	13.7			75		
Auto refinishing	495.7			2,724		
Consumer and commercial products (CCP): Adhesives and sealants	4,223.0			23,140		
CCP: Automotive aftermarket products	437.5			2,397		
CCP: Coatings and related products	2,199.5			12,052		
CCP: Household products	4,618.3			25,306		

Source Category	Annual emissions (tons/year)			Season-day emissions (pounds/day)		
	VOC	NO_X	CO	VOC	NO_X	CO
CCP: Fungicide, insecticide, and rodenticide products	4,121.1			22,581		
CCP: Personal care products	4,535.3			24,851		
CCP: Miscellaneous products, NEC	162.1			888		
Degreasing	525.1			3,028		
Dry cleaning	18.2			140		
Factory finished wood and wood furniture	826.1			6,158		
Graphics arts	233.5			1,390		
Industrial maintenance coatings	761.7			5,859		
Manufacturing electronic and other electrical: SIC 36 - 363	24.2			186		
Manufacturing large appliances: SIC 363	11.3			87		
Manufacturing machinery and equipment: SIC 35	41.2			317		
Manufacturing marine: SIC 373	8.0			61		
Manufacturing metal furniture: SIC 25	49.7			382		
Manufacturing motor vehicles: SIC 371	53.6			412		
Manufacturing paper: SIC 26	19.2			148		
Miscellaneous surface coating	56.5			356		
Miscellaneous industrial solvent use	100.8			709		
Other special purpose coatings	482.6			3,712		
Total solvent use	**27,474.1**			**155,939**		
Airports: aviation gasoline stage 1	1.6			9		
Airports: aviation gasoline stage 2	46.6			255		
Bulk plants	25.3			139		

Source Category	Annual emissions (tons/year)			Season-day emissions (pounds/day)		
	VOC	NO_X	CO	VOC	NO_X	CO
Bulk terminals	129.4			712		
Gas stations stage 1: balanced submerged fill	298.6			1,832		
Gas stations stage 1: submerged fill	92.1			565		
Gas stations: tank trucks in transit	52.2			320		
Gas stations stage 1: underground tanks breathing/emptying	606.2			3,189		
Pipeline gasoline	59.7			327		
Portable fuel containers, commercial	503.4			2,751		
Portable fuel containers, residential	463.6			2,533		
Miscellaneous volatile organic liquid storage and transport	1.3			6		
Total volatile organic liquid storage and transport	**2,280.0**			**12,638**		
Landfills	9.6	16.6	17.6	53	91	97
Leaking Underground Storage Tanks	4.6			34		
Open burning	10.7	4.8	101.4	215	95	2,027
Other waste	2.1	6.8	4.4	11	37	21
Publicly Owned Treatment Works (POTWs)	60.0			461		
Total waste treatment and disposal	**87.0**	**28.2**	**123.4**	**774**	**224**	**2,145**
Total nonpoint	**49,096.0**	**5,399.9**	**73,755.7**	**460,416**	**44,947**	**80,885**

Table 3.5–3: Annual and season-day emissions from nonpoint sources in the Maricopa County 2015 NAA.

Source Category	Annual emissions (tons/year)		Season-day emissions (pounds/day)			
	VOC	NO_X	CO	VOC	NO_X	CO
Commercial/institutional distillate oil: boilers	0.1	3.3	0.8	0	23	6
Commercial/institutional distillate oil: engines	0.4	5.3	1.1	3	36	8

Source Category	Annual emissions (tons/year)		Season-day emissions (pounds/day)			
	VOC	NO_X	CO	VOC	NO_X	CO
Commercial/institutional liquefied petroleum gas (LPG)	4.7	128.6	72.0	33	893	500
Commercial/institutional natural gas	46.5	845.5	710.2	323	5,871	4,932
Industrial distillate oil: boilers	0.7	71.1	17.8	5	493	123
Industrial distillate oil: engines	99.5	1,430.7	307.9	691	9,936	2,138
Industrial LPG	1.7	47.6	26.7	12	331	185
Industrial natural gas	21.5	390.2	327.7	149	2,709	2,276
Residential distillate oil	0.0	0.6	0.2			
Residential LPG	2.8	71.7	20.3			
Residential natural gas	58.4	997.4	424.4	152	2,602	1,107
Residential wood combustion	1,847.9	192.2	11,500.0			
Total fuel combustion	**2,084.1**	**4,184.1**	**13,409.2**	**1,368**	**22,895**	**11,276**
Bakeries	71.1			459		
Commercial cooking	539.3		1,506.2	2,931.2		8,186
Commercial sterilization	1.6			9		
Chemical manufacturing	148.9			886		
Electrical equipment manufacturing	161.2	37.8	8.5	890	208	47
Fabricated metal product manufacturing	7.2		0.3	37	8	2
Hospitals	18.7			103		
Rubber and plastic product manufacturing	975.1			6,021		
Secondary metal production	46.1	20.5	109.3	293	110	568
Industrial processes, not elsewhere classified (NEC)	65.5	13.9	49.0	373	78	233
All industrial processes	**2,034.7**	**72.3**	**1,673.3**	**12,002**	**403**	**9,035**
Accidental releases						
Aircraft engine testing	0.0	2.4	0.0	0	15	0
Backyard barbeques	90.0	23.7	1,145.7	492	129	6,260
Composting	779.5			4,283		
Crematories, human	0.3	14.9	1.3	2	89	8
Crematories, animal	0.2	8.8	0.5	1	49	3
Livestock	680.5			3,739		
Prescribed fires	0.2	0.2	2.5			
Structure fires	27.0	3.4	147.2	147	19	804
Vehicle fires	8.0	1.0	31.1	43	5	170
Wildfires	13,444.3	1,087.3	56,611.2	264,203	20,917	50,644

Source Category	Annual emissions (tons/year)			Season-day emissions (pounds/day)		
	VOC	NO_X	CO	VOC	NO_X	CO
Total miscellaneous nonpoint sources	**15,029.9**	**1,141.7**	**57,939.4**	**272,911**	**21,223**	**57,889**
Aircraft surface coating	6.7			39		
Architectural coatings	2,397.3			13,172		
Agricultural Pesticides	113.6			624		
Asphalt application, emulsified	163.2			894		
Asphalt application, hot mix	811.4			4,446		
Asphalt application, warm mix	14.2			78		
Auto refinishing	496.4			2,728		
Consumer and commercial products (CCP): Adhesives and sealants	4,338.6			23,773		
CCP: Automotive aftermarket products	449.5			2,463		
CCP: Coatings and related products	2,259.7			12,382		
CCP: Household products	4,744.7			25,998		
CCP: Fungicide, insecticide, and rodenticide products	4,233.9			23,200		
CCP: Personal care products	4,659.5			25,531		
CCP: Miscellaneous products, NEC	166.5			912		
Degreasing	525.8			3,032		
Dry cleaning	18.9			145		
Factory finished wood and wood furniture	827.2			6,166		
Graphics arts	233.8			1,392		
Industrial maintenance coatings	789.0			6,069		
Manufacturing electronic and other electrical: SIC 36 - 363	24.2			186		
Manufacturing large appliances: SIC 363	11.3			87		
Manufacturing machinery and equipment: SIC 35	41.2			317		
Manufacturing marine: SIC 373	8.0			61		
Manufacturing metal furniture: SIC 25	49.7			383		
Manufacturing motor vehicles: SIC 371	53.7			413		
Manufacturing paper: SIC 26	19.3			148		
Miscellaneous industrial solvent use	100.9			710		
Miscellaneous surface coating	56.7			357		
Other special purpose coatings	499.9			3,845		
Total solvent use	**28,114.7**			**159,553**		
Airports: aviation gasoline stage 1	1.6			9		

Source Category	Annual emissions (tons/year)			Season-day emissions (pounds/day)		
	VOC	NO_X	CO	VOC	NO_X	CO
Airports: aviation gasoline stage 2	46.6			255		
Bulk plants	25.3			139		
Bulk terminals	129.4			712		
Gas stations stage 1: balanced submerged fill	298.6			1,832		
Gas stations stage 1: submerged fill	92.1			565		
Gas stations: tank trucks in transit	52.2			320		
Gas stations stage 1: underground tanks breathing/emptying	606.2			3,189		
Pipeline Gasoline	59.7			327		
Portable fuel containers, residential	476.3			2,603		
Portable fuel containers, commercial	505.4			2,762		
Miscellaneous volatile organic liquid storage and transport	1.3			6		
Total volatile organic liquid storage and transport	**2,294.7**			**12,719**		
Landfills	9.6	16.6	17.6	53	91	97
Leaking underground storage tanks	4.6			34		
Open burning	11.7	5.2	110.8	232	103	2,187
Other waste	2.1	6.8	4.4	11	37	21
Publicly owned treatment works	61.6			474		
Total waste treatment and disposal	**89.6**	**28.6**	**132.8**	**804**	**232**	**2,306**
Total nonpoint	**49,647.7**	**5,426.7**	**73,154.7**	**459,356**	**44,753**	**80,506**

3.6 References

EPA, 1992. Compilation of Air Pollution Emission Factors (AP-42). Volume I: Stationary Point and Area Sources. Fifth ed. Chapter 2: Solid Waste Disposal, 2.5 Open Burning, Table 2.5–5. EPA, Office of Air Quality Planning and Standards, Research Triangle Park, NC.

EPA, 2000. Area Source Category Method Abstract: Vehicle Fires. Emission Inventory Improvement Program (EIIP), May 2000. Internet address: https://www.epa.gov/sites/production/files/2015-08/documents/vehclf13.pdf

EPA, 2001a. Introduction to Area Source Emission Inventory Development. Emission Inventory Improvement Program (EIIP) Vol. III, Chapter 1. Revised Final, January 2001.Prepared by Eastern Research Group, Inc. for the Area Source Committee, EIIP. Internet address: http://www.epa.gov/ttn/chief/eiip/techreport/volume03/iii01_apr2001.pdf

EPA, 2001b. Leaking Underground Storage Tanks. Emission Inventory Improvement Program Vol. III, Area Source Method Abstract. May 2001. Internet address: http://www.epa.gov/ttn/chief/eiip/techreport/volume03/ust2_dec2000.pdf

EPA, 2001c. Structure Fires. Emission Inventory Improvement Program (EIIP) Vol. III, Chap. 18. Revised Final, Jan. 2001.Prepared by Eastern Research Group, Inc. for the Area Sources Committee, EIIP. Internet address: http://www.epa.gov/ttn/chief/eiip/techreport/volume03/iii18_apr2001.pdf

EPA, 2020. National Emissions Inventory (NEI) Plan. Internet address: https://www.epa.gov/sites/default/files/2020-08/documents/2020_nei_plan_final.pdf

MCAQD, 2019. 2017 Periodic Emissions Inventory for Ozone Precursors. Maricopa County Air Quality Department, Phoenix AZ, November 2019.

NOAA, 2022. Degree Day Statistics States and Cities. Climate Prediction Center. Internet address: https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/cdus/degree_days/

WGA/WRAP, 2005. 2002 Fire Emission Inventory for the WRAP Region – Phase II. Project No. 178-6. Western Governors Association/Western Regional Air Partnership. July 22, 2005. Tables 5 and 6. Internet address: http://www.wrapair.org/forums/fejf/documents/WRAP_2002_PhII_EI_Report_20050722.pdf

4. Nonroad Mobile Sources

4.1 Introduction

Nonroad mobile sources are vehicles or equipment that move (or are moved) within the 12-month period and are not licensed or certified as highway vehicles. Nonroad vehicles and equipment fall into the following categories:

- Agricultural equipment, such as tractors, combines and balers;
- Airport ground support equipment (GSE), such as baggage tugs and terminal tractors, and auxiliary power units (APU);
- Commercial equipment, such as generators and pumps;
- Construction equipment, such as graders, back hoes and trenchers;
- Industrial equipment, such as forklifts and sweepers;
- Lawn and garden equipment, such as leaf blowers and lawn mowers;
- Logging equipment (not present in Maricopa County);
- Oil field equipment (not present in Maricopa County);
- Pleasure craft, such as power boats and personal watercraft;
- Railway maintenance equipment, such as rail straighteners;
- Recreational equipment, such as all-terrain vehicles and off-road motorcycles;
- Underground mining equipment (not present in Maricopa County);
- Aircraft, such as jet- and piston-engine planes; and
- Locomotives, such as switching and line-haul trains.

For most nonroad mobile source categories (except aircraft, APUs, GSE, and locomotives), the EPA Motor Vehicle Emission Simulator (MOVES3) model was used to produce emission estimates.

For aircraft, APUs, and airport GSE categories, the Federal Aviation Administration (FAA) Aviation Environmental Design Tool (AEDT) Version 3d computed emissions related to aircraft operations at airports. EPA estimated rail emissions based on national locomotive fuel usage, locomotive fleet data, the amount of track in each state and county, along with usage and grade data for each track section. Season-day rail estimates were calculated assuming that rail activity is consistent throughout the year.

This document reports annual and ozone season average daily nonroad mobile source emissions in 2020 for Maricopa County, the ozone nonattainment area for the 2008 ozone standard, and the expanded ozone nonattainment area for the 2015 ozone standard. The expanded area for the 2015 standard includes a small section of Gila County containing the Tonto National Monument monitor and an additional section of Pinal County containing the Queen Valley monitor and San Tan Valley. Spatial surrogates based on land use and demographics in each county allocate the annual and ozone season-day emissions to the nonattainment areas. The sections below describe the different

approaches used to allocate emissions for the different equipment categories to Maricopa County and the two nonattainment areas.

4.2 Emission Calculation Methodology

Table 4.2–1 summarizes the specific emissions estimation methods used to generate the annual and ozone season-day nonroad mobile sources emission inventory. The following subsections describe the methodologies associated with these calculation methods.

Table 4.2–1: Estimation method for all nonroad mobile sources.

Category	Annual Method	Season Day Method
Agricultural	MOVES3	MOVES3
Airport GSE+APUs	AEDT 3d	AEDT 3d
Commercial	MOVES3	MOVES3
Construction	MOVES3	MOVES3
Industrial	MOVES3	MOVES3
Lawn and garden	MOVES3	MOVES3
Pleasure craft	MOVES3	MOVES3
Railway maintenance	MOVES3	MOVES3
Recreational	MOVES3	MOVES3
Aircraft	AEDT 3d	AEDT 3d
Locomotives	EPA Rail Estimates	Assumed same

4.2.1 MOVES3

The MOVES3 (version 3.0.2) model calculated emissions for nonroad sources in Maricopa County using local inputs as described below.

The National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Information (NCEI) Local Climatological Data website (NCEI, 2020) provided hourly profiles of monthly average temperature observations at Phoenix Sky Harbor Airport. The Arizona Department of Agriculture (AZDA) Weights and Measures Services Division provided fuel specifications for 2020, identical to the fuel data used in modeling onroad mobile source emissions.

EPA recommends adjusting default model input files (such as equipment population and activity levels) where local data are available, to replace the default values derived from national averages. A local survey performed by ENVIRON as part of an inventory developed to study the impact of visibility-impairing pollutants (ENVIRON et al., 2003) was used to replace the default population and activity levels for commercial lawn and garden equipment in Maricopa County. Survey results showed that for most categories of commercial lawn and garden equipment, populations in Maricopa County are significantly lower than EPA default values, while the average annual hours of operations for most equipment types are slightly higher than EPA's values. Using this local data results in a considerable decrease in emissions from commercial lawn and garden equipment, compared with earlier results using EPA default inputs. Default equipment populations for oil field equipment based on employment were set to zero, as there is no oil and gas production in Maricopa County (AZOGCC, 2018).

The MOVES3 nonroad model output consists of typical weekday and weekend emissions for each month of the year. The typical weekday emissions multiplied by the number of weekdays in each month added to the typical weekend emissions multiplied by the number of weekend days in the month represents the total emissions for the month. The sum of the monthly emissions over the year represents the total annual emissions.

Ozone season-day emissions are a 3-month average of the typical weekday, or typical weekend, emissions over the ozone season months (June-August). To be conservative, the typical day type with the highest emissions (weekday or weekend) represents ozone season-day emissions for each nonroad emissions category. For example, typical daily emissions from agricultural equipment are higher on weekdays than on weekends. As such, weekday emissions are representative of ozone season-day emissions for agricultural equipment. Other categories, such as recreational equipment, have higher emissions on weekends rather than weekdays.

Spatial surrogates, based on land use and demographics, proportionally allocate the annual and ozone season-day emissions computed for Maricopa County to the nonattainment areas, as described in Section 4.3.

4.2.2 Airport Ground Support Equipment

The AEDT model produced emission estimates for GSE and APUs at airports. Section 4.2.3 below describes the modeling input data used. GSE and APU emissions for Luke Air Force Base (AFB) and aircraft emissions for Luke AFB are a single grouped emissions estimate.

4.2.3 Aircraft

The AEDT model produced emission estimates for aircraft at 14 airports in Maricopa County. The AEDT model is a software system that models aircraft performance in space and time to estimate noise, fuel consumption, emissions, and air quality consequences. AEDT leverages geographic information system (GIS) and relational database technology to support individual studies ranging in scope from a single flight at an airport to scenarios at the regional, national, and global levels. AEDT is actively used by the U.S. government for regulatory studies, research, and domestic aviation system planning and aviation environmental policy analysis.

The AEDT model calculates aircraft, GSE, and APU emissions of VOC, NO_x, and CO using airport operational data for 2020 as discussed below. The model computes emissions individually for each combination of aircraft and engine type, and AEDT model outputs aggregated emissions for four main aircraft categories:

- Air carriers (AC): Larger commercial aircraft with at least 60 seats or 18,000 pounds of payload capacity, used for scheduled service to transport passengers and/or freight;
- Air taxis (AT): Smaller commercial turbine- or piston-powered aircraft with less than 60 seats or 18,000 pounds of payload capacity;
- General aviation (GA): Aircraft used on an unscheduled basis for recreational flying, personal transportation, and other activities, including business travel; and
- Military (ML): Aircraft used to support military operations.

The AEDT model utilizes three main input databases to estimate annual or seasonal emission inventories at each airport:

- Airport database: Relevant airport information, such as latitude, longitude, runway, taxi-in and taxi-out time, country, and weather data;
- Fleet database: Aircraft/engine models and flight tracking profiles for arrival, departure, and touch-and-go (T&G) operations; and
- Local activity database: Number of aircraft operations for landing/takeoffs (LTO), and fleet mix at each airport.

Local aircraft activity data (number of LTOs or T&G operations) is a critical input to the AEDT model. The FAA Operations Network (OPSNET) database (FAA, 2021a) provided daily activity data on 2020 aircraft operations for the eight larger commercial and general aviation airports in the Maricopa County (Chandler Municipal, Falcon Field, Glendale Municipal, Phoenix Deer Valley, Phoenix Goodyear, Phoenix-Mesa Gateway, Phoenix Sky Harbor, and Scottsdale airports). Additionally, FAA 5010 Airport Master Records database (airportiq5010.com) provided operations data for five smaller general aviation airports included in the inventory (Buckeye Municipal, Gila Bend Municipal, Stellar Airpark, Pleasant Valley, and Wickenburg Municipal airports). Because the FAA's 5010 database does not have the 2020 operational data for Sky Ranch at Carefree, the recent 2017 survey data at this same airport were adopted. The AFB personnel provided the numbers of F-16s and F-35s military aircraft based at Luke AFB in 2020. The FAA Traffic Flow Management System Counts (TFMSC) database provided aircraft fleet mix for 11 of the 14 commercial and general aviation airports. The fleet mix from Phoenix Goodyear assumedly represents those at both nearby Buckeye Municipal and Gila Bend Municipal, and the fleet mix for Pleasant Valley was taken from 2017 survey data.

Table 4.2.3–1 summarizes the activity level for each aircraft category at each airport included in the inventory, and indicates the data sources for activity and fleet mix.

Table 4.2–2: Annual airport operations (by aircraft category) and related data sources

Airport Name	2020 Operations						
	FAA LID	Operations Data Source[1]	Fleet Mix Data Source[2]	Air Carrier (AC)	Air Taxi (AT)	General Aviation (GA)	Military (ML)
Buckeye Municipal	BXK	AirportIQ 5010	TFMSC	0	100	54,000	100
Chandler Municipal	CHD	OPSNET	TFMSC	0	12,827	201,664	127
Falcon Field	FFZ	OPSNET	TFMSC	7	77,000	228,745	1,924
Gila Bend Municipal	E63	AirportIQ 5010	TFMSC	0	624	41,317	59
Glendale Municipal	GEU	OPSNET	TFMSC	0	280	86,048	4
Luke Air Force Base	LUF	[Emissions for 2020 were estimated by scaling based on numbers of F-16 and F-35 fighter jets, see text for details]					

Airport Name	2020 Operations						
	FAA LID	Operations Data Source[1]	Fleet Mix Data Source[2]	Air Carrier (AC)	Air Taxi (AT)	General Aviation (GA)	Military (ML)
Phoenix Deer Valley	DVT	OPSNET	TFMSC	20	52,662	349,672*	90
Phoenix Goodyear	GYR	OPSNET	TFMSC	184	3,324	74,916*	1,175
Phoenix-Mesa Gateway	IWA	OPSNET	TFMSC	11,080	50,218	194,997	3,044
Phoenix Sky Harbor	PHX	OPSNET	TFMSC	260,343	30,628	17,371	1,982
Pleasant Valley	P48	AirportIQ 5010	Survey	0	0	30,000*	0
Scottsdale	SDL	OPSNET	TFMSC	23	23,127	172,321	381
Sky Ranch at Carefree	18AZ	Survey	TFMSC	0	0	4,291	0
Stellar Airpark	P19	AirportIQ 5010	TFMSC	0	0	40,000	0
Wickenburg Municipal	E25	AirportIQ 5010	TFMSC	0	400	35,700	50

AirportIQ 5010: online database of FAA Form 5010 information (http://airportiq5010.com)

OPSNET: Operational Network (FAA, 2021a)

Survey: MAG Airport Survey (2017 operations and fleet mix, conducted via email and phone call, 2018)

TFMSC: Traffic Management System Counts (FAA, 2021b)

* The number of operations includes touch-and-go operations reported by airport or FAA.

Note that T&G operations for fixed wing aircraft consist of an approach, brief ground roll (landing), an immediate takeoff, and a climb-out–all of which occur without exiting the runway. Specifically a T&G operation counts as two operations in FAA procedures, because both a landing and a takeoff occur.

The following section describes the derivation of activity and emission estimates for general aviation activity at a representative airport: Chandler Municipal (CHD). The OPSNET database reported 201,644 general aviation operations at this airport in 2020, as listed in Table 4.2–2. The TFMSC database of general aviation activity and fleet mix at Chandler Municipal airport in 2020 comprised 93 different aircraft types recognized by AEDT, with a combined 2,533 operations. The smaller numbers reported in TFMSC are a representative sample of the total general aviation operations. The number of operations for each type in the sample divided by the combined number of operations in the sample gives a relative frequency distribution of aircraft types at this airport. This frequency distribution, multiplied by the total number of operations reported by OPSNET, provides the number of operations allocated to each aircraft type for input to the AEDT model. Table 4.2–3 demonstrates this calculation for the general aviation activity at Chandler Municipal Airport. When

applied to each aircraft category at each airport, this procedure typically resulted in 10 to 100 aircraft types representing 98.6 to 100% of all reported activity.

Table 4.2–3: Aircraft type activity distribution at Chandler Municipal airport.

Rank	Aircraft Type	TFMSC Reported Operations	Relative Frequency (%)	Cumulative Frequency (%)	Total Operations for AEDT
1	BE20 - Beech 200 Super King	365	14.410%	14.410%	29,046
2	TBM9 - Socata TBM	210	8.291%	22.700%	16,720
3	C172 - Cessna Skyhawk 172/Cutlass	177	6.988%	29.688%	14,092
4	C560 - Cessna Citation V/Ultra/Encore	131	5.172%	34.860%	10,430
5	C25C - Cessna Citation CJ4	115	4.540%	39.400%	9,156
6	LJ45 - Bombardier Learjet 45	96	3.790%	43.190%	7,644
7	PC12 - Pilatus PC-12	80	3.158%	46.348%	6,370
8	BE9L - Beech King Air 90	79	3.119%	49.467%	6,290
9	S22T - Cirrus SR-22 Turbo	73	2.882%	52.349%	5,812
10	C425 - Cessna 425 Corsair	72	2.842%	55.191%	5,732
11	P28A - Piper Cherokee	72	2.842%	58.034%	5,732
12	P46T - Piper Malibu Meridian	66	2.606%	60.640%	5,254
13	SF50 - Cirrus Vision SF50	65	2.566%	63.206%	5,174
14	AC90 - Gulfstream Commander	63	2.487%	65.693%	5,016
15	M20T - Turbo Mooney M20K	57	2.250%	67.943%	4,538
16	C182 - Cessna Skylane 182	56	2.211%	70.154%	4,458
17	C525 - Cessna CitationJet/CJ1	53	2.092%	72.246%	4,220
18	BE36 - Beech Bonanza 36	44	1.737%	73.983%	3,504
19	SR22 - Cirrus SR 22	42	1.658%	75.642%	3,344
20	BE58 - Beech 58	31	1.224%	76.865%	2,468
21	TBM7 - Socata TBM-7	31	1.224%	78.089%	2,468
22	C550 - Cessna Citation II/Bravo	30	1.184%	79.274%	2,388
87	BE60 - Beech 60 Duke	1	0.039%	99.763%	80
88	C25A - Cessna Citation CJ2	1	0.039%	99.803%	80
89	HUSK - Aviat A-1 Husky Pup	1	0.039%	99.842%	80
90	LJ60 - Bombardier Learjet 60	1	0.039%	99.882%	80
91	LNC4 - Lancair 4	1	0.039%	99.921%	80
92	M20 - Mooney M-20C Ranger	1	0.039%	99.961%	80
93	PA30 - Piper PA-30	1	0.039%	100.000%	80
	Total	**2,533**			**201,664**

* Computations rounded to produce even multiples of LTO, with adjustments to account for accumulated rounding error added to the dominant aircraft type.

There are three types of aircraft with emissions at Luke AFB: F-16 fighter jets, F-35 fighter jets and transient aircraft. There are also emissions from associated GSE. The ratio of 0.46 between the number of F-16s based at Luke AFB in 2020 and the number of F-16s based there in 2008 (Weston, 2010) provides an estimate of aircraft and associated GSE emissions. Emissions from F-35 aircraft and their associated GSE were scaled using a ratio of 0.63 between the number of F-35 aircraft based at Luke AFB in 2020 and the future total number of F-35 aircraft in the L6 scenario emissions as obtained from the base's 2012 environmental impact statement report (USAF, 2012). Transient

aircraft emissions for 2020 are similar to those for 2008, based on discussions with Luke AFB personnel.

4.2.4 Locomotives

There are three railway companies operating within the 8-hour ozone nonattainment area. Burlington Northern/Santa Fe Railway (BNSF), Union Pacific Railway (UP) and Amtrak each provided diesel fuel usage for the computation of annual emissions from locomotives. Railway operations from these companies fall into three categories: Class I haul lines, passenger trains, and yard/switching operations. EPA estimated rail emissions based on national locomotive fuel usage, locomotive fleet data, the amount of track in each state and county, along with usage and grade data for each track section. Assuming that locomotive activity is uniform throughout the year, the annual totals divided by 365 days per year represent the ozone season-day emissions.

4.3 Emission Allocation Methodology

Spatial surrogates were used to allocate the county level annual and ozone season-day emissions for each of the categories to the 8-hour ozone nonattainment areas (NAA) using the methodology presented in this section. Table 4.3–1 summarizes the specific allocation methods used. The following sub-sections describe the methodologies.

Table 4.3–1: Calculation and allocation method for nonroad mobile sources.

Category	Allocation
Agricultural	Land Use (Agricultural)
Airport GSE+APUs	Location Data
Commercial	Land Use (Commercial)
Construction	Employment (Construction)
Industrial	Land Use (Industrial)
Lawn and garden	Land Use (Single family housing low+medium density, All development
Pleasure craft	Land Use (Lakes)
Railway maintenance	Land Use (Railroad)
Recreational	Land Use (Passive Open + Vacant, Golf Courses)
Aircraft	Location Data
Locomotives	Location Data

4.3.1 Land Use

The acreages of specific land use categories are the spatial surrogates for the allocation of emissions to the 2008 and 2015 8-hour ozone NAAs for the agriculture, commercial, industrial, lawn and garden, pleasure craft, railway maintenance and recreational sectors. Maricopa County annual and ozone season-day emissions, multiplied by the ratio of the category acreage in the NAA to the category acreage in Maricopa County, represent the annual and ozone season-day emissions for the NAA.

4.3.2 Location Data

The geographic location of each source identifies whether it is located inside or outside of the 8-hour ozone NAA. Annual and ozone season-day emissions for each source located inside the NAA are included in NAA totals.

4.3.3 Employment

The number of employees in specific employment sectors are spatial surrogates for the allocation of county emissions to the 2008 and 2015 8-hour ozone NAAs for the construction sectors. Maricopa County annual and ozone season-day emissions, multiplied by the ratio of employees in the NAA to the number of employees in Maricopa County, represents the annual and ozone season-day emissions for the NAA.

4.4 Quality Assurance Procedures

A comparison of the 2020 nonroad mobile sources emission estimates to previous emissions inventories (2017) provided a quality check of the results. Any unexpected changes (large increases or decreases in source emissions) triggered investigations to identify the reasons for the changes. Inspection of annual emissions totals computed individually for each source served as additional validation. Personnel who were not involved in the development of the results reviewed the input/output files and calculations for accuracy. In addition, external agency staff reviewed the emissions estimates.

4.5 Summary of Nonroad Mobile Source Emissions

Table 4.5–1 summarizes annual and ozone season-day emissions of VOC, NO_x, and CO from nonroad mobile sources in Maricopa County. Tables 4.5–2 and 4.5-3 show the annual and ozone season-day emissions for these pollutants for the 2008 and 2015 8-hour ozone NAAs.

Table 4.5–1: Annual and ozone season-day emissions from nonroad mobile sources in Maricopa County.

Category	Annual emissions (tons/year)			Season day emissions (pounds/day)		
	VOC	NO_X	CO	VOC	NO_X	CO
Agricultural	22.6	230.6	238.9	196	1,982	2,108
Airport GSE+APUs	33.9	171.5	931.7	159	797	4,426
Commercial	1,005.3	801.7	28,273.6	6,815	4,846	189,413
Construction	1,487.6	7,354.7	14,977.7	10,340	50,572	106,856
Industrial	122.8	862.1	3,407.9	780	5,113	22,118
Lawn and garden	2,746.6	490.1	47,865.2	26,043	4,232	492,237
Pleasure craft	173.9	65.4	753.3	3,229	1,634	19,497
Railway maintenance	1.0	5.0	14.5	7	34	104
Recreational	453.4	45.7	5,397.5	5,515	513	70,275
Aircraft	1,263.7	2,413.4	8,302.9	6,123	12,041	40,195
Locomotives	52.8	1,129.3	221.8	289	6,171	1,212
Total	**7,363.6**	**13569.5**	**110,385.0**	**59,496**	**87,935**	**948,441**

Table 4.5–2: Annual and ozone season-day emissions from nonroad mobile sources in the 2008 8-hour ozone NAA.

Category	Annual emissions (tons/year)			Season day emissions (pounds/day)		
	VOC	NO_X	CO	VOC	NO_X	CO
Agricultural	12.6	128.7	133.3	109	1,106	1,176
Airport GSE+APUs	33.4	169.9	917.4	156	788	4,348
Commercial	990.4	789.9	27,856.4	6,714	4,774	186,619
Construction	1,477.8	7,306.1	14,878.6	10,272	50,237	106,149
Industrial	122.5	860.2	3,400.5	778	5,102	22,069
Lawn and garden	2,685.4	479.5	46,803.0	25,457	4,139	481,170
Pleasure craft	173.9	65.4	753.3	3,229	1,634	19,497
Railway maintenance	0.6	2.7	7.8	4	18	56
Recreational	242.4	33.0	4,345.1	2,957	366	56,676
Aircraft	1,237.6	2,401.2	8,151.8	5,981	11,975	39,373
Locomotives	42.4	885.7	170.8	232	4,840	933
Total	**7,019.0**	**13,122.3**	**107,418.0**	**55,889**	**84,979**	**437,378**

Table 4.5–3: Annual and ozone season-day emissions from nonroad mobile sources in the 2015 8-hour ozone NAA.

Category	Annual emissions (tons/year)			Season day emissions (pounds/day)		
	VOC	NO_X	CO	VOC	NO_X	CO
Agricultural	13.4	136.8	141.8	116	1,176	1,251
Airport GSE+APUs	33.4	169.9	917.4	156	788	4,348
Commercial	1,000.9	798.2	28,150.7	6,785	4,825	188,590
Construction	1,482.0	7,327.1	14,921.4	10,301	50,381	106,454
Industrial	122.8	862.6	3,409.8	780	5,116	22,130
Lawn and garden	2,779.6	494.9	48,420.7	26,376	4,276	498,467
Pleasure craft	176.5	66.4	764.5	3,277	1,659	19,787
Railway maintenance	0.6	2.8	8.1	4	19	58
Recreational	257.4	34.7	4,570.6	3,140	386	59,615
Aircraft	1,237.6	2,401.2	8,151.8	5,981	11,975	39,373
Locomotives	43.0	898.4	173.6	235	4,909	948
Total	**7,147.2**	**13,193.0**	**109,630.4**	**57,151**	**85,510**	**941,021**

4.6 References

AZOGCC, 2018. Production Reports. Arizona Oil and Gas Conservation Commission. http://www.azogcc.az.gov/production_reports

ENVIRON et al., 2003. Maricopa County 2002 Comprehensive Emission Inventory for the Cap and Trade Oversight Committee, Final Rep. Oct. 9, 2003. Prepared for Arizona Department of Environmental Quality.

EPA, 2009. Emission Factors for Locomotives. Office of Transportation and Air Quality. Rep. EPA-420-F09-025, April 2009.

FAA, 2021a. Operational Network (OPSNET) database. Federal Aviation Administration. https://aspm.faa.gov/opsnet/sys/Airport.asp.

FAA, 2021b. Traffic Flow Management System Counts (TFMSC) database. Federal Aviation Administration. https://aspm.faa.gov/tfms/sys/Airport.asp.

NCEI, 2020. Local Climatological Data. NOAA National Centers for Environmental Information. https://www.ncdc.noaa.gov/IPS/lcd.

USAF, 2012. Final F-35A Training Basing Environmental Impact Statement. http://www.dtic.mil/dtic/tr/fulltext/u2/a612501.pdf.

Weston, 2010. 2008 Mobile Source Air Emissions Inventory for Luke Air Force Base. Weston Solutions, Inc. Prepared for Air Education and Training Command (AETC), US Air Force, Randolph AFB, TX. June 2010.

5. Onroad Mobile Sources

5.1 Introduction

Onroad mobile source emissions for ozone precursors, such as volatile organic compounds (VOCs), oxides of nitrogen (NO_x), and carbon monoxide (CO), have been calculated for Maricopa County, the 8-hour ozone nonattainment area for the 2008 ozone standards, and the 8-hour ozone nonattainment area for the 2015 ozone standards for the 2020 Periodic Emissions Inventory (PEI).

Motor Vehicle Emission Simulator (MOVES3) is the latest model developed by the U.S. Environmental Protection Agency (EPA) for the purpose of estimating onroad and off-network motor vehicle emission factors.

The MOVES3 inputs were developed using local data from multiple sources such as the Arizona Department of Transportation (ADOT), the Arizona Department of Agriculture (AZDA), the Maricopa Association of Governments (MAG) Transportation Division, and the National Centers for Environmental Information (NCEI).

The main references for preparing the onroad mobile source portion of the 2020 emissions inventory were:

- Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations (US EPA, 2017);
- Policy Guidance on the Use of MOVES3 for State Implementation Plan Development, Transportation Conformity, General Conformity, and Other Purposes (US EPA, 2020a);
- MOVES3 Technical Guidance: Using MOVES to Prepare Emission Inventories for State Implementation Plans and Transportation Conformity (US EPA, 2020b);
- Overview of EPA's Motor Vehicle Emission Simulator (MOVES3) (US EPA, 2021a); and
- Instructions and Best Practices for Development and Submittal of Onroad Inputs for the 2020 National Emissions Inventory (NEI) (US EPA, 2021b).

5.2 Onroad Emissions

Onroad exhaust, evaporative, refueling, and extended idling emissions were estimated by MOVES3.

5.2.1 MOVES3 Model

Onroad mobile source emissions were calculated using the EPA state-of-the-art emissions modeling tool, MOVES3. MOVES3 is intended for official use to estimate national, state, and county level inventories of criteria air pollutants from highway vehicles. The user of MOVES3 is allowed to specify vehicle types, time periods, geographical areas, pollutants, vehicle operating characteristics, and road types for a particular scenario to be modeled by creating a Run Specification (RunSpec).

In order to calculate vehicle emissions for the calendar year 2020, MOVES3 was executed using local input data for each geographical area (Maricopa County, the 8-hour ozone nonattainment area for the 2008 ozone standards, and the 8-hour ozone nonattainment area for the 2015 ozone

standards). Each scenario was created using the county scale setting and the inventory calculation type. The specific MOVES3 model RunSpec and RunSpec summaries are described in Appendix C.

5.2.2 Local Input Data Used with the MOVES3 Model

MOVES3 requires local data such as the presence of inspection and maintenance (I/M) programs, meteorological data, vehicle populations, source type age distribution, annual vehicle miles traveled (VMT), monthly/daily/hourly fractions, road type distribution, average speed distribution, fuel data, and alternative vehicle and fuel technologies (AVFT).

5.2.2.1 Fuel Data

Regarding the fuel local input data, MOVES3 provides three MOVES tables, which are [fuelsupply], [fuelformulation], and [fuelusagefraction]. The fuel data for each month were derived from the 2020 fuel inspection results in Maricopa County provided by AZDA. The fuel data for Maricopa County were also applied to the 8-hour ozone nonattainment areas. The specific MOVES tables for fuel data are presented in Appendix C.

5.2.2.2 I/M Programs

MOVES3 has an [IMCoverage] table for I/M programs, which reflects the actual proportions of vehicles subject to the specified levels of inspection. The term "I/M vehicles" denotes vehicles which are required to undergo an emission test and/or inspection under the Vehicle Inspection/Maintenance Program. It is important to note that participation in the I/M program is required for all vehicles registered in Area A, with the exception of certain model years and vehicle classes. However, it is assumed that 91.6 percent of the vehicles operating within the 8-hour ozone nonattainment area and Maricopa County participate in the I/M program, while the remaining 8.4 percent do not participate in the program. These percentages reflect the control measures "Tougher Enforcement of Vehicle Registration and Emissions Test Compliance" and "Expansion of Area A Boundaries," described in the MAG Eight-Hour Ozone Redesignation Request and Maintenance Plan for the Maricopa Nonattainment Area (MAG, 2009). This percentage is directly applied to the Compliance Factor in the [IMCoverage] table. The same I/M programs were applied for Maricopa County and the 8-hour ozone nonattainment areas. The specific MOVES table for I/M programs is presented in Appendix C.

5.2.2.3 Meteorological Data

MOVES3 requires hourly temperature and relative humidity data by specific month of the year. Meteorological data for the Phoenix Sky Harbor International Airport in 2020 were obtained from the National Centers for Environmental Information (https://www.ncdc.noaa.gov/IPS/lcd/lcd.html). The same hourly average temperature and relative humidity data for each month were applied for Maricopa County and the 8-hour ozone nonattainment areas. The specific MOVES table [ZoneMonthHour] for meteorological data is presented in Appendix C.

5.2.2.4 Vehicle Population

In MOVES3, off-network emissions including start, evaporative, and extended idle emissions are directly determined by population of vehicles in an area. The vehicle population in Maricopa County

was obtained from the July 2019 vehicle registration data provided by ADOT since the July 2020 vehicle registration data are not available at ADOT. The vehicle population data were allocated to the 13 MOVES source types based on MOVES default vehicle population fractions for Maricopa County in 2019 and MOVES default source type population growth rates for Maricopa County between 2019 and 2020 were applied to calculate source type population for 2020. The vehicle population in the 8-hour ozone nonattainment areas were estimated by applying the population ratio of the two geographical areas in 2020 to the vehicle population in Maricopa County. The population ratio for 2020 was derived from the MAG socioeconomic data. The specific MOVES table [SourceTypeYear] for vehicle population is presented in Appendix C.

5.2.2.5 Source Type Age Distribution

MOVES3 categorizes vehicles according to vehicle classes and model years. The source type age distribution input table was prepared using the EPA MOVES data converter with the July 2019 vehicle registration data from ADOT and the EPA MOVES age distribution projection tool to project the 2019 age distribution to the 2020 age distribution. The same source type age distribution was applied for Maricopa County and the 8-hour ozone nonattainment areas. The specific MOVES table [SourceTypeAgeDistribution] for source type age distribution is presented in Appendix C.

5.2.2.6 Annual VMT

The 2020 annual VMTs were used to estimate onroad exhaust and evaporative emissions. The 2020 annual average daily VMTs for Maricopa County and the 8-hour ozone nonattainment areas were derived from the 2020 traffic assignment data generated by the MAG Activity Based Model (ABM). The annual average daily VMTs were multiplied by 366 days to obtain the annual VMTs. The specific MOVES table [HPMSvTypeYear] for annual VMT is presented in Appendix C.

5.2.2.7 Road Type Distribution

MOVES3 requires the distribution of VMTs by road type as a local input. The road type VMT distribution by HPMS vehicle type was derived with the 2020 traffic assignment data and the MOVES default VMT fractions for the HPMS vehicle types. The road type distribution assigned to the HPMS vehicle class was applied to all MOVES source types within the class. The specific MOVES table [RoadTypeDistribution] for road type distribution is presented in Appendix C.

5.2.2.8 VMT Fraction

Since VMT varies by month, day of week, and hour, MOVES3 requires month/day/hour VMT fractions as a local input in order to derive hourly VMT for each weekday/weekend and month from the annual VMT. The month/day/hour VMT fractions were developed from data recorded by continuous traffic counters on freeways (ADOT Freeway Management System) and arterials (Phoenix Automatic Traffic Recorders) in 2020. The specific MOVES tables [MonthVMTFraction], [DayVMTFraction], and [HourVMTFraction] for VMT fractions are presented in Appendix C.

5.2.2.9 Average Speed Distribution

In MOVES3, vehicle power, speed, and acceleration have a significant effect on vehicle emissions for all pollutants. MOVES3 estimates those emission effects by assigning activity to operating mode distributions, which are determined by the distribution of vehicle hours traveled (VHT) in sixteen

speed bins. Local estimates of average speed were developed by post-processing the output from the 2020 traffic assignment data. To develop the average speed distribution, VHTs in sixteen speed bins were accumulated separately for each hour of the day, source type, and road type in Maricopa County. Then, the average speed distribution was calculated by normalizing VHTs in sixteen speed bins for each hour of the day, source type, and road type. The same methodology was applied to develop the speed estimates for the 8-hour ozone nonattainment areas. The specific MOVES table [AvgSpeedDistribution] for the average speed distribution is presented in Appendix C.

5.2.2.10 Alternative Vehicle and Fuel Technologies (AVFT) Strategy

MOVES3 allows users to modify the fuel engine fraction using different fuels and technologies in each model year in order to reflect the local situation. The main AVFT input was obtained from the MOVES3 default database for Maricopa County and transit bus portion was updated with the 2020 transit bus fleet information provided by the Valley Metro. The same AVFT strategy was applied for Maricopa County and the 8-hour ozone nonattainment areas. The specific MOVES table [AVFT] for AVFT strategy is shown in Appendix C.

5.2.3 MOVES3 Outputs

MOVES3 was executed with the RunSpec files described in Appendix C to obtain exhaust and evaporative emissions for VOC, NO_X, and CO. These values were obtained for the following categories:

- Source types: motorcycle, passenger car, passenger truck, light commercial truck, other buses, transit bus, school bus, refuse truck, single unit short-haul truck, single unit long-haul truck, motor home, combination short-haul truck, and combination long-haul truck.
- Road types: off-network, rural restricted access, rural unrestricted access, urban restricted access, and urban unrestricted access

5.2.4 MOVES3 Emission Estimates

MOVES3 was used to generate onroad emissions by source type, road type, weekday/weekend day, and month. By specifying the output time aggregate level as 24-hour day, MOVES3 produces typical weekday and weekend emissions for each month. The annual emissions were calculated by aggregating monthly onroad emissions, which were derived by multiplying number of days and typical day emissions for each weekday/weekend day and month. The ozone season-day emissions were calculated by averaging the ozone season work weekday emissions from June through August.

Tables 5.2–1 through 5.2-3 show the calculated annual and ozone season-day VOC, NO_X, and CO emissions by road type and source type in Maricopa County, the 8-hour ozone nonattainment area for the 2008 ozone standards, and the 8-hour ozone nonattainment area for the 2015 ozone standards, respectively.

Table 5.2–1: Annual and season-day onroad mobile source emissions in Maricopa County, by road type and source type.

Road type	Source type	Annual emissions (tons/year)			Season day emissions (pounds/day)		
		VOC	NO_X	CO	VOC	NO_X	CO
Off-Network	Motorcycle	378.0	0.7	31.1	2,418	4	153
	Passenger car	5,523.0	1,050.2	15,730.7	39,900	6,601	86,980
	Passenger truck	1,383.3	543.8	5,189.5	10,066	3,733	30,087
	Light commercial truck	563.3	347.9	3,960.9	4,048	2,496	23,562
	Other buses	6.2	37.3	73.6	38	215	500
	Transit bus	1.3	4.2	18.9	7	24	118
	School bus	1.4	9.3	11.4	7	63	88
	Refuse truck	1.9	20.9	17.0	10	113	98
	Single unit short-haul truck	189.0	735.7	1,302.2	1,215	4,248	8,657
	Single unit long-haul truck	5.8	37.6	34.1	34	187	171
	Motor home	14.8	5.1	102.6	116	31	601
	Combination short-haul truck	6.3	111.1	60.0	29	634	377
	Combination long-haul truck	23.6	333.3	198.0	128	1,789	1,110
Rural Restricted Access	Motorcycle	3.7	3.5	51.8	22	18	294
	Passenger car	27.6	80.4	1,683.7	173	479	12,744
	Passenger truck	12.0	50.6	510.4	75	298	3,808
	Light commercial truck	5.1	24.8	213.7	32	148	1,594
	Other buses	2.0	28.7	55.4	11	153	319
	Transit bus	0.4	1.4	30.6	2	7	169
	School bus	0.5	6.2	4.5	3	33	25
	Refuse truck	0.3	5.5	9.3	2	29	51
	Single unit short-haul truck	20.7	197.5	454.7	121	1,054	2,592
	Single unit long-haul truck	1.2	11.3	28.9	7	60	164
	Motor home	3.0	11.9	99.2	19	64	575
	Combination short-haul truck	8.3	211.4	135.0	45	1,126	741
	Combination long-haul truck	29.3	822.0	356.5	161	4,379	1,961
Rural Unrestricted Access	Motorcycle	11.7	7.7	122.9	72	39	684
	Passenger car	75.7	155.2	3,608.1	480	924	27,683
	Passenger truck	32.1	100.5	1,015.4	203	595	7,630
	Light commercial truck	15.1	52.7	475.7	96	316	3,564
	Other buses	0.7	9.7	12.3	4	51	69
	Transit bus	0.2	0.5	10.7	1	3	58
	School bus	0.2	2.2	1.6	1	11	9
	Refuse truck	0.3	3.8	6.2	1	21	34
	Single unit short-haul truck	15.7	149.8	241.3	92	805	1,358
	Single unit long-haul truck	0.9	9.1	15.5	5	49	87
	Motor home	2.1	8.6	40.1	13	46	228
	Combination short-haul truck	1.4	33.3	22.7	7	171	122
	Combination long-haul truck	4.9	127.6	60.9	26	656	326

Road type	Source type	Annual emissions (tons/year)			Season day emissions (pounds/day)		
		VOC	NO_X	CO	VOC	NO_X	CO
Urban Restricted Access	Motorcycle	68.8	56.3	861.1	430	291	4,853
	Passenger car	541.8	1,329.1	28,400.4	3,498	7,757	211,761
	Passenger truck	233.2	853.6	8,396.0	1,501	4,971	61,191
	Light commercial truck	104.8	434.0	3,706.3	685	2,582	27,446
	Other buses	7.4	101.9	156.9	43	543	831
	Transit bus	1.9	5.5	108.6	11	31	597
	School bus	2.1	23.1	16.4	12	125	92
	Refuse truck	2.4	39.1	66.3	14	212	371
	Single unit short-haul truck	156.1	1,472.7	2,861.5	940	8,098	15,930
	Single unit long-haul truck	9.3	86.9	183.0	56	482	1,020
	Motor home	21.7	87.0	552.4	135	476	3,001
	Combination short-haul truck	15.6	385.7	254.8	88	2,088	1,437
	Combination long-haul truck	54.8	1,484.3	682.2	309	8,012	3,868
Urban Unrestricted Access	Motorcycle	223.5	87.4	1,665.5	1,406	448	9,489
	Passenger car	1,360.6	2,120.9	60,054.1	8,742	12,889	458,456
	Passenger truck	567.4	1,403.6	16,091.5	3,632	8,563	120,885
	Light commercial truck	282.1	764.4	7,693.7	1,820	4,766	57,884
	Other buses	7.6	95.6	88.7	44	525	504
	Transit bus	2.6	7.2	86.0	15	41	480
	School bus	2.3	26.0	15.1	13	144	86
	Refuse truck	2.1	33.0	44.2	12	182	250
	Single unit short-haul truck	128.8	1,317.7	1,618.3	770	7,267	9,242
	Single unit long-haul truck	7.6	84.4	104.1	46	467	595
	Motor home	17.3	71.7	226.7	108	394	1,286
	Combination short-haul truck	6.9	186.5	114.7	40	1,033	658
	Combination long-haul truck	23.6	694.2	332.2	135	3,838	1,912

Table 5.2–2: Annual and ozone season-day onroad mobile source emissions in the 8-hour ozone nonattainment area for the 2008 ozone standards, by road type and source type.

Road type	Source type	Annual emissions (tons/year)			Season day emissions (pounds/day)		
		VOC	NO_X	CO	VOC	NO_X	CO
Off-Network	Motorcycle	383.0	0.8	31.5	2,450	4	155
	Passenger car	5,557.3	1,056.0	15,830.5	40,155	6,634	87,529
	Passenger truck	1,398.0	548.4	5,245.2	10,176	3,761	30,409
	Light commercial truck	562.5	346.3	3,956.2	4,042	2,481	23,533
	Other buses	6.1	35.8	73.3	38	207	500
	Transit bus	1.2	3.9	18.0	7	23	113
	School bus	1.4	9.0	11.3	7	61	88
	Refuse truck	1.8	20.4	16.6	10	110	95
	Single unit short-haul truck	187.4	722.0	1,291.6	1,207	4,181	8,605

Road type	Source type	Annual emissions (tons/year)			Season day emissions (pounds/day)		
		VOC	NO_X	CO	VOC	NO_X	CO
	Single unit long-haul truck	5.7	36.6	33.3	33	182	167
	Motor home	14.8	5.1	102.6	116	31	601
	Combination short-haul truck	5.7	99.4	55.3	26	571	350
	Combination long-haul truck	20.0	285.2	171.1	108	1,534	961
Rural Restricted Access	Motorcycle	2.2	2.1	31.9	13	11	181
	Passenger car	17.7	53.7	1,120.0	110	321	8,498
	Passenger truck	7.7	33.8	342.9	48	200	2,569
	Light commercial truck	3.2	16.3	140.4	20	97	1,048
	Other buses	1.1	16.3	31.9	6	87	185
	Transit bus	0.2	0.8	17.2	1	4	95
	School bus	0.3	3.5	2.6	2	19	14
	Refuse truck	0.2	3.8	6.4	1	20	35
	Single unit short-haul truck	14.1	134.2	314.1	82	714	1,794
	Single unit long-haul truck	0.8	7.7	19.9	5	41	114
	Motor home	2.1	8.1	69.1	13	43	403
	Combination short-haul truck	4.7	119.3	75.9	26	635	416
	Combination long-haul truck	16.5	465.5	200.9	91	2,479	1,103
Rural Unrestricted Access	Motorcycle	9.9	6.6	104.2	61	33	580
	Passenger car	63.8	131.5	3,046.6	404	781	23,331
	Passenger truck	27.2	85.5	862.1	172	505	6,467
	Light commercial truck	12.6	44.3	399.4	80	265	2,988
	Other buses	0.6	7.8	9.8	3	41	55
	Transit bus	0.2	0.4	8.5	1	2	46
	School bus	0.2	1.8	1.3	1	9	7
	Refuse truck	0.2	3.3	5.4	1	18	29
	Single unit short-haul truck	13.6	129.2	207.7	79	695	1,169
	Single unit long-haul truck	0.8	7.9	13.4	5	42	75
	Motor home	1.8	7.4	34.4	11	40	195
	Combination short-haul truck	1.1	26.7	18.2	6	138	98
	Combination long-haul truck	3.9	102.8	49.0	21	529	263
Urban Restricted Access	Motorcycle	69.1	56.6	864.7	432	292	4,873
	Passenger car	543.3	1,333.2	28,487.3	3,507	7,781	212,418
	Passenger truck	235.0	860.3	8,462.1	1,513	5,010	61,677
	Light commercial truck	104.3	432.1	3,690.3	682	2,571	27,329
	Other buses	7.4	101.4	156.2	43	541	828
	Transit bus	1.9	5.4	106.7	11	30	587
	School bus	2.1	23.1	16.3	12	125	91
	Refuse truck	2.4	39.0	66.3	14	212	371
	Single unit short-haul truck	156.1	1,473.3	2,863.0	940	8,101	15,939
	Single unit long-haul truck	9.3	86.9	183.1	56	482	1,020
	Motor home	21.7	86.9	552.1	135	475	2,999

Road type	Source type	Annual emissions (tons/year)			Season day emissions (pounds/day)		
		VOC	NO_X	CO	VOC	NO_X	CO
	Combination short-haul truck	15.5	382.5	252.8	87	2,071	1,426
	Combination long-haul truck	54.5	1,476.5	678.6	307	7,970	3,848
Urban Unrestricted Access	Motorcycle	224.6	88.0	1,675.2	1,413	451	9,544
	Passenger car	1,366.5	2,131.1	60,324.8	8,778	12,950	460,445
	Passenger truck	572.6	1,417.0	16,242.2	3,665	8,643	121,999
	Light commercial truck	281.3	762.4	7,672.6	1,814	4,752	57,717
	Other buses	7.6	95.7	88.8	44	526	504
	Transit bus	2.5	7.1	85.0	15	40	474
	School bus	2.3	26.1	15.1	14	145	86
	Refuse truck	2.1	33.0	44.2	12	182	250
	Single unit short-haul truck	129.0	1,319.6	1,620.9	771	7,277	9,257
	Single unit long-haul truck	7.6	84.5	104.3	46	467	595
	Motor home	17.3	71.7	226.8	108	394	1,287
	Combination short-haul truck	6.9	186.0	114.4	39	1,030	656
	Combination long-haul truck	23.6	694.3	332.3	135	3,838	1,912

Table 5.2–3: Annual and ozone season-day onroad mobile source emissions in the 8-hour ozone nonattainment area for the 2015 ozone standards, by road type and source type.

Road type	Source type	Annual emissions (tons/year)			Season day emissions (pounds/day)		
		VOC	NO_X	CO	VOC	NO_X	CO
Off-Network	Motorcycle	397.1	0.8	32.7	2,541	4	161
	Passenger car	5,690.1	1,080.6	16,211.5	41,121	6,785	89,632
	Passenger truck	1,444.2	565.4	5,419.3	10,514	3,873	31,417
	Light commercial truck	567.4	348.3	3,992.7	4,079	2,492	23,750
	Other buses	6.2	36.3	75.3	38	210	514
	Transit bus	1.2	3.9	17.8	7	23	113
	School bus	1.4	9.2	11.7	7	63	91
	Refuse truck	1.8	20.5	16.7	10	111	96
	Single unit short-haul truck	189.5	728.6	1,306.4	1,221	4,221	8,707
	Single unit long-haul truck	5.8	36.9	33.6	34	184	168
	Motor home	15.0	5.1	103.7	117	32	607
	Combination short-haul truck	5.8	99.6	55.7	26	573	353
	Combination long-haul truck	20.1	286.4	171.9	109	1,540	967
Rural Restricted Access	Motorcycle	2.2	2.1	31.9	13	11	181
	Passenger car	17.7	53.7	1,119.3	110	321	8,493
	Passenger truck	7.8	34.1	345.9	48	202	2,592
	Light commercial truck	3.2	16.0	138.3	20	95	1,032
	Other buses	1.1	16.3	32.0	6	87	185
	Transit bus	0.2	0.7	16.8	1	4	93
	School bus	0.3	3.5	2.6	2	19	14
	Refuse truck	0.2	3.8	6.4	1	20	35

Road type	Source type	Annual emissions (tons/year)			Season day emissions (pounds/day)		
		VOC	NO_X	CO	VOC	NO_X	CO
	Single unit short-haul truck	14.1	134.2	314.1	82	714	1,794
	Single unit long-haul truck	0.8	7.7	19.9	5	41	114
	Motor home	2.1	8.1	69.0	13	43	402
	Combination short-haul truck	4.6	118.8	75.6	25	632	414
	Combination long-haul truck	16.6	466.2	201.2	91	2,482	1,105
Rural Unrestricted Access	Motorcycle	11.2	7.3	116.3	69	37	647
	Passenger car	71.3	145.3	3,388.4	453	864	26,010
	Passenger truck	30.7	95.4	965.9	194	565	7,260
	Light commercial truck	13.9	48.4	437.5	89	290	3,280
	Other buses	0.6	8.4	10.6	4	44	60
	Transit bus	0.2	0.5	9.0	1	2	49
	School bus	0.2	2.0	1.4	1	10	8
	Refuse truck	0.2	3.6	5.8	1	19	32
	Single unit short-haul truck	14.7	140.0	224.3	86	754	1,263
	Single unit long-haul truck	0.9	8.5	14.4	5	46	81
	Motor home	2.0	8.0	37.0	12	43	210
	Combination short-haul truck	1.2	28.9	19.7	6	149	106
	Combination long-haul truck	4.3	111.5	53.2	23	576	286
Urban Restricted Access	Motorcycle	69.1	56.6	864.7	432	292	4,873
	Passenger car	542.9	1,332.3	28,469.6	3,505	7,776	212,285
	Passenger truck	237.0	867.7	8,535.3	1,526	5,054	62,210
	Light commercial truck	102.8	425.7	3,635.4	672	2,533	26,922
	Other buses	7.4	101.8	156.7	43	542	830
	Transit bus	1.8	5.3	104.4	11	30	574
	School bus	2.1	23.2	16.4	12	126	92
	Refuse truck	2.4	39.0	66.3	14	212	370
	Single unit short-haul truck	156.2	1,473.4	2,863.4	940	8,102	15,941
	Single unit long-haul truck	9.3	86.9	183.0	56	482	1,020
	Motor home	21.6	86.7	550.6	135	474	2,991
	Combination short-haul truck	15.4	380.9	251.7	87	2,063	1,420
	Combination long-haul truck	54.6	1,478.5	679.6	307	7,981	3,853
Urban Unrestricted Access	Motorcycle	228.1	89.4	1,701.1	1,435	458	9,693
	Passenger car	1,385.9	2,160.9	61,167.3	8,903	13,131	466,880
	Passenger truck	586.1	1,450.2	16,621.8	3,752	8,846	124,852
	Light commercial truck	281.2	762.1	7,668.6	1,814	4,751	57,688
	Other buses	7.6	96.5	89.6	45	530	509
	Transit bus	2.5	7.0	83.7	15	40	467
	School bus	2.4	26.4	15.3	14	146	87
	Refuse truck	2.2	33.3	44.6	12	183	252
	Single unit short-haul truck	130.2	1,331.8	1,635.9	778	7,344	9,343
	Single unit long-haul truck	7.7	85.3	105.2	46	472	601

Road type	Source type	Annual emissions (tons/year)			Season day emissions (pounds/day)		
		VOC	NO_X	CO	VOC	NO_X	CO
	Motor home	17.4	72.1	228.2	108	397	1,295
	Combination short-haul truck	6.9	186.3	114.5	40	1,032	657
	Combination long-haul truck	23.8	699.3	334.6	136	3,865	1,925

5.3 Quality Assurance Process

5.3.1 VMT Estimates

Normal quality assurance procedures, including automated and manual consistency checks, were conducted by MAG in developing the 2020 TransCAD traffic assignment network used to generate the VMT data. The VMT estimates using the MAG ABM have been validated by the MAG transportation modeling group.

5.3.2 Emission Estimates

The quality assurance process performed on the MOVES3 analyses included accuracy, completeness, and reasonableness checks. For reasonableness, the 2020 onroad mobile source emission estimates were compared with previous emissions inventories. For accuracy and completeness, all input/output data and calculations were checked by an independent reviewer. Any errors found were corrected and the corrections were then rechecked by the reviewer.

5.4 Summary of All Onroad Mobile Source Emissions

Tables 5.4–1 through 5.4–3 summarize annual and ozone season-day onroad mobile source emissions, by road type, for Maricopa County, the 8-hour ozone nonattainment area for the 2008 ozone standards, and the 8-hour ozone nonattainment area for the 2015 ozone standards, respectively. Tables 5.4–4 through 5.4–6 also summarize annual and ozone season-day emissions from onroad mobile sources, by vehicle type. Table 5.4–7 summarizes the annual and ozone season-day emissions for VOC, NO_X, and CO from all onroad mobile sources in Maricopa County, the 8-hour ozone nonattainment area for the 2008 ozone standards, and the 8-hour ozone nonattainment area for the 2015 ozone standards in 2020.

Table 5.4–1: Annual and ozone season-day onroad mobile source emissions in Maricopa County, by road type.

Road type	Annual emissions (tons/year)			Season day emissions (pounds/day)		
	VOC	NO_X	CO	VOC	NO_X	CO
Off-network	8,097.9	3,237.1	26,730.0	58,016	20,138	152,502
Rural restricted access	114.1	1,455.2	3,633.7	673	7,848	25,037
Rural unrestricted access	161.0	660.7	5,633.4	1,001	3,687	41,852
Urban restricted access	1,219.9	6,359.2	46,245.9	7,722	35,668	332,398
Urban unrestricted access	2,632.4	6,892.6	88,134.8	16,783	40,557	661,727
Total	**12,225.3**	**18,604.8**	**170,377.8**	**84,195**	**107,898**	**1,213,516**

Table 5.4–2: Annual and ozone season-day onroad mobile source emissions in the 8 hour ozone nonattainment area for the 2008 ozone standards, by road type.

Road type	Annual emissions (tons/year)			Season day emissions (pounds/day)		
	VOC	NO_X	CO	VOC	NO_X	CO
Off-network	8,144.9	3,168.9	26,836.5	58,375	19,780	153,106
Rural restricted access	70.8	865.1	2,373.2	418	4,671	16,455
Rural unrestricted access	135.9	555.2	4,760.0	845	3,098	35,303
Urban restricted access	1,222.6	6,357.2	46,379.5	7,739	35,661	333,406
Urban unrestricted access	2,643.9	6,916.5	88,546.6	16,854	40,695	664,726
Total	**12,218.1**	**17,862.9**	**168,895.8**	**84,231**	**103,905**	**1,202,996**

Table 5.4–3: Annual and ozone season-day onroad mobile source emissions in the 8 hour ozone nonattainment area for the 2015 ozone standards, by road type.

Road type	Annual emissions (tons/year)			Season day emissions (pounds/day)		
	VOC	NO_X	CO	VOC	NO_X	CO
Off-network	8,345.6	3,221.6	27,449.0	59,824	20,111	156,576
Rural restricted access	70.9	865.2	2,373.0	417	4,671	16,454
Rural unrestricted access	151.4	607.8	5,283.5	944	3,399	39,292
Urban restricted access	1,222.6	6,358.0	46,377.1	7,740	35,667	333,381
Urban unrestricted access	2,682.0	7,000.6	89,810.4	17,098	41,195	674,249
Total	**12,472.5**	**18,053.2**	**171,293.0**	**86,023**	**105,043**	**1,219,952**

Table 5.4–4: Annual and ozone season-day onroad mobile source emissions in Maricopa County, by source type.

Source type	Annual emissions (tons/year)			Season day emissions (pounds/day)		
	VOC	NO_X	CO	VOC	NO_X	CO
Motorcycle	685.7	155.6	2,732.4	4,348	800	15,473
Passenger car	7,528.7	4,735.8	109,477.0	52,793	28,650	797,624
Passenger truck	2,228.0	2,952.1	31,202.8	15,477	18,160	223,601
Light commercial truck	970.4	1,623.8	16,050.3	6,681	10,308	114,050
Other buses	23.9	273.2	386.9	140	1,487	2,223
Transit bus	6.4	18.8	254.8	36	106	1,422
School bus	6.5	66.8	49.0	36	376	300
Refuse truck	7.0	102.3	143.0	39	557	804
Single unit short-haul truck	510.3	3,873.4	6,478.0	3,138	21,472	37,779
Single unit long-haul truck	24.8	229.3	365.6	148	1,245	2,037
Motor home	58.9	184.3	1,021.0	391	1,011	5,691
Combination short-haul truck	38.5	928.0	587.2	209	5,052	3,335
Combination long-haul truck	136.2	3,461.4	1,629.8	759	18,674	9,177
Total	**12,225.3**	**18,604.8**	**170,377.8**	**84,195**	**107,898**	**1,213,516**

Table 5.4–5: Annual and ozone season-day onroad mobile source emissions in the 8 hour ozone nonattainment area for the 2008 ozone standards, by source type.

Source type	Annual emissions (tons/year)			Season day emissions (pounds/day)		
	VOC	NO_x	CO	VOC	NO_x	CO
Motorcycle	688.8	154.1	2,707.5	4,369	791	15,333
Passenger car	7,548.6	4,705.5	108,809.2	52,954	28,467	792,221
Passenger truck	2,240.5	2,945.0	31,154.5	15,574	18,119	223,121
Light commercial truck	963.9	1,601.4	15,858.9	6,638	10,166	112,615
Other buses	22.8	257.0	360.0	134	1,402	2,072
Transit bus	6.0	17.6	235.4	35	99	1,315
School bus	6.3	63.5	46.6	36	359	286
Refuse truck	6.7	99.5	138.9	38	542	780

Source type	Annual emissions (tons/year)			Season day emissions (pounds/day)		
	VOC	NO_x	CO	VOC	NO_x	CO
Single unit short-haul truck	500.2	3,778.3	6,297.3	3,079	20,968	36,764
Single unit long-haul truck	24.2	223.6	354.0	145	1,214	1,971
Motor home	57.7	179.2	985.0	383	983	5,485
Combination short-haul truck	33.9	813.9	516.6	184	4,445	2,946
Combination long-haul truck	118.5	3,024.3	1,431.9	662	16,350	8,087
Total	**12,218.1**	**17,862.9**	**168,895.8**	**84,231**	**103,905**	**1,202,996**

Table 5.4–6: Annual and ozone season-day onroad mobile source emissions in the 8-hour ozone nonattainment area for the 2015 ozone standards, by source type.

Source type	Annual emissions (tons/year)			Season day emissions (pounds/day)		
	VOC	NO_x	CO	VOC	NO_x	CO
Motorcycle	707.7	156.2	2,746.7	4,490	802	15,555
Passenger car	7,707.9	4,772.8	110,356.1	54,092	28,877	803,300
Passenger truck	2,305.8	3,012.8	31,888.2	16,034	18,540	228,331
Light commercial truck	968.5	1,600.5	15,872.5	6,674	10,161	112,672
Other buses	22.9	259.3	364.2	136	1,413	2,098
Transit bus	5.9	17.4	231.7	35	99	1,296
School bus	6.4	64.3	47.4	36	364	292
Refuse truck	6.8	100.2	139.8	38	545	785
Single unit short-haul truck	504.7	3,808.0	6,344.1	3,107	21,135	37,048
Single unit long-haul truck	24.5	225.3	356.1	146	1,225	1,984
Motor home	58.1	180.0	988.5	385	989	5,505
Combination short-haul truck	33.9	814.5	517.2	184	4,449	2,950
Combination long-haul truck	119.4	3,041.9	1,440.5	666	16,444	8,136
Total	**12,472.5**	**18,053.2**	**171,293.0**	**86,023**	**105,043**	**1,219,952**

Table 5.4–7: Annual and ozone season-day emissions from all onroad mobile sources in Maricopa County, the 8-hour ozone nonattainment area for the 2008 ozone standards, and the 8-hour ozone nonattainment area for the 2015 ozone standards.

Geographic area	Annual emissions (tons/year)			Season day emissions (pounds/day)		
	VOC	NO_X	CO	VOC	NO_X	CO
Maricopa County	12,225.3	18,604.8	170,377.8	84,195	107,898	1,213,516
8-hour ozone nonattainment area for the 2008 ozone standards	12,218.1	17,862.9	168,895.8	84,231	103,905	1,202,996
8-hour ozone nonattainment area for the 2015 ozone standards	12,472.5	18,053.2	171,293.0	86,023	105,043	1,219,952

5.5 References

EPA, 2017. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, U.S. Environmental Protection Agency, EPA-454-B-17-003, July 2017.

EPA, 2020a. Policy Guidance on the Use of MOVES3 for State Implementation Plan Development, Transportation Conformity, General Conformity, and Other Purposes, U.S. Environmental Protection Agency, EPA-420-B-20-044, November 2020.

EPA, 2020b. MOVES3 Technical Guidance: Using MOVES to Prepare Emission Inventories for State Implementation Plans and Transportation Conformity, U.S. Environmental Protection Agency, EPA-420-B-20-052, November 2020.

EPA, 2021a. Overview of EPA's Motor Vehicle Emission Simulator (MOVES3), EPA-420-R-21-004, March 2021.

EPA, 2021b, Instructions and Best Practices for Development and Submittal of Onroad Inputs for the 2020 National Emissions Inventory (NEI), U.S. Environmental Protection Agency, February 2021.

MAG, 2009. MAG Eight-Hour Ozone Redesignation Request and Maintenance Plan for the Maricopa Nonattainment Area, Maricopa Association of Governments, February 2009.

6. Biogenic Sources

6.1 Introduction

Volatile organic compounds (VOC), carbon monoxide (CO), and nitrogen oxides (NO_X) emissions are reported as ozone precursor emissions. Biogenic emissions have been estimated for the 2020 Periodic Emissions Inventory (PEI) for ozone precursors in Maricopa County and the 8-hour ozone nonattainment areas (NAA) for the 2008 and 2015 ozone standards using the Model of Emissions of Gases and Aerosols from Nature (MEGAN). MEGAN is a state-of-the-art biogenic emissions model developed initially at the National Center for Atmospheric Research (NCAR) and maintained at the University of California, Irvine (Guenther et al., 2017, 2012; Jiang et al., 2011; Guenther, 2006a, 2006b, and 2007; Guenther et al., 2006). Some corrections and improvements were made in the latest official version of MEGAN3 (Jiang et al., 2018; Guenther et al., 2017) compared to its previous versions. The linear decrease in emissions proposed by Guenther et al. (2012) is implemented as reference for all 28 biogenic VOC gases and CO. The simulation with the MEGAN3 approach predicts a 32% reduction in the 2017 annual VOC emissions in comparison to the value predicted by MEGAN2.1 in the 8-hour zone NAA. However, NO_X emission predicted by MEGAN3 is increased to more than double compared to the value from MEGAN2.1.

In an effort to improve the meteorology field generated for MEGAN by the Weather Research and Forecasting Model (WRF), WRF Data Assimilation (WRFDA) were implemented to adjust the model using observations nudging or gridded analysis nudging. Based on surface observational data and upper-air sounding data obtained from the National Centers for Environmental Prediction (NCEP), the WRF Data Assimilation technique combines observations with WRF Preprocessing System (WPS) outputs to update lateral boundary and initial conditions to provide an improved estimate of the atmospheric state. The application of the observation nudging and gridded analysis nudging using surface observations further improved the WRF meteorological modeling performance as described in section 6.3 below.

Gridded biogenic emissions were calculated for each day in 2020 using day-specific hourly WRF meteorology. The gridded daily emissions were aggregated to produce monthly and annual emission totals.

6.2 Modeling Domain

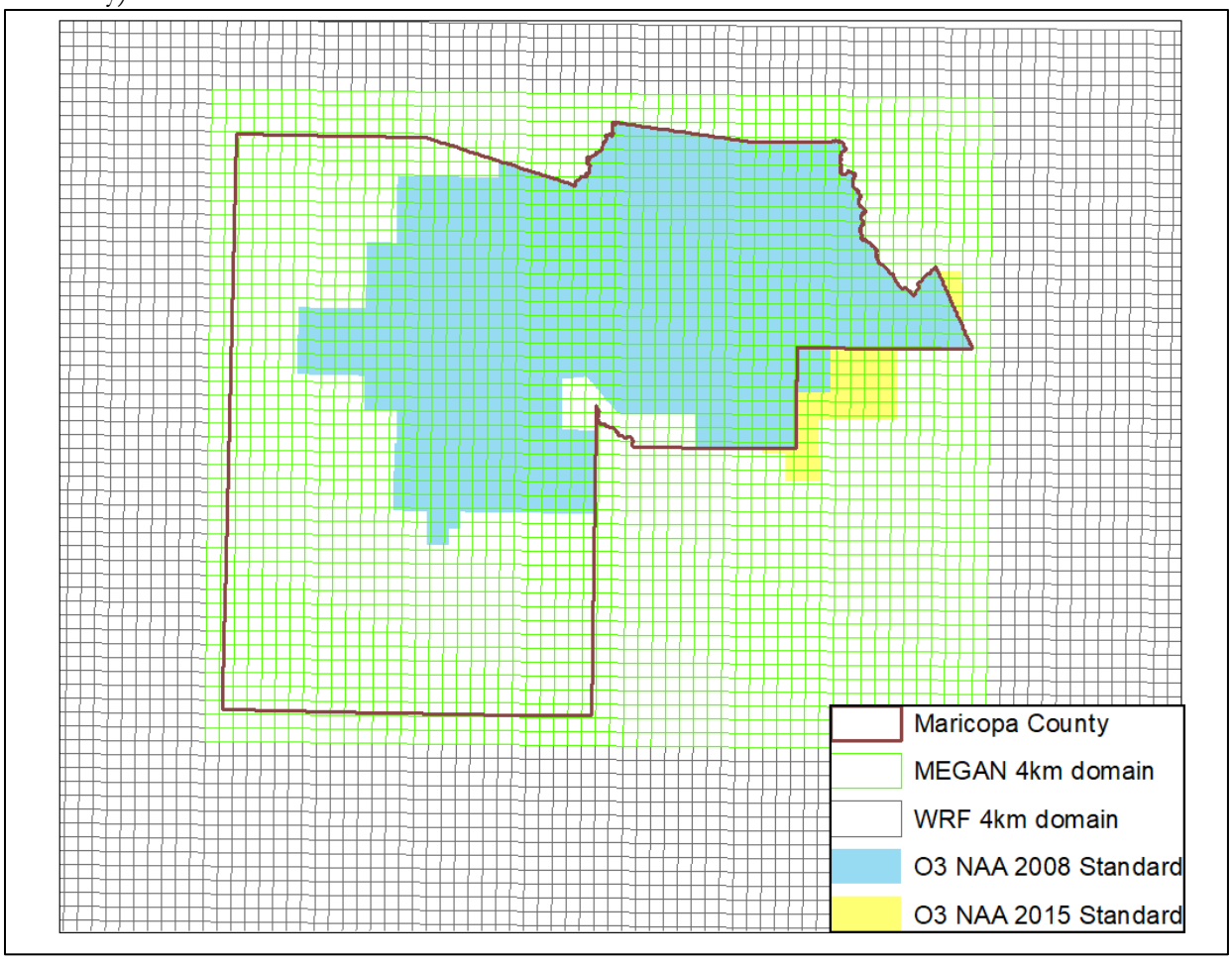
MEGAN inputs and outputs for each grid cell are based on a user-defined two-dimensional gridded modeling domain. A 4-km x 4-km grid was defined to cover the entire area of Maricopa County and portions of neighboring counties. The target areas for the development of biogenic emissions are Maricopa County and the 8-hour ozone nonattainment areas for the 2008 and 2015 ozone standards within the 4-km domain. The modeling domain is defined with a Lambert Conformal Conic Projection (LCC) coordinate system and the available domain parameters are presented in Table 6.2–1. Additional input files that mask areas covered by Maricopa County and the 8-hour ozone nonattainment areas for the 2008 and 2015 ozone standards were developed using ArcGIS software in order to calculate emissions for those three target areas. The masking value is 1.0 for the grid cells fully covered by the target area, a fractional value for grid cells partially covered by the target area (e.g., boundaries of Maricopa County or the 8-hour ozone nonattainment areas), and 0.0 for grid cells outside the target area. As shown in Figure 6.2–1, biogenic emissions for Maricopa County and

the 8-hour ozone nonattainment areas were extracted from MEGAN simulations using the mask values from all of corresponding masked grid cells in the 4-km modeling domain as weights.

Table 6.2–1: The 4-km gridded modeling domain in the LCC coordinate system.

Grid horizontal resolution	Grid size	Domain LCC range (10^3 meters)	Target area
4 km × 4 km	56 × 47	(-130, –119) – (354, 473)	8-hour ozone NAAs for 2008 and 2015 ozone standards and Maricopa County

Figure 6.2–1: The WRF 4-km × 4-km grid (white), MEGAN 4-km × 4-km grid (green), the 8-hour ozone nonattainment area for the 2008 ozone standard (blue), the 8-hour ozone nonattainment area for the 2015 ozone standard (blue plus yellow), and Maricopa County (grid cells within the brown boundary).



6.3 Input Data

MEGAN requires both land cover and meteorological data as inputs for the calculation of biogenic emissions.

6.3.1 Land Cover Data

Land cover data such as eight-day average leaf area index (LAI) and fraction of surface area covered by each growth form (crop, grass, shrub, needle leaf tree) and ecotype files for MEGAN3 are typically based on satellite and ground observations. The grid-specific ecotype and growth form csv files created by the pre-processor are used as the model input. The LAI in non-urban grid cells are based on the 1-km NASA eight-day MODIS v6 satellite observations for 2020. LAI in the Phoenix urban grid cells is determined based on an approach described by Boyer (2018). Emission factors and vegetation light dependence fractions are specified from gridded maps based on observations of vegetation biogenic emissions for all of the vegetation types and tree species composition. Eight shell scripts control FORTRAN programs to calculate gridded biogenic emission rates from the inputs described above and the following meteorological conditions in each grid.

6.3.2 Meteorological Data

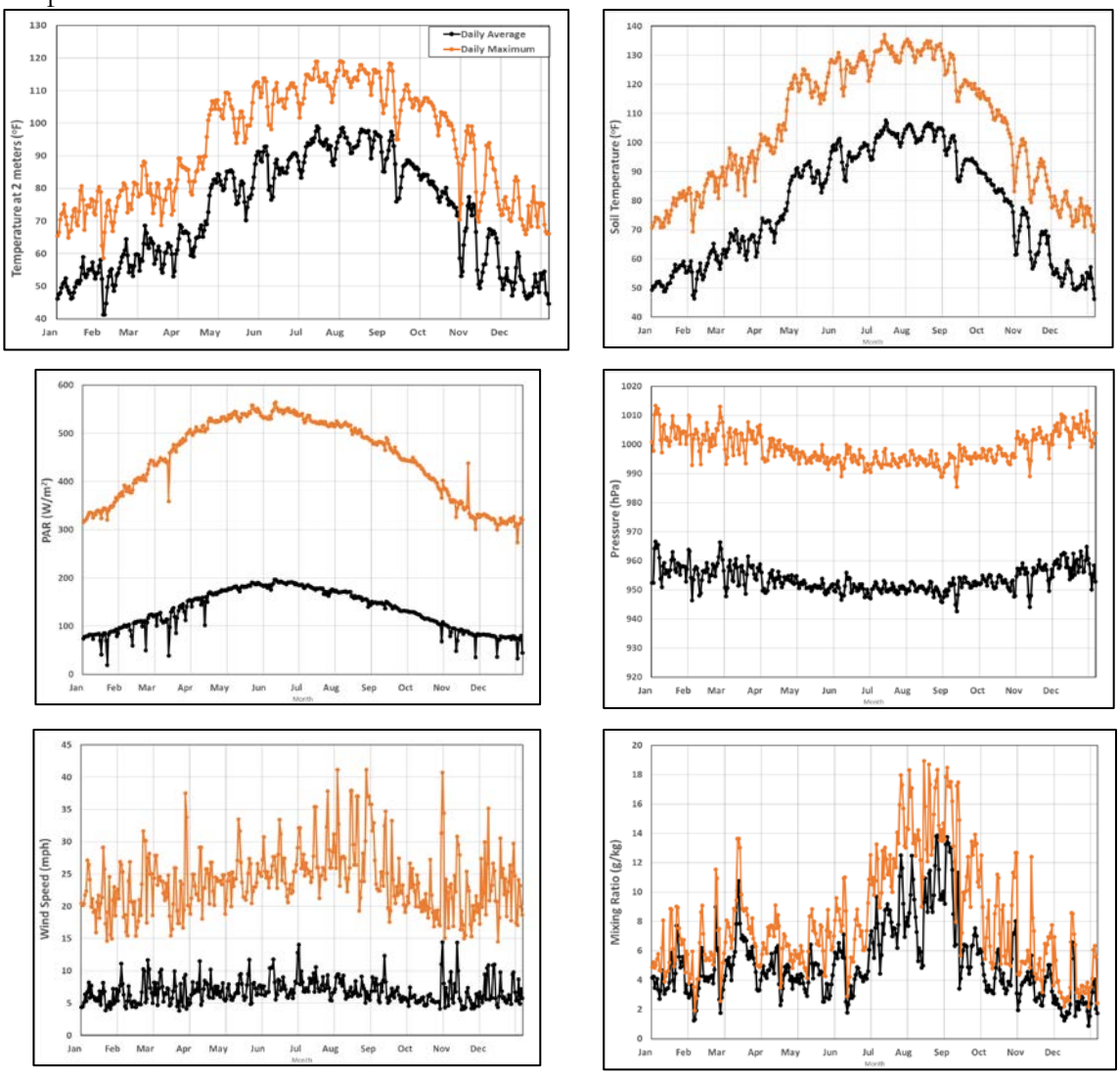
Meteorological data were obtained from WRF version 4.3 model runs by post-processing with the Meteorology-Chemistry Interface Processor (MCIP v5.0). The output of MCIP was then used as input to MET2MGN, a component program of MEGAN which prepares the meteorological data for input to MEGAN. The MET2MGN output includes photosynthetically active radiation (PAR) at the surface, air temperature at 2 meters above surface, air pressure, humidity, wind speed, top-layer soil moisture and temperature, and accumulated precipitation for each grid cell for each hour.

Biogenic emissions of VOC and CO are mainly affected by temperature, solar radiation, and soil moisture. NOx emissions from soils depend on soil temperature and water-filled pore space, which are determined by soil types and precipitation. Wind speed and humidity influence leaf temperature. Figure 6.3.2–1 shows daily mean and daily maximum air temperature, surface soil temperature, PAR, air pressure, wind speed, water vapor mixing ratio, surface soil moisture, and 24-hour accumulated precipitation in Maricopa County. The highest daily mean temperature and PAR were both recorded in June. The highest daily mean soil temperature and soil moisture both occurred in July. Therefore, the highest NO_X emissions from soil are expected to occur in July due to the higher soil temperature and moisture. The soil moisture is generally higher in July due to more rainfall during the month. In particular, strong pulse NO_X emission responses to wet soil can occur in high temperature regions (Bertram et al. 2005; Oikawa, 2015). Higher temperature and higher PAR contribute to elevated biogenic VOC and CO emissions.

In order to validate the WRF model output, the modeled temperature, water vapor mixing ratio, wind speed, and solar radiation were compared to hourly observations from fifteen National Weather Service stations (NWS; DS472.0) and twelve Arizona Meteorological Network (AZMET) stations located within the 4-km modeling domain. Figure 6.3.2–2 illustrates the locations of the monitoring stations in these two networks. The accuracy of the modeled temperature, water vapor mixing ratio, wind speed, and solar radiation was evaluated by performing a linear regression on the sets of paired modeled and observed hourly meteorological parameters, with a sample size of 8745. For each parameter the coefficient of determination (R^2) was computed, which represents the amount of variability in the observations that is explained by the model. Possible values of R^2 range from 0.0 to 1.0. The R^2 value of 1.0 means that the model explains 100% of the variability in the observations (model predictions perfectly fit observations) while a value of 0.0 means that the model explains none of the variability (model predictions are not correlated to observations at all). Thus, higher values of R^2 represent improvements in model accuracy. As shown in Figure 6.3.2–3, the R^2

values for temperature, water vapor mixing ratio, wind speed, and solar radiation using WRF FDDA are 0.99, 0.97, 0.80, and 0.95, respectively. This indicates that WRF with FDDA generates a more realistic set of meteorological inputs for use in the estimation of biogenic emissions.

Figure 6.3.2–1: WRF modeled daily average and daily maximum values of temperature at 2 meters above surface, soil temperature, PAR, air pressure, wind speed at 10 meters above the ground, water vapor mixing ratio at 2 meters above the ground, soil moisture, and 24-hour accumulated precipitation in 2020.



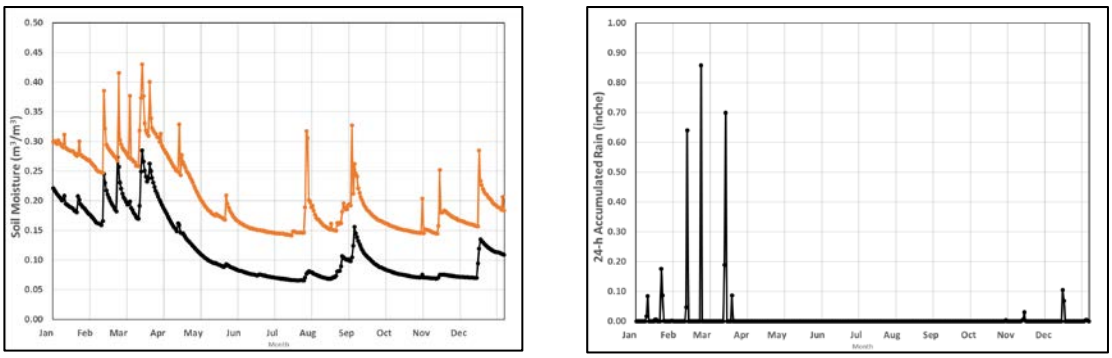


Figure 6.3.2–2: Locations of NWS and AZMET meteorological stations.

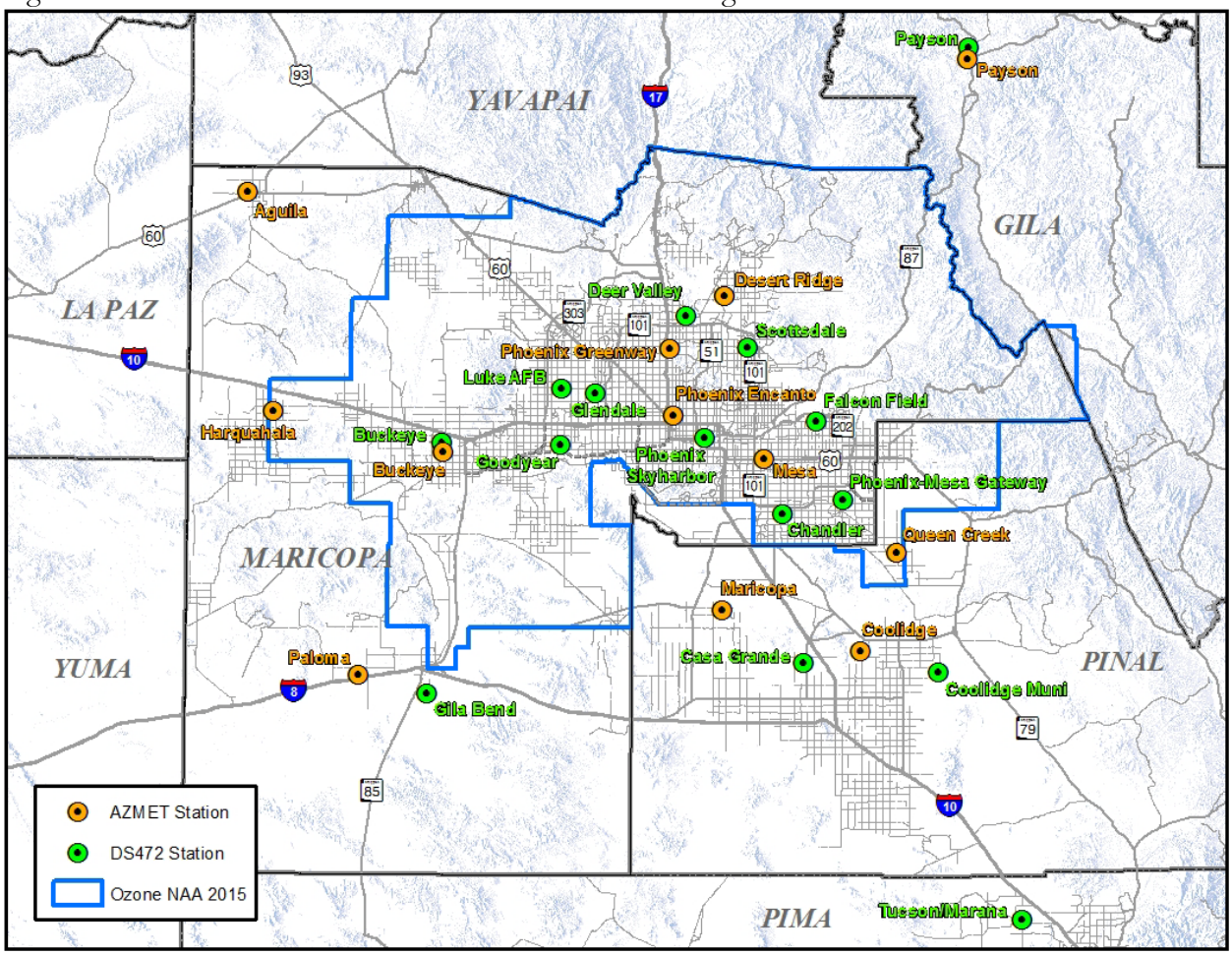
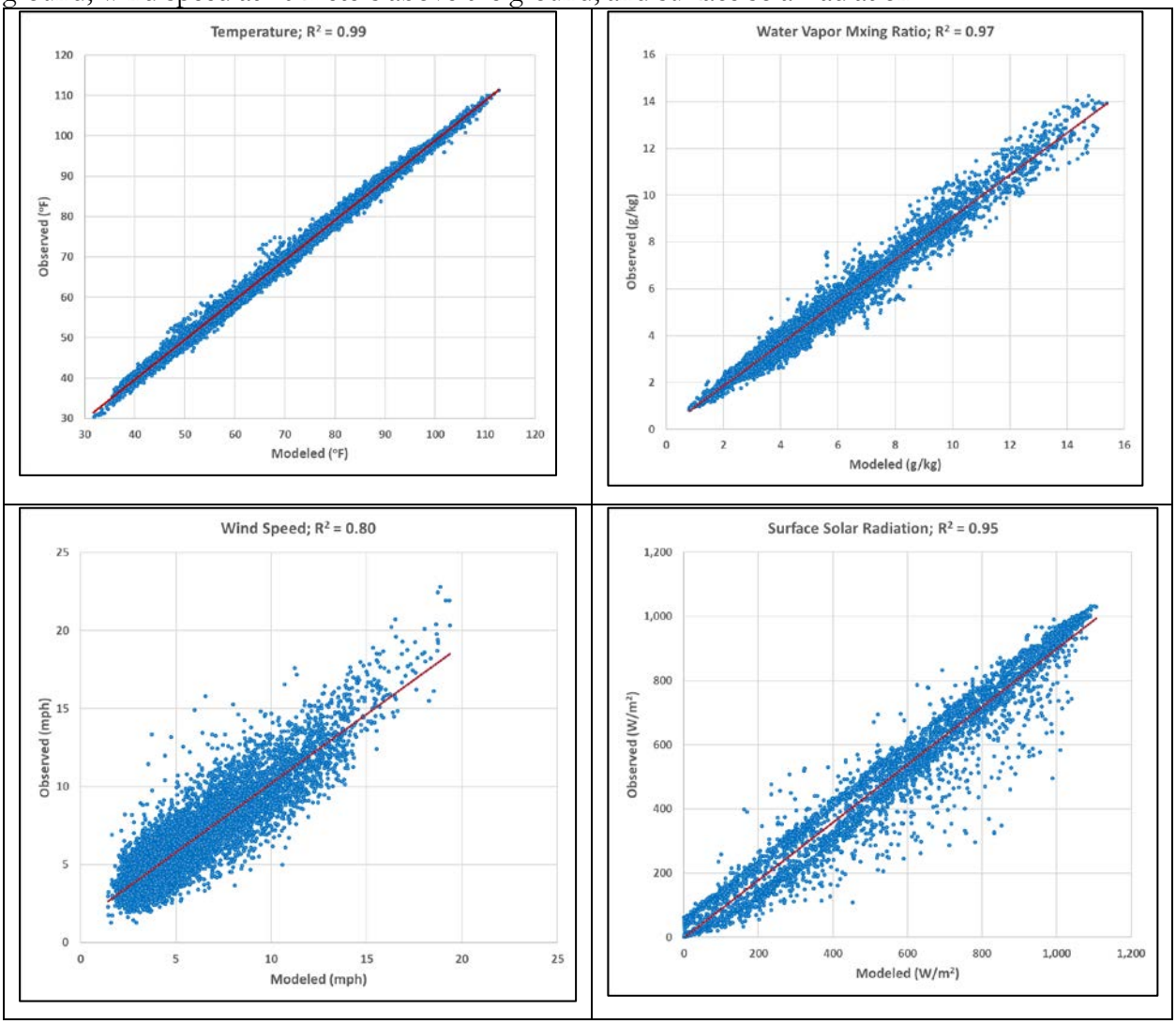


Figure 6.3.2–3: Paired hourly modeled and observed data in 2020 from NWS and AZMET stations for temperature at 2 meters above the surface, water vapor mixing ratio at 2 meters above the ground, wind speed at 10 meters above the ground, and surface solar radiation.



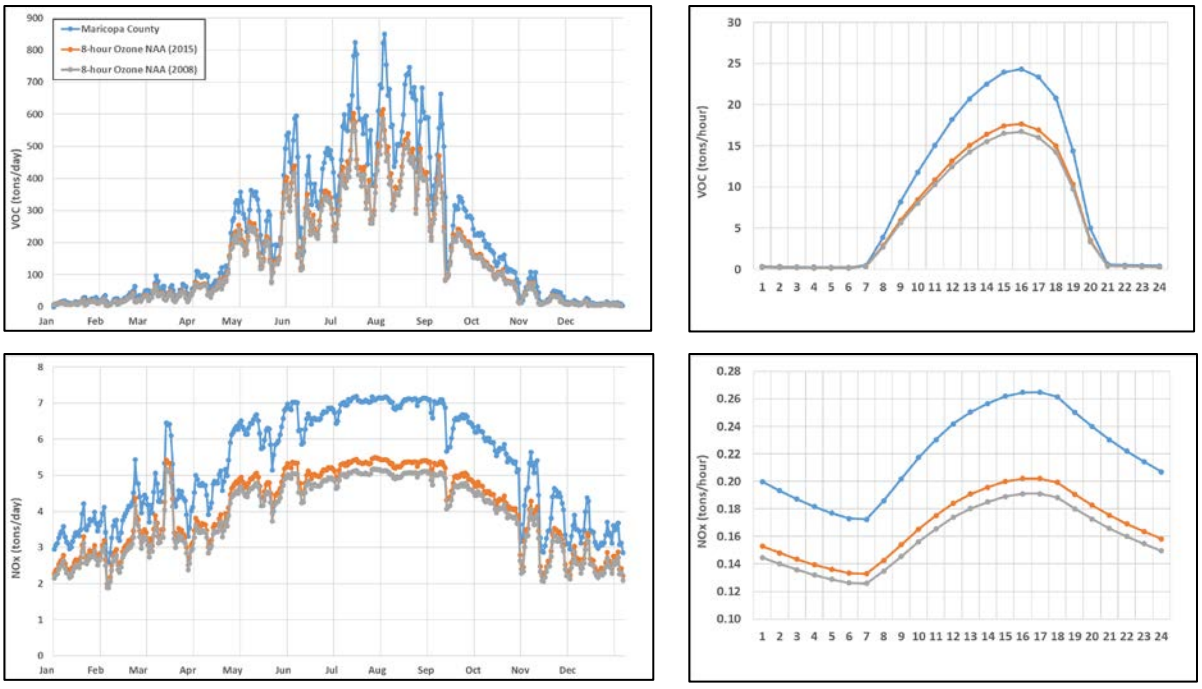
6.4 Emission Estimation

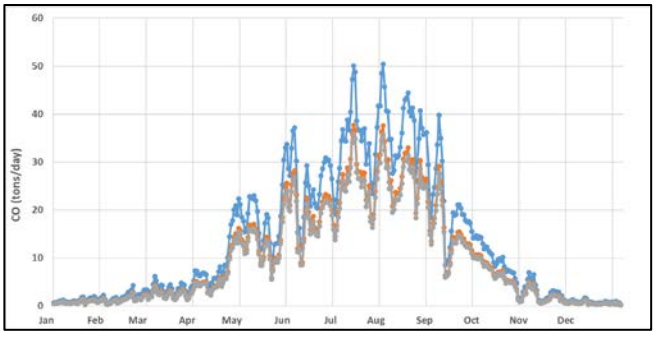
Average daily emissions for each month in 2020 are provided in Table 6.4–1 for Maricopa County and the 8-hour ozone nonattainment areas for the 2008 and 2015 ozone standards. Average daily emissions in 2020 and annual mean diurnal cycles of emissions of ozone precursors including VOC, NO_x, and CO for Maricopa County and the 8-hour ozone nonattainment areas for the 2008 and 2015 ozone standards are illustrated in Figure 6.4–1. Monthly biogenic emissions for Maricopa County and the 8-hour ozone nonattainment areas for the 2008 and 2015 ozone standards are presented in Table 6.4–2. The maximum emissions occurred during the ozone season (June–August), as temperature and solar radiation reached their highest levels during those summer months.

Table 6.4–1: Average daily biogenic emissions (pounds/day) by month in 2020 for Maricopa County and the 8-hour ozone nonattainment areas for the 2008 and 2015 ozone standards.

Month	Maricopa County			8-hour ozone NAA (2015)			8-hour NAA (2008)		
	VOC	NO_X	CO	VOC	NO_X	CO	VOC	NO_X	CO
January	34,471	6,899	2,339	24,322	5,339	1,669	22,782	5,056	1,563
February	58,768	7,784	4,018	40,289	6,048	2,789	37,773	5,733	2,614
March	105,490	9,189	7,247	72,973	7,213	5,091	68,189	6,838	4,756
April	300,312	10,315	19,745	211,923	7,846	14,242	200,090	7,424	13,439
May	579,494	12,499	37,438	423,238	9,513	28,009	400,374	8,992	26,474
June	775,511	13,239	49,743	575,373	10,088	37,872	544,530	9,531	35,801
July	1,167,491	14,106	72,172	852,744	10,717	54,183	808,919	10,122	51,306
August	1,160,046	14,053	70,481	838,701	10,648	52,342	795,713	10,055	49,573
September	634,550	13,054	39,521	454,080	9,882	29,088	431,471	9,338	27,593
October	255,574	10,706	16,377	181,283	8,095	11,925	172,166	7,656	11,311
November	77,624	8,082	5,147	55,312	6,157	3,764	52,414	5,817	3,560
December	22,665	6,793	1,590	15,659	5,251	1,123	14,814	4,973	1,061

Figure 6.4–1: Daily biogenic emissions in 2020 and annual mean diurnal cycles of VOC, NOx, and CO emissions for Maricopa County and the 8-hour ozone nonattainment areas for the 2008 and 2015 ozone standards.





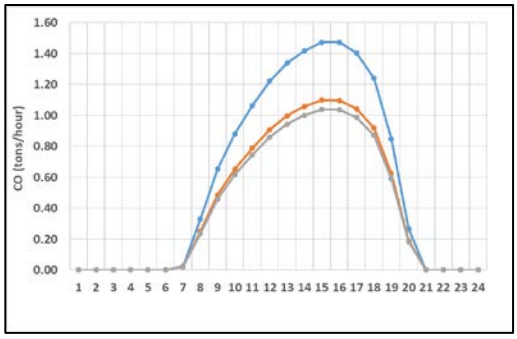


Table 6.4–2: Monthly biogenic emissions (tons/month) in 2020 for Maricopa County and the 8-hour ozone nonattainment areas for the 2008 and 2015 ozone standards.

Month	Maricopa County			8-hour ozone NAA (2015)			8-hour ozone NAA (2008)		
	VOC	NO_X	CO	VOC	NO_X	CO	VOC	NO_X	CO
January	534.3	106.9	36.2	377.0	82.8	25.9	353.1	78.4	24.2
February	852.1	112.9	58.3	584.2	87.7	40.4	547.7	83.1	37.9
March	1,635.1	142.4	112.3	1,131.1	111.8	78.9	1,056.9	106.0	73.7
April	4,504.7	154.7	296.2	3,178.8	117.7	213.6	3,001.4	111.4	201.6
May	8,982.2	193.7	580.3	6,560.2	147.5	434.1	6,205.8	139.4	410.3
June	11,632.7	198.6	746.1	8,630.6	151.3	568.1	8,167.9	143.0	537.0
July	18,096.1	218.6	1,118.7	13,217.5	166.1	839.8	12,538.2	156.9	795.2
August	17,980.7	217.8	1,092.5	12,999.9	165.0	811.3	12,333.5	155.9	768.4
September	9,518.3	195.8	592.8	6,811.2	148.2	436.3	6,472.1	140.1	413.9
October	3,961.4	165.9	253.8	2,809.9	125.5	184.8	2,668.6	118.7	175.3
November	1,164.4	121.2	77.2	829.7	92.4	56.5	786.2	87.3	53.4
December	351.3	105.3	24.6	242.7	81.4	17.4	229.6	77.1	16.5
Total	**79,213.2**	**1,934.0**	**4,989.1**	**57,372.8**	**1,477.3**	**3,707.3**	**54,361.1**	**1,397.0**	**3,507.5**

6.5 Summary of All Biogenic Source Emissions

Annual and ozone season (June–August) average daily emissions from biogenic sources for Maricopa County and the two 8-hour ozone nonattainment areas are provided in Table 6.5–1.

Table 6.5–1: Annual and season-day biogenic emissions in 2020 for Maricopa County and the 8 hour ozone nonattainment areas for the 2008 and 2015 ozone standards.

Geographic Area	Annual emissions (tons/year)			Season day emissions (pounds/day)		
	VOC	NO_X	CO	VOC	NO_X	CO
Maricopa County	79,213.2	1,934.0	4,989.1	1,034,349	13,799	64,132
2008 ozone NAA	54,361.1	1,397.0	3,507.5	716,387	9,903	45,560
2015 ozone NAA	57,372.8	1,477.3	3,707.3	755,606	10,484	48,132

6.6 References

Bertram, T. H., A. Heckel, A. Richter, J. P. Burrows, and R. C. Cohen, 2005, Satellite measurements of daily variations in soil NOx emissions, Geophys. Res. Lett., 32, L24812, doi:10.1029/2005GL024640.

Boyer, Doug, 2018. Biogenic Emission Modeling with MEGAN, TCEQ.

Gerard E. Mansell, Greg Yarwood (ENVIRON), Alex Guenther (NCAR), and Christine Wiedinmyer (Golden CO), 2006. Final Report Maricopa Association of Governments 2006 Biogenics Study.

Guenther, A., 2006a. User's Guide to Processing Driving Variables for Model of Emissions of Gases and Aerosols from Nature (MEGAN).

Guenther, A., 2006b. User's Guide to the Model of Emissions of Gases and Aerosols from Nature (MEGAN) Version MEGAN-VBA-2.0.

Guenther, A., 2007. Corrigendum to "Estimates of global terrestrial isoprene emissions using MEGAN (Model of Emissions of Gases and Aerosols from Nature)" *Atmos. Chem. Phys.*, 6, 3181–3210, 2006; *Atmos. Chem. Phys.*, 7, 4327–4327.

Guenther, A., T. Karl, P. Harley, C. Wiedinmyer, P. I. Palmer, and C. Geron, 2006. Estimates of global terrestrial isoprene emissions using MEGAN (Model of Emissions of Gases and Aerosols from Nature), *Atmos. Chem. Phys.*, 6, 1–30.

Guenther, A. B., Jiang, X., Heald, C. L., Sakulyanontvittaya, T., Duhl, T., Emmons, L. K., and Wang, X., 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, 1471–1492, doi:10.5194/gmd-5-1471-2012.

Guenther, A. B.; Tejas, S.; Huang, L.; Wentland, A.; Jung, J.; Beardsley, R.; Johnson, J.; Chun Hsieh, W.; Kemball-Cook, S.; Yarwood, G., 2017. A Next Generation Modelling System for Estimating Texas Biogenic VOC Emissions.

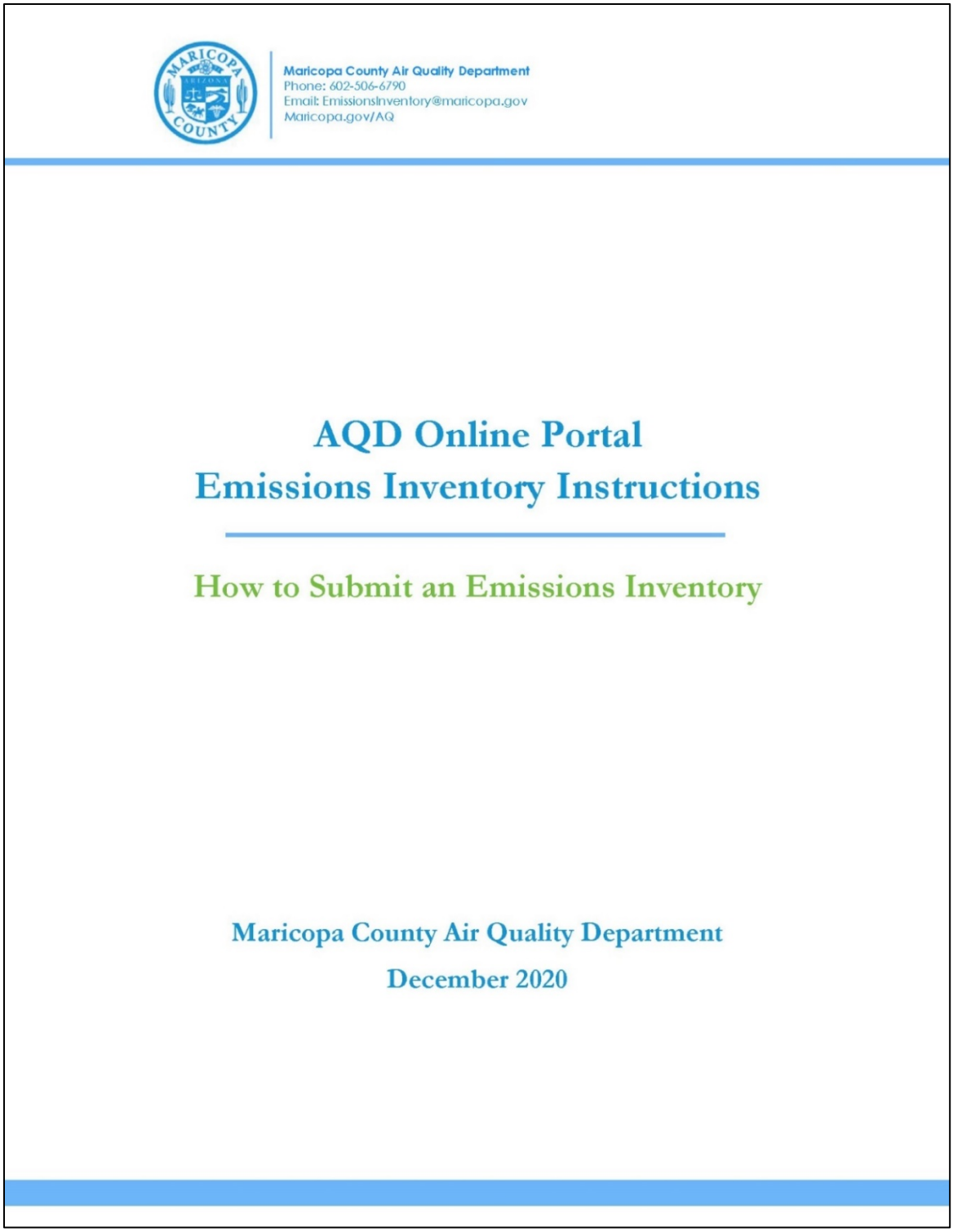
Project Report of Texas Commission on Environmental Quality.

Jiang, X., Guenther, A., Potosnak, M., Geron, C., Seco, R., Karl, T., Kim, S., Gu, L. and Pallardy, S., 2018. Isoprene emission response to drought and the impact on global atmospheric chemistry. *Atmospheric Environment*, *183*, pp.69-83.

Jiang, X., A. Guenther, T. Duhl, and T. Sakulyanontvittaya, 2011. MEGAN version 2.10 User's Guide. NCAR Earth Systems Laboratory, Atmosperhic Chemistry Division. www.acom.ucar.edu/webt/MEGAN/MEGAN2.1_User_Guide_05-07-2012.pdf

Oikawa, P.Y., Ge, C., Wang, J., Eberwein, J.R., Liang, L.L., Allsman, L.A., Grantz, D.A. and Jenerette, G.D., 2015. Unusually high soil nitrogen oxide emissions influence air quality in a high-temperature agricultural region. *Nature communications*, *6*, p.8753. http://doi.org/10.1038/ncomms9753.

Appendix A. Instructions for Reporting 2020 Annual Air Pollution Emissions



Maricopa County Air Quality Department
Phone: 602-506-6790
Email: EmissionsInventory@maricopa.gov
Maricopa.gov/AQ

AQD Online Portal
Emissions Inventory Instructions

How to Submit an Emissions Inventory

Maricopa County Air Quality Department

December 2020

Table of Contents

Introduction

These instructions will provide the necessary information for completing a facility's emissions inventory in the Maricopa County Air Quality Department (MCAQD) Online Portal. There are four required tasks to complete and submit an emissions inventory.

1. Create an emissions inventory.
2. Facility contact change.
3. Facility inventory change.
4. Emissions inventory for reporting year.

In addition to these instructions, there are process specific help sheets at maricopa.gov/5628 that give specific directions on how to complete tasks 3 and 4 for commonly permitted processes. Please note if your facility is requesting selected data be held confidential, please refer to the Emissions Inventory Confidential Data Help Sheet at maricopa.gov/5628.

Before you start, you should collect all facility operational information including hours of operation and material usage.

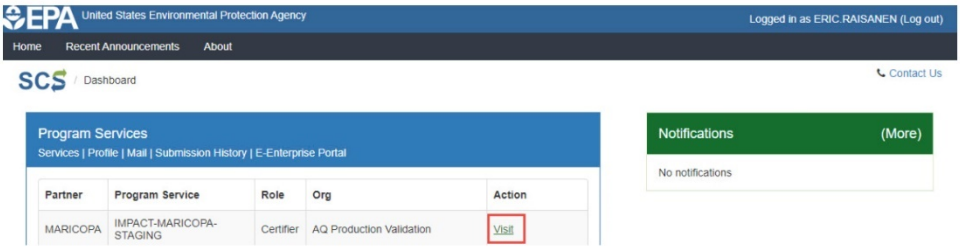
AQD Online Portal Access

In order to access the AQD Online Portal to complete your emissions inventory, you must first create a Shared CROMERR Services (SCS) Electronic Signature on the Environmental Protection Agency (EPA) Advanced Shared Services website at https://encromerr.epa.gov/. The SCS Electronic Signature is used to ensure the integrity and validity of reports submitted electronically. Please use Google Chrome as your internet browser for the EPA's SCS electronic reporting site and for the AQD Online Portal. You must also enable pop-ups on your internet browser.

Each individual accessing the AQD Online Portal must create an SCS Electronic Signature. **An SCS Electronic Signature is for individual use only and cannot be shared or accessed by anybody other than the individual who created the Electronic Signature.** Instructions for creating an SCS Electronic Signature are available at maricopa.gov/1820.

The process for creating an SCS Account requires verifying the identity of the user, which on average can take three days. Start this process well in advance of the emissions inventory report due date to allow enough time to complete the report.

Once an SCS Electronic Signature has been created, it will be linked to the contact profile in the AQD Online Portal for any facility you will be responsible for preparing or submitting emissions inventory reports. Once the SCS Electronic Signature is linked to your contact profile, you will log in to the SCS Electronic Signature at https://encromerr.epa.gov/ and click **Visit** to access the AQD Online Portal.



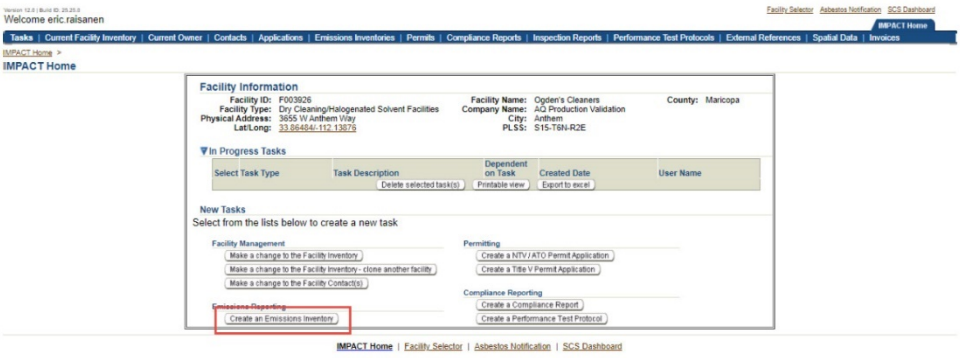
Task 1: Create Emissions Inventory

Once you have gained access to the AQD Online Portal, you can generate an emissions inventory. Choose the facility for which you want to create an emissions inventory.

Facility ID	Facility Name	Department	Operating	Facility Class	Facility Type	Address 1	City	County	Lat/Long
F006332	AQ Production Validation		Operating	Minor	Other (Unknown)	300 E Indian School Rd	Phoenix	Maricopa	33.49862/-112.07034
F038069	Test building 3		Operating	Asbestos	Not Applicable	301 W Jefferson	Phoenix	Maricopa	33.44658/-112.07832

Step 1

On the IMPACT Home page, click **Create an Emissions Inventory** on the bottom left of the screen.



Step 2

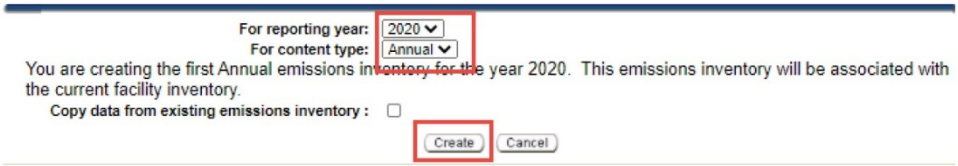
A pop-up window should appear. If the pop-up window does not appear, click on the error symbol on the right side of the address bar.

Select **Always allow pop-ups and redirects from https://airimpact.maricopa.gov** and click **Done**.

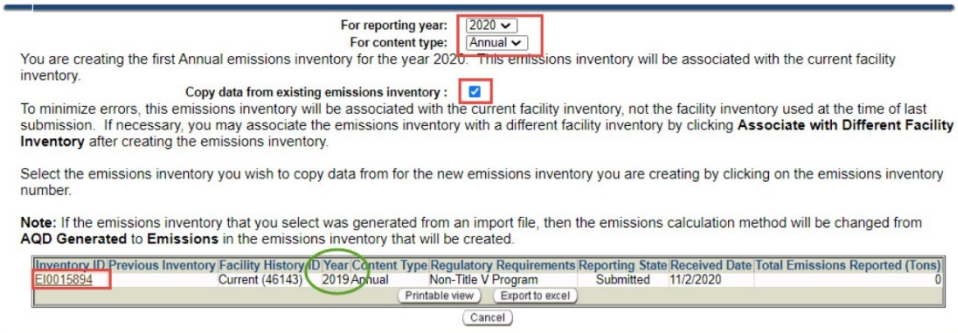
Step 3

Select the reporting year for the emissions inventory that has been requested, which is noted in the notification email. Remember you are reporting emissions for the previous calendar year. Select **Annual** as the content type.

To report emissions for a facility that did not report emissions in 2019, click **Create**.



To report emissions for a facility that did report emissions in 2019, click the box to **Copy data from existing emissions inventory** and click on the Inventory ID for the 2019 emissions inventory (EI0015894). If multiple emissions inventories were submitted for the 2019 reporting year, select the Inventory ID for the most recent 2019 emissions inventory. **If there are no emissions inventories with a 2019 reporting year listed in this table, do not attempt to copy data from an existing emissions inventory.**



Important Note – Review the email that was sent to the emissions inventory contacts when the 2019 emissions inventory was approved. If the emissions inventory staff identified any reporting errors,

they will be listed in the approval email as items to correct when 2020 emissions are reported. If these items are not corrected when the 2020 emissions inventory is submitted, it is likely that the facility will be required to submit a revised emissions inventory report.

Task 2: Facility Contact Change

Before the emissions inventory can be completed, you must review the facility information. First, verify the facility emissions inventory contacts are correct.

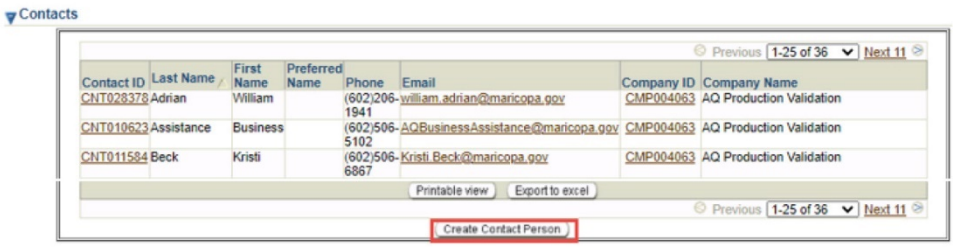
Step 1

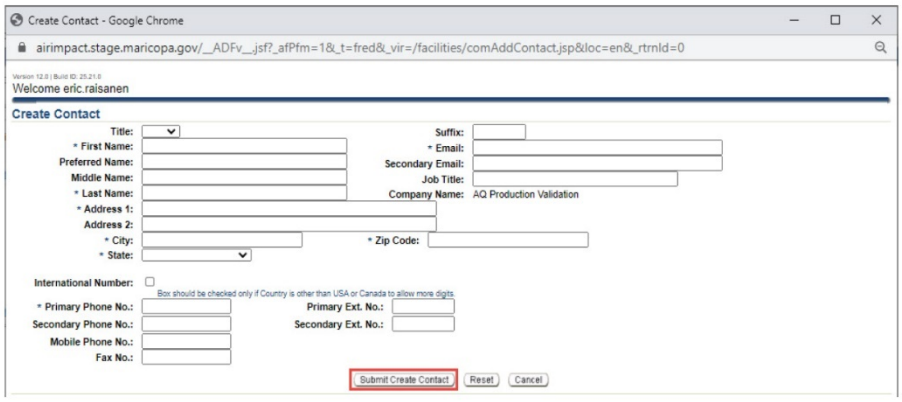
Click the **Facility Contact** tab on the top right of AQD Online Portal.

Review the list of contacts for the facility. Ensure there is a contact person assigned for billing, compliance, emissions inventory, permitting, and responsible official. If the information is correct, proceed to Task 3.

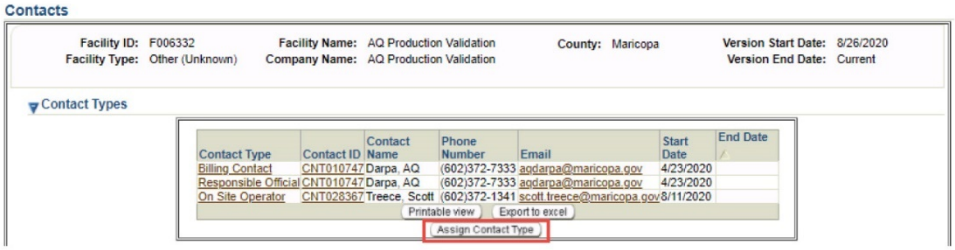
If there is missing or incorrect information, you can create a new contact, assign a contact to a contact type, add an end date for an existing contact type assignment, and/or update contact information for an existing contact.

Option 1 – Create a new contact
Click **Create Contact Person**, enter the required contact information in the pop-window, and click **Submit Create Contact**. This should only be completed if the person is not listed in the contacts table.



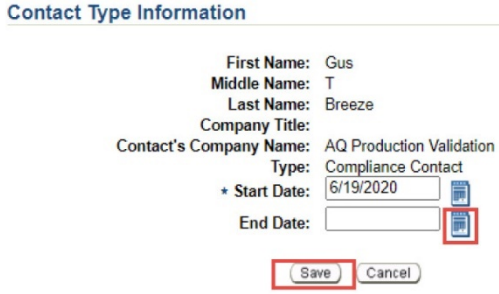


Option 2 – Assign contact type
Click **Assign Contact Type** and select the appropriate contact type and person for the role. Enter the start date when the person began as that contact type and click **Save**.

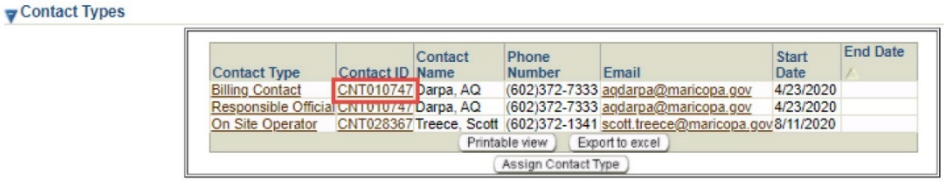


Option 3 – Add an end date for a contact type assignment
If a person is assigned as a contact type and they are no longer the appropriate contact for that type of correspondence, click on the **Contact Type** (e.g., Compliance Contact, Billing Contact, etc.) next to their name in the Contact Types table.

In the popup window, click **Edit Contact Type Dates**, enter an End Date (when that person stopped acting as that contact type), and click **Save**.



Option 4 – Edit contact information for an existing contact
Edit an existing contact by clicking on the **Contact ID** next to their name.



In the popup window, click **Edit**, update the contact information, and click **Save**.

Task 3: Facility Inventory Change

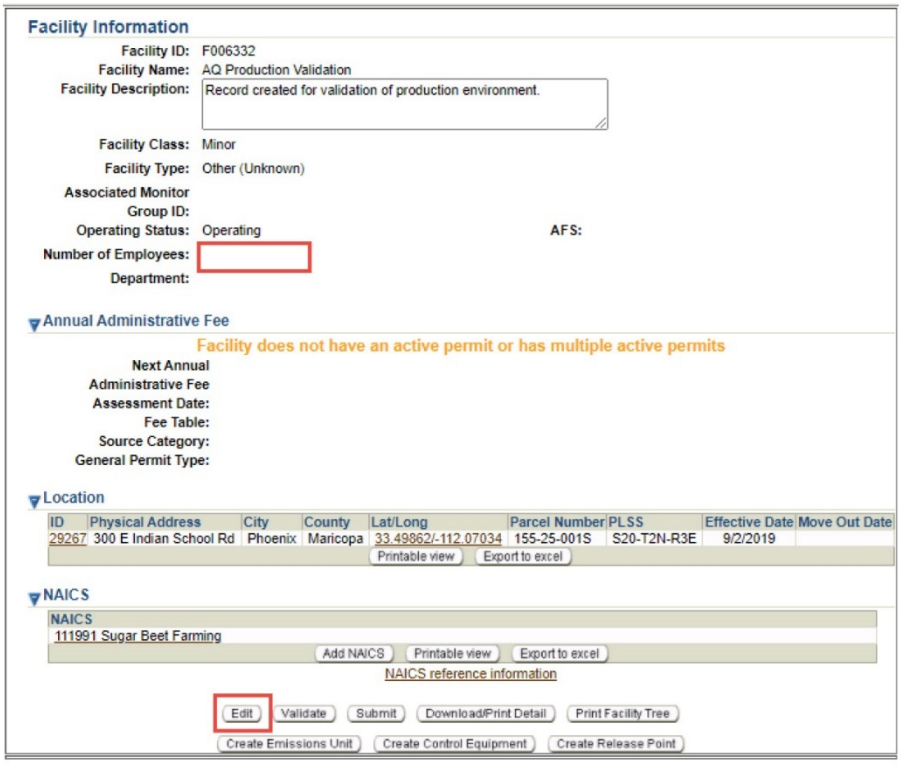
The AQD Online Portal contains a facility inventory, which is a list of the emission units and processes at your facility. Emission units can be individual pieces or groups of equipment and their processes. Task 3 allows you to review the facility inventory to ensure that it matches your current equipment and operations on the ground. You can add or modify emission units, emissions processes, control equipment, and release points (stacks) to reflect operations that occurred during the reporting year.

Step 1

Click on the blue **Facility Inventory Change** tab on the top right of the AQD Online Portal.

Step 2

Click **Edit** at the bottom of the Facility Information screen. Enter the **Number of Employees** for the facility during the reporting year and click **Save** at the bottom of the screen.



Step 3

On the left of the screen there will be a list of emission units called the Facility Tree. Review the facility tree to ensure all equipment and processes that operated in the emissions inventory reporting year are present. Emission units that are aggregated by type and de-minimis equipment do not need a process associated with them. If there are emission units or processes missing, they must be added. Click **Expand Facility Tree** to show all emission units and the emissions processes, control equipment, and release points associated with each emission unit.

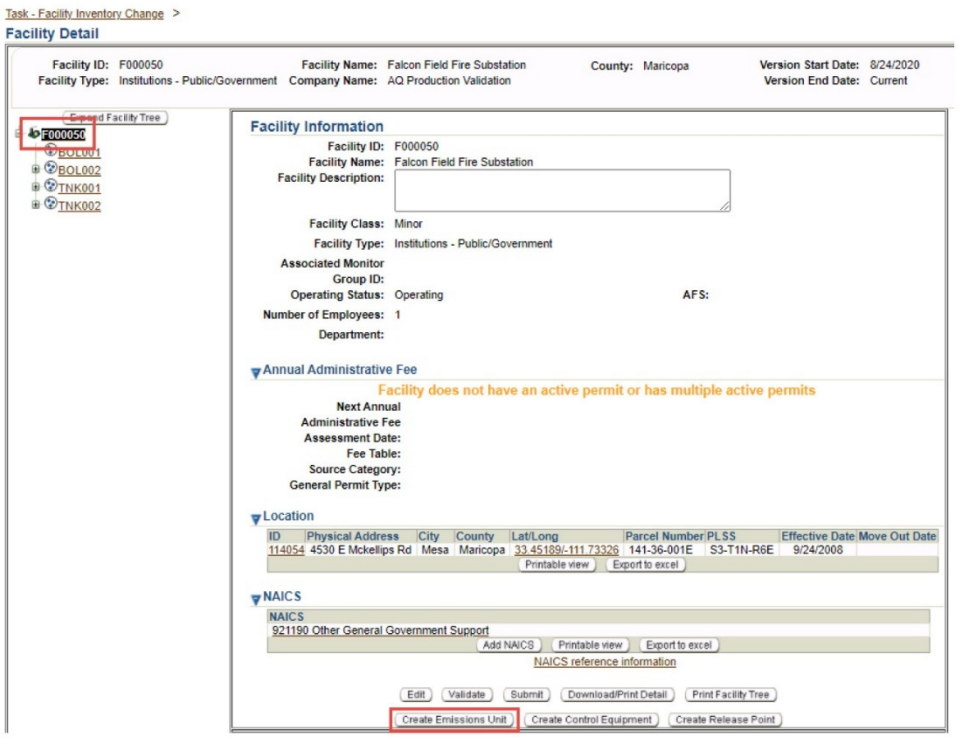
Step 4

To add an emission unit, there are two options. You can clone an existing emission unit or create a new emission unit.

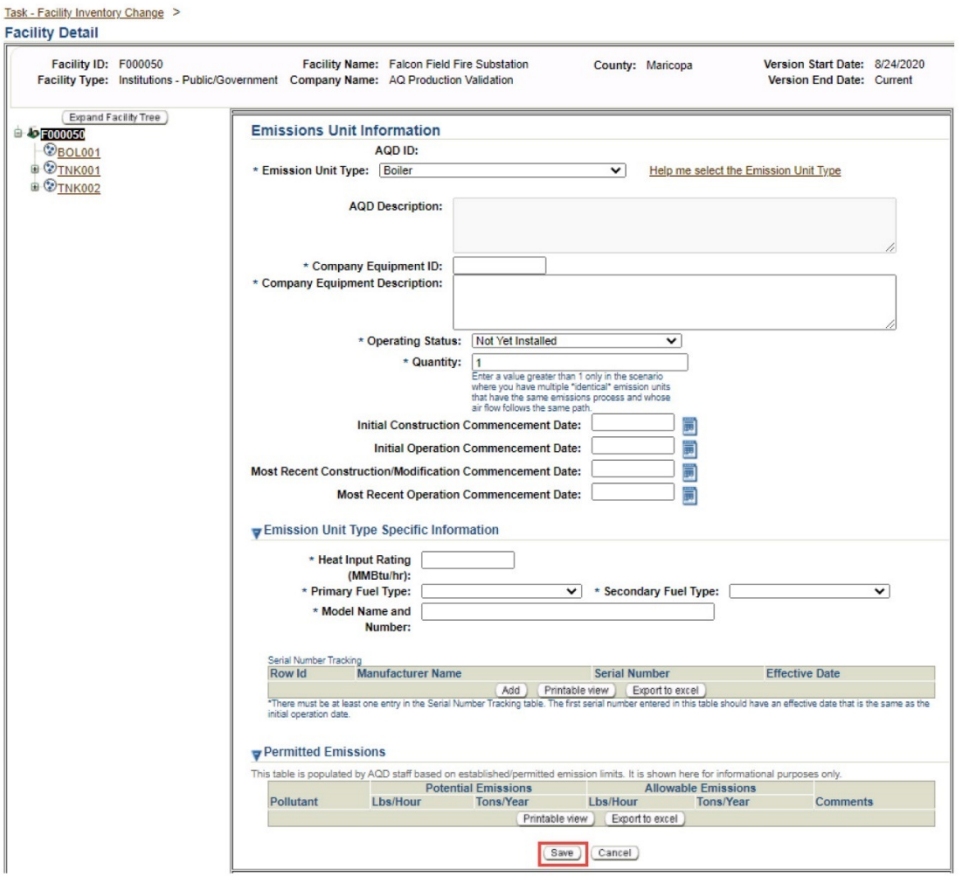
Option 1

To clone an existing emission unit, first select the emission unit you would like to clone and click **Create Cloned Emissions Unit** at the bottom of the Emission Unit Information screen. A new emission unit with identical descriptions and information will be created. Other information such as the serial number must be added to the new cloned unit. Cloning emission units is a useful tool if your facility has multiples of the same type of equipment.

Option 2
To create a new emission unit, select the **Facility ID** at the top of the Facility Inventory Tree. Click **Create Emissions Unit** at the bottom of the Facility Information screen.

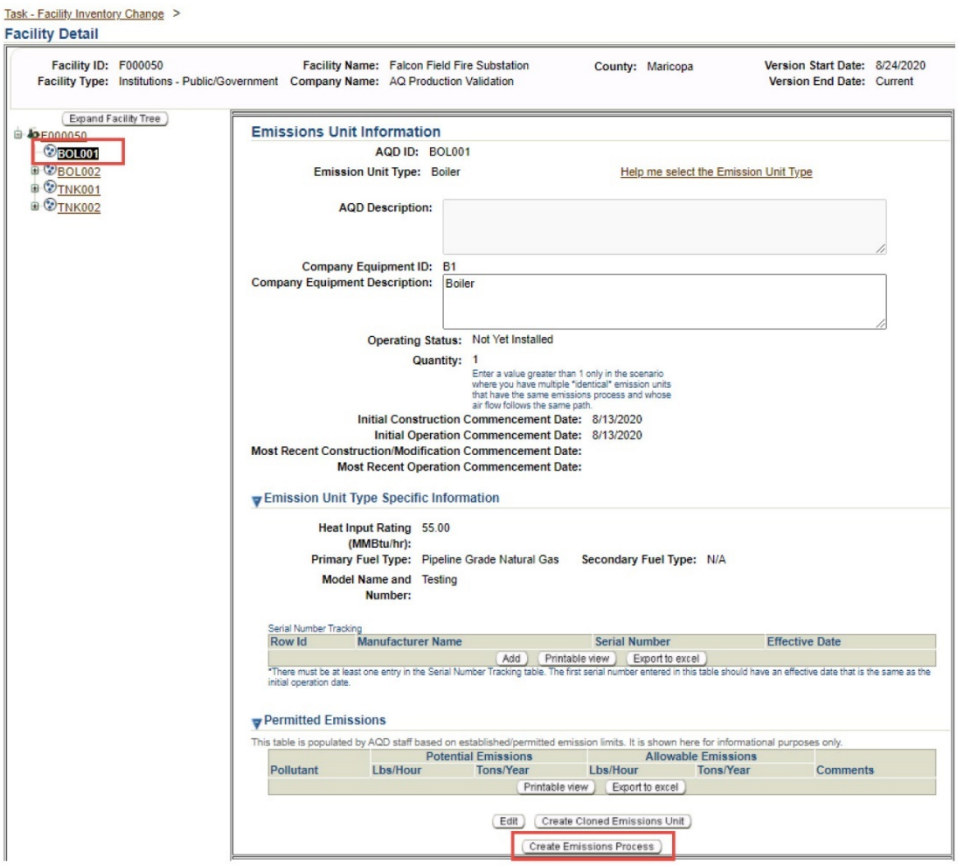


Select the **Emission Unit Type** from the dropdown list. Click **Help me select the Emission Unit Type** see an explanation of emission unit types. Enter all of the emission unit information (required fields are indicated by an asterisk). Click **Save** to add the emission unit to the facility tree.



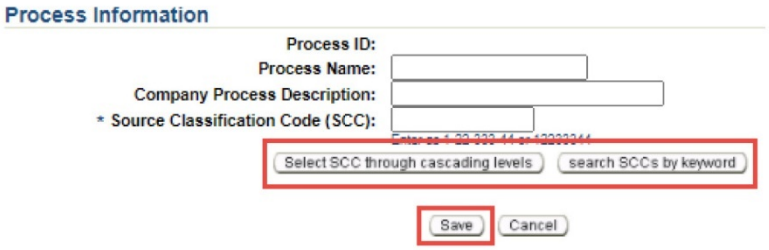
Step 5

To report emissions, you must add processes to the emission unit. Ensure you add all processes associated with the emission unit. First, select the emission unit ID, **BOL001**. Click **Create Emissions Process** at the bottom of the selected Emissions Unit Information screen.



Step 6

On the Process Information screen, enter the process name and company process description. The information entered here will be visible on the emissions inventory screen where you enter emissions factors and operational information. You cannot change the process ID number. If you know the process source classification code (SCC), enter it in the SCC field. If you do not know the SCC, click either the **Select SCC through cascading levels** or **Search SCCs by keyword** to help locate the SCC. Once you have selected the SCC, click **Save** to add the process. A list of common SCC codes is also available at maricopa.gov/5628.

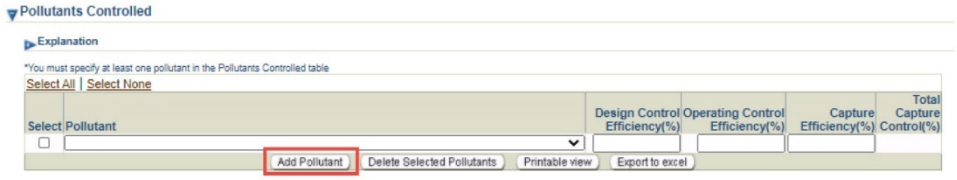


Step 7

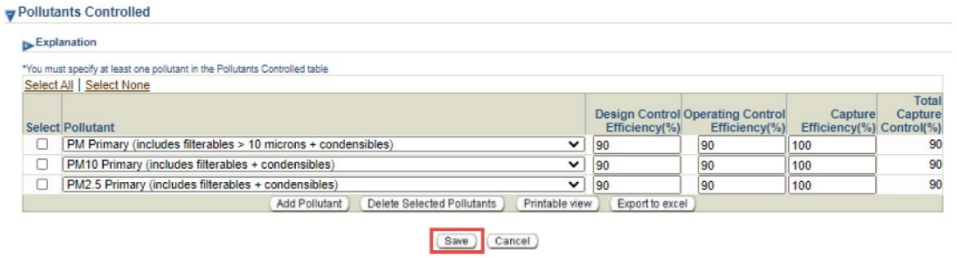
Complete this step if your facility uses control equipment or is required to report release points (stacks). A facility is required to report release points if the facility emits more than 10 tons of any pollutant during a calendar year.

Add control equipment and release points associated with your facility to the Facility Tree.

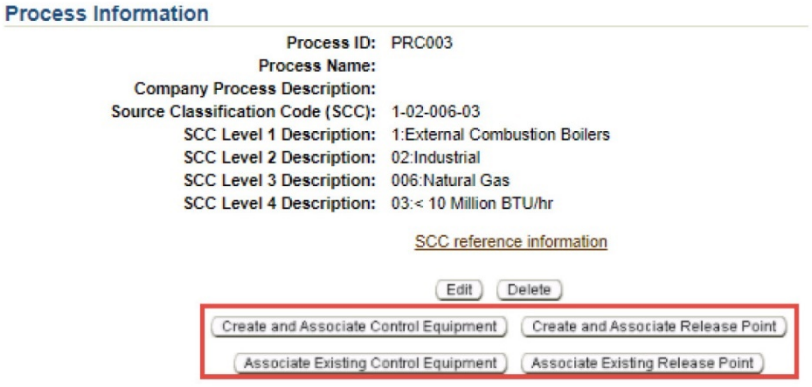
When adding control equipment, you must specify the design control efficiency, operating control efficiency, and capture efficiency for each pollutant controlled. Click **Add Pollutant** to add a new row to the table.



For control equipment that is used to control particulate matter emissions, these parameters must be specified for all three categories of particulate matter (PM) - PM primary, PM_{10} primary, and $PM_{2.5}$ primary. This ensures the AQD Online Portal accurately calculates PM emissions.

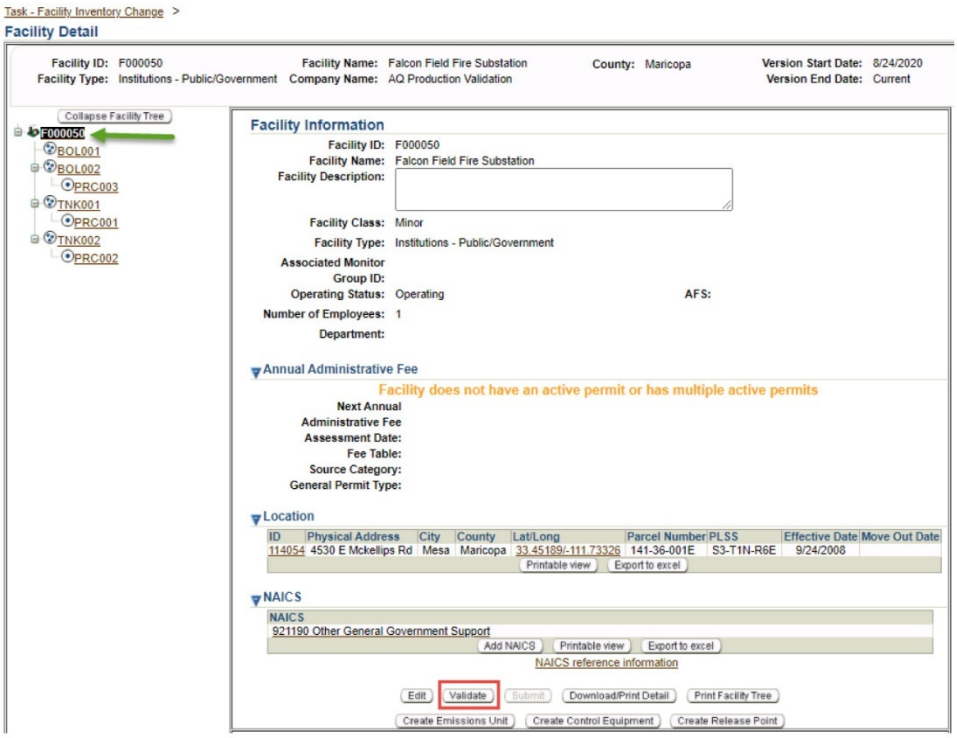


Control equipment is always associated with the emissions process it controls. Release points are associated with the control equipment that vents to a stack; for processes without control equipment, the release point is associated with the emissions process. Click on the **emissions process** or **control equipment** and click **Create and Associate Control Equipment** or **Create and Associate Release Point**. If the same control equipment controls multiple emissions processes, click **Associate Existing Control Equipment** to add the control to the other emissions processes. If multiple emissions processes are vented to the same stack, click **Associate Existing Release Point** to add the release point to all of the processes or controls that vent to the stack.

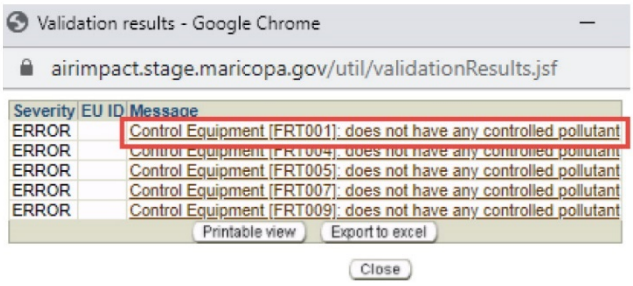


Step 8

Once you have verified the emission units, emissions processes, control equipment, and release points, you must validate the facility inventory to check for errors and missing information. Select the **Facility ID** at the top of the Facility Tree. Click **Validate** at the bottom of the Facility Information screen.



Validation errors will appear in a pop-up window. Click on the error message to open the screen where the error can be corrected.



If no validation errors are found, a validation successful message will be visible at the top of the Facility Detail screen.

Task 4: Emissions Inventory for Reporting Year

Now that you have verified contact information and facility information, you are ready to calculate emissions for your facility. If your facility is requesting data to be confidential, refer to the Emissions Inventory Confidential Data Help Sheet at maricopa.gov/5628.

To complete this task, ensure the following information is available for each emission unit and process. The AQD Online Portal will save your progress and changes so if this information is not readily available, the report can be completed later.

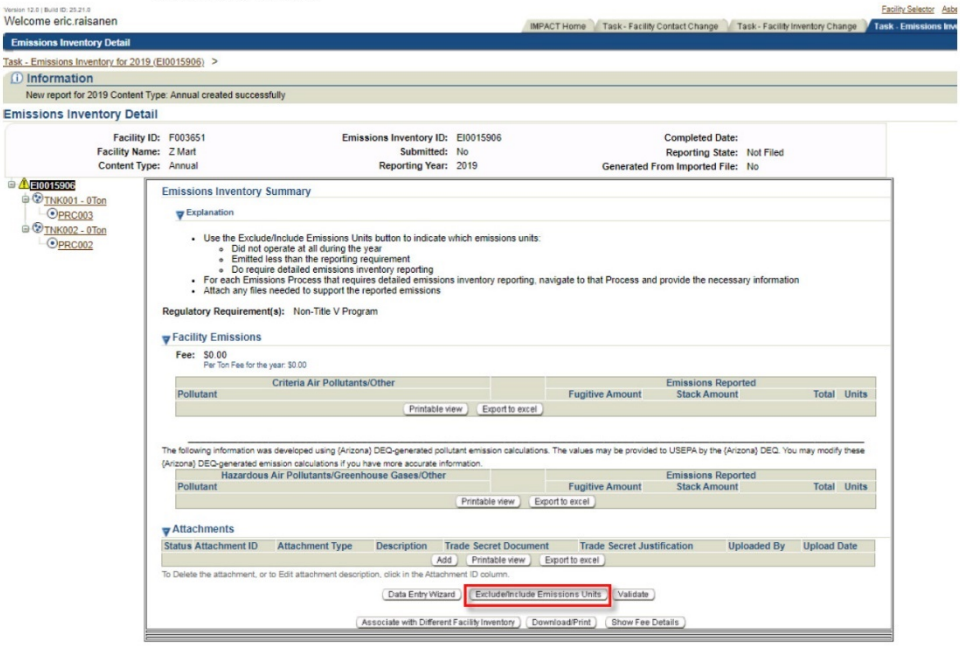
1. Did the emission unit operate in the reporting year?
2. What were the operating hours of the emission unit or process?
3. Material throughput - Some of the material throughputs will need to be in specific units in order to calculate the emissions. You may need to use a conversion factor in order to convert the units into the required reporting units.
4. What method was used to calculate emissions?
5. For emission units that are subject to performance testing, you will need the results of the most recent performance test.

Step 1

Click on the **Emissions Inventory for #### Reporting Year** tab on the top right of the screen.

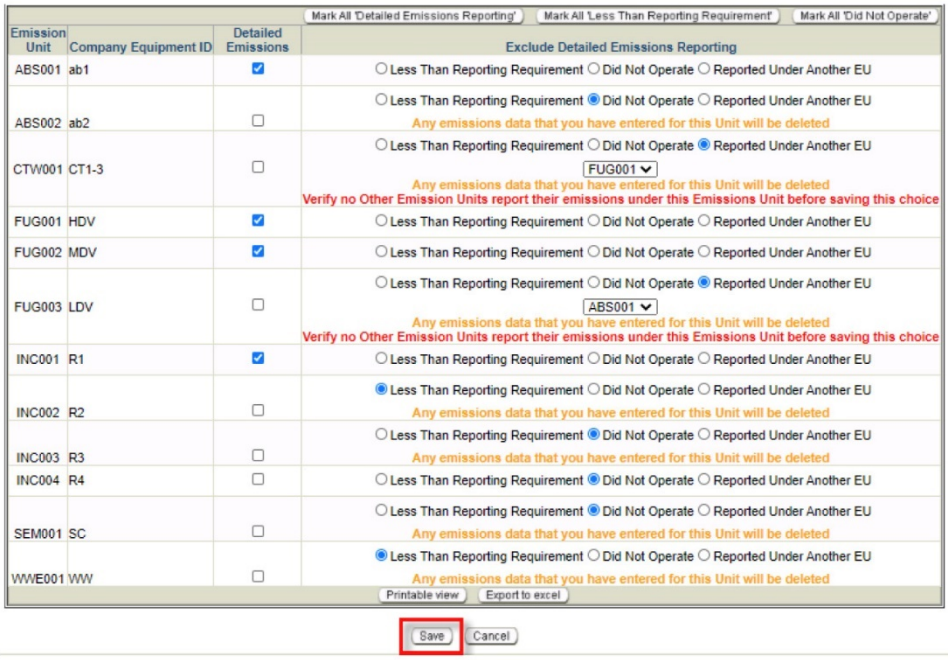
Select which emission units to include or exclude for the emissions inventory. There are two options.

Option 1
On the bottom of the emissions inventory summary page, click **Exclude/Include Emission Units**.

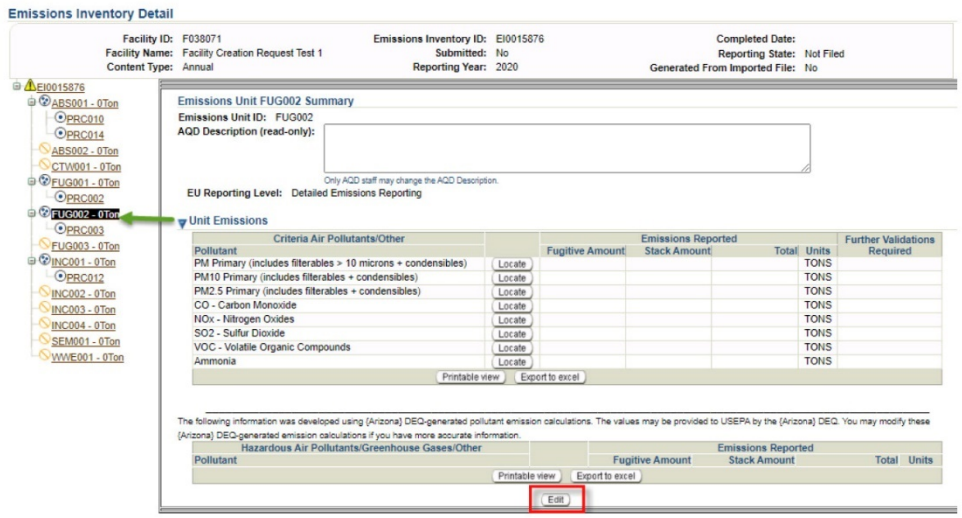


Select the appropriate reporting level for each emission unit and click **Save**.

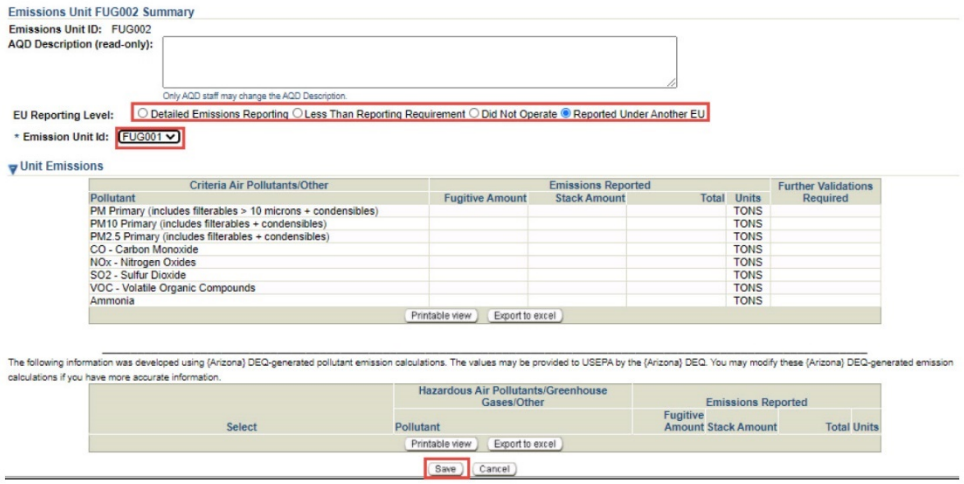
- **Detailed Emissions** (i.e., reporting is required)
- **Less than Reporting Requirement** – this is for any emission unit that is part of an insignificant activity.
- **Did Not Operate**
- **Reported Under Another EU** – this is for similar emission units with the same process material and the same emissions factors. When this option is selected, a drop down will appear to indicate which emission unit the emissions are reported under.



Option 2
To include or exclude emission units individually, click on the **Emission Unit ID** (e.g., FUG002) in the **Emissions Inventory Tree** and click **Edit**.

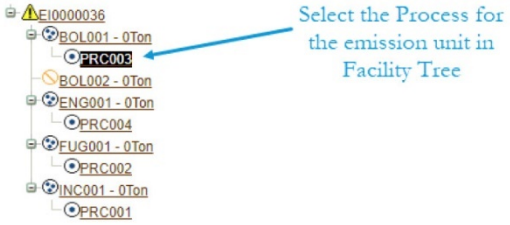


Select the **EU Reporting Level**. If Reported Under Another EU is selected, select the EU where emissions are reported in the Emission Unit ID dropdown. Click **Save**.



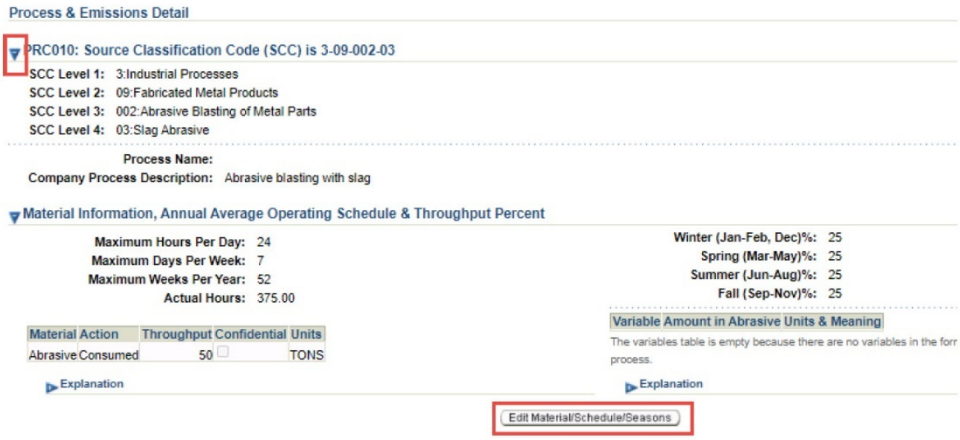
Step 2

Enter emissions and operating details at the process level. Select the process for the emission unit in the Facility Tree.



Step 3

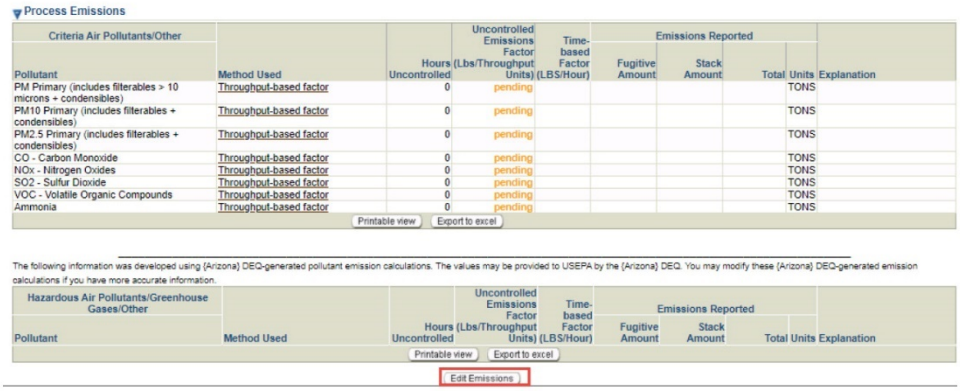
Click **Edit Material/Schedule/Seasons** in the center of the screen. Click on the triangle next to the process ID to view the process description. Enter data in every field and click **Save**. Note that the throughput units may be different than the units that were used in the past. If so, you will need to convert your throughput amount to the units required by the AQD Online Portal. There may also be variables (such as sulfur content or heat content) that must be entered for the emissions calculator to work (see table below). If any fields in this section are left empty, you will receive validation errors when you attempt to submit the emissions inventory.



Common Variables	
Natural gas heat content (Btu/cubic-foot)	1037
Diesel fuel heat content (Btu/gallon)	139000
Propane heat content (Btu/gallon)	91,452
Ultra-low sulfur diesel sulfur content (%)	0.0015

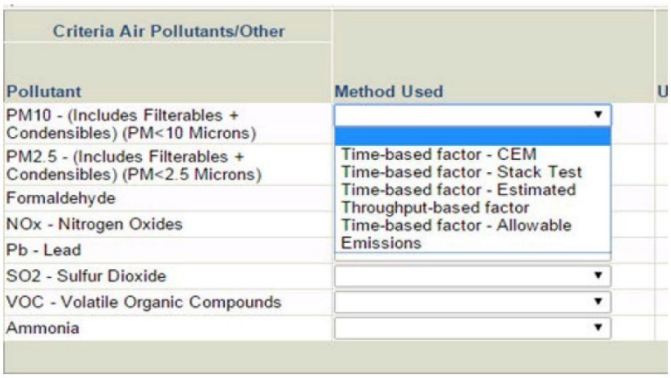
Step 4

Once you have entered in the operating information, material throughput information, and variables, enter emissions factors for the process. The AQD Online Portal will provide EPA WebFire emissions factors for many processes. You can also manually enter emissions factors. Click **Edit Emissions** at the bottom of the Process and Emission Detail screen to enter emissions data.



Choose the **Method Used** for calculating emissions (you can select a different method for each pollutant):

- If the emissions unit is equipped with a Continuous Emissions Monitoring System (CEMS), use the method **Time-based factor – CEM** for all pollutants that are monitored by CEMS.
- If CEMS is not used to measure emissions, but the emissions unit has been performance tested, select **Time-based factor – Stack Test** for all pollutants that are subject to performance testing.
- For pollutants that are not measured by CEMS performance testing, use the method **Throughput-based factor** or **Time-based factor - Estimated** to calculate emissions based on throughput or actual operating hours.
- Emissions – Enter actual emissions from a process. If this method is used, a spreadsheet must be uploaded to show how the emissions were calculated. The spreadsheet can be uploaded from the main **Emissions Inventory Summary**. The **Material Usage Calculation Tool**, available at maricopa.gov/5628 can be used to calculate emissions from evaporative processes and allocate the emissions by process for entry into the AQD Online Portal.



Step 5

1. Enter **Hours Uncontrolled** for each pollutant. For pollutants that are uncontrolled, enter the total operating hours in **Hours Uncontrolled**. If the process was continually controlled, Hours Uncontrolled will be zero (0) for all pollutants controlled. If a pollutant was only controlled for a portion of the operating hours, indicate the number of hours the process operated without controls.

2. Enter **Uncontrolled Emissions Factors**. Based on the SCC of the process, available EPA WebFIRE emissions factors will populate in the table. If emissions factors do not populate into the table, enter appropriate emissions factors for the process in the Uncontrolled Emissions Factor column. The MCAQD's process-specific help sheets at maricopa.gov/5628, the permit technical support document, and AP-42: Compilation of Air Pollutant Emissions Factors are all common resources for obtaining emissions factors. Note that emissions factors must be converted to units of "pounds per throughput unit", where throughput unit must be the same units requested in Step 3 (e.g., if the AQD Online Portal requires throughput in units of million cubic feet, then the uncontrolled emissions factor must be in units of pounds per million cubic feet). Users cannot remove pollutants that are prepopulated in the Criteria Air Pollutants or Hazardous Air Pollutants (HAPs) tables. If there are pollutants that are not emitted by a process, enter zero (0) in the **Uncontrolled Emissions Factor** column.

3. If a time-based method was selected in Step 4, an emissions factor (in units of pounds per hour) must be entered in the **Time-Based Factor** column.

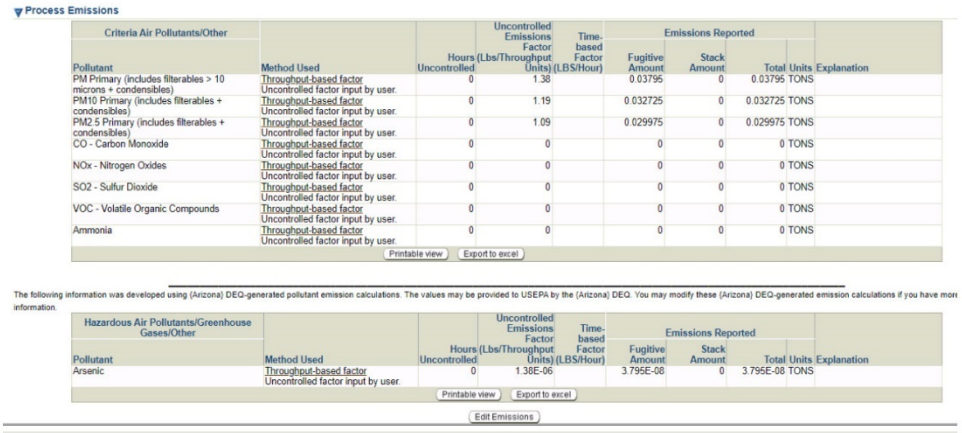
4. If the Emissions method was selected in Step 4, enter fugitive and stack emissions for the pollutant in the Fugitive Amount and Stack Amount columns. Emissions can only be reported in the **Stack Amount** column if the emissions process is connected to a release point. If the emissions process is not connected to a release point, all emissions must be reported in the **Fugitive Amount** column. If the facility inventory tree indicates that a portion of the emissions are vented to the stack and a portion of the emissions are fugitive, the stack and fugitive emissions should be reported in the appropriate columns.

5. Emissions can be reported as tons or pounds (choose the preferred units in the **Units** column).

6. If you are required to report HAPs that are not listed in the HAPs table, click **Add Emission** and select the HAP in the Pollutant drop down. Enter all information that is required to calculate HAP emissions. HAPs reporting is only required if the facility is subject to a Maximum Achievable Control Technology (MACT) standard or if there is a HAP limit in its permit.

7. Ensure that there are no blank spaces. You must enter a value for all empty fields. Any blank spaces will result in validation errors when you attempt to submit the emissions inventory.

8. Click **Save** to calculate emissions. Emissions will be calculated based on the operational information and the emissions factors provided. Due to rounding differences, the final emission amount may not match the numbers from the facility's report exactly.



▼ Process Emissions

Criteria Air Pollutants/Other			Uncontrolled Emissions Factor	Time-based Factor	Emissions Reported				
Pollutant	Method Used	Hours Uncontrolled	(Lbs/Throughput Units)	(LBS/Hour)	Fugitive Amount	Stack Amount	Total	Units	Explanation
PM Primary (includes filterables > 10 microns + condensibles)	Throughput-based factor Uncontrolled factor input by user.	0	1.38		0.03795	0	0.03795	TONS	
PM10 Primary (includes filterables + condensibles)	Throughput-based factor Uncontrolled factor input by user.	0	1.19		0.032725	0	0.032725	TONS	
PM2.5 Primary (includes filterables + condensibles)	Throughput-based factor Uncontrolled factor input by user.	0	1.09		0.029975	0	0.029975	TONS	
CO - Carbon Monoxide	Throughput-based factor Uncontrolled factor input by user.	0	0		0	0	0	TONS	
NOx - Nitrogen Oxides	Throughput-based factor Uncontrolled factor input by user.	0	0		0	0	0	TONS	
SO2 - Sulfur Dioxide	Throughput-based factor Uncontrolled factor input by user.	0	0		0	0	0	TONS	
VOC - Volatile Organic Compounds	Throughput-based factor Uncontrolled factor input by user.	0	0		0	0	0	TONS	
Ammonia	Throughput-based factor Uncontrolled factor input by user.	0	0		0	0	0	TONS	

Printable view | Export to excel

The following information was developed using (Arizona) DEQ-generated pollutant emission calculations. The values may be provided to USEPA by the (Arizona) DEQ. You may modify these (Arizona) DEQ-generated emission calculations if you have more information.

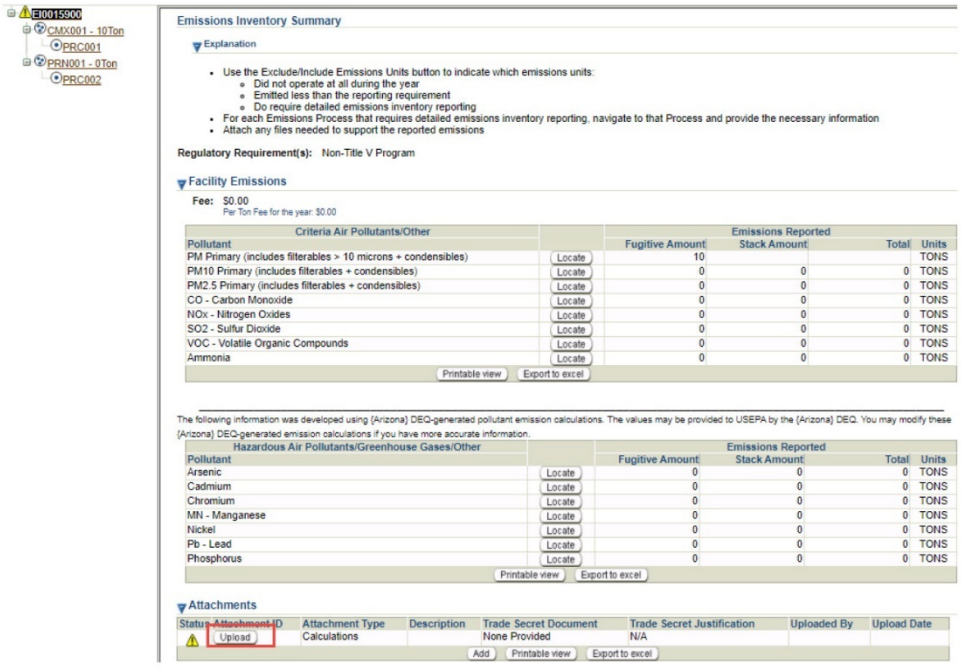
Hazardous Air Pollutants/Greenhouse Gases/Other			Uncontrolled Emissions Factor	Time-based Factor	Emissions Reported				
Pollutant	Method Used	Hours Uncontrolled	(Lbs/Throughput Units)	(LBS/Hour)	Fugitive Amount	Stack Amount	Total	Units	Explanation
Arsenic	Throughput-based factor Uncontrolled factor input by user.	0	1.38E-06		3.795E-08	0	3.795E-08	TONS	

Printable view | Export to excel

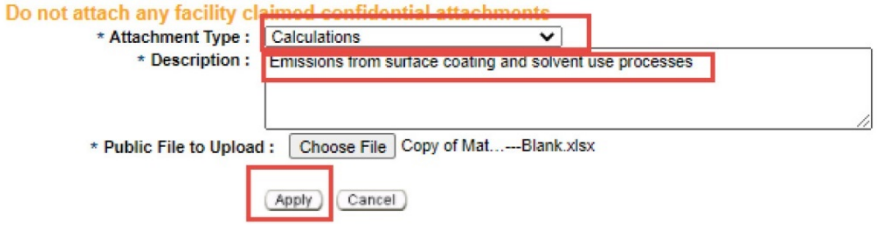
Edit Emissions

Step 7

If you selected **Emissions** as the method used to calculate emissions for any process, you must submit a calculation spreadsheet showing how the emissions were calculated. To attach a spreadsheet, click on the **Emissions Inventory ID** at the top of the Emissions Inventory Tree. Click **Upload** in the Attachments table near the bottom of the page.



Select **Calculations** as the Attachment Type. If submitting more than one calculation spreadsheet, indicate which processes are calculated in each spreadsheet in the Description field. Click **Choose File** to upload a file and click **Apply**.



Data Entry Wizard

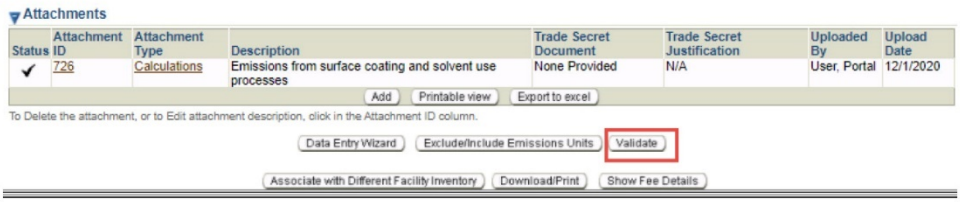
The data entry wizard is an alternative method to enter in the information required to compute emissions. You can include/exclude all emission units that operated, record the annual hours operated, and input the material throughputs from one screen. Please note that if you open the data entry wizard, it will overwrite any previously entered data each time you open the tool. After using the data entry wizard, users must enter or verify additional material and operating information such as maximum hours and seasonal throughput percent in each individual equipment process screen. Reference Steps 1-8 for guidance on how to enter this information.

Task 5: Validate and Submit Emissions Inventory

Once you have finished entering data and attaching any files, you are ready to validate and submit the emissions inventory.

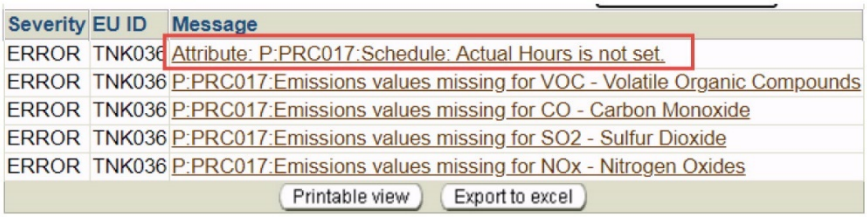
Step 1

Click **Validate** at the bottom of the Task-Emissions Inventory screen to check for errors and missing data.



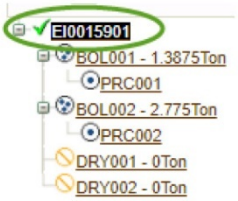
Step 2

Any validation errors will appear in a pop-up window. Correct any errors by clicking the message.



Step 3

Once all errors have been corrected, a checkmark will appear next to the facility in the Facility Tree. This indicates a successful validation.



Step 4

After you have completed the validation, submit your emissions inventory. The emissions inventory must be submitted by a Responsible Official (Rule 100 § 503). A Responsible Official is:

- For a corporation: A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or a duly authorized representative approved in advance by the MCAQD.
- For a partnership or sole proprietorship: A general partner or the proprietor, respectively.
- For a municipality, State, Federal, or other public agency: Either a principal executive officer or ranking elected official.
- For affected sources: The designated representative under Title IV-Acid Deposition Control of the Act or the designated representative for any other purposes under 40 CFR Part 70.

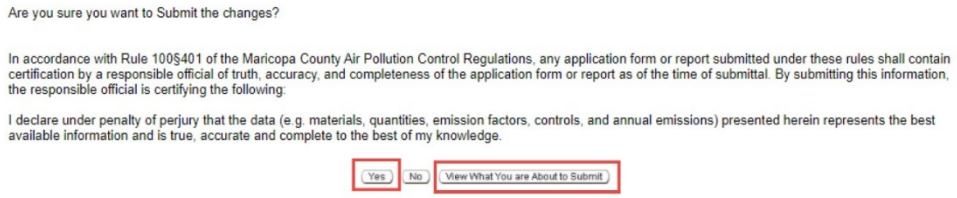
In order to submit the emissions inventory, the Responsible Official must create an SCS Electronic Signature and select the certifier role. To submit, the Responsible Official will click **Submit** at the bottom of the **Task-Emissions Inventory** screen. This will submit the contact changes, the facility inventory changes, and the completed emissions inventory.

Step 5

Indicate that you are authorized to sign the submission by clicking **Yes** on the pop-up window.

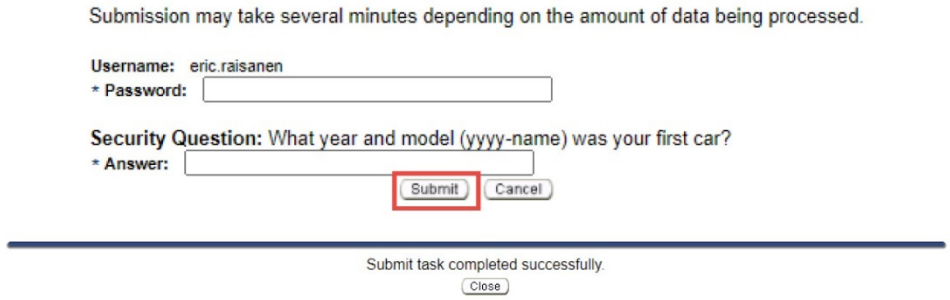
Step 6

To review and save a copy of the submission for your records, click **View What You are About to Submit**. Once you have you reviewed and saved the files, click **Yes** to certify the accuracy of the submission.

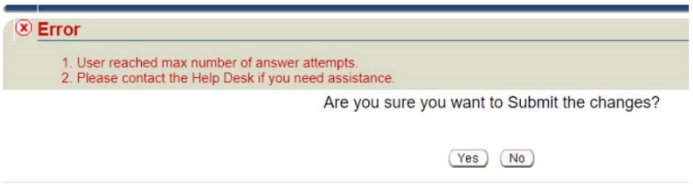


Step 7

A confirmation box will appear, followed by a dialogue box where you will enter your password and answer a security question. This attaches your SCS electronic signature to the submission and submits the emissions inventory to MCAQD.

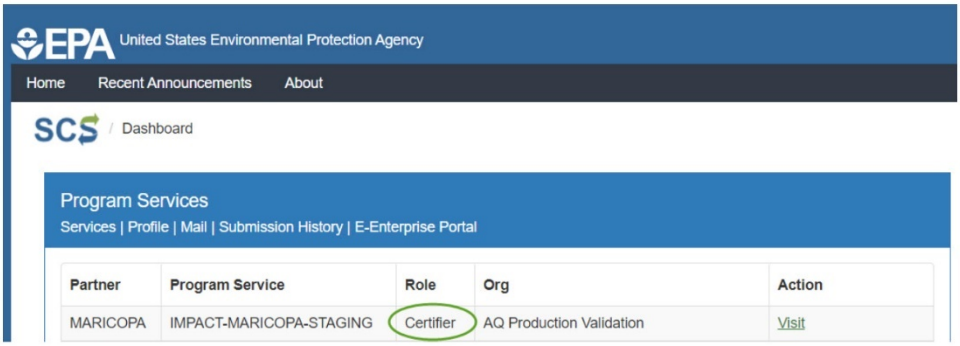


Ensure the password and the answer to the security question are entered correctly. If you enter an incorrect password or answer twice, you will have to reset your security questions before can complete the submission. If you see the following error message, go to maricopa.gov/1820 and follow the instructions for Resetting SCS Account Security Questions.



Only a Responsible Official who has created a Certifier account and completed the electronic signature agreement can submit an emissions inventory. If you attempt to submit an emissions inventory and receive a message that questions are not on file, verify that you have created a Certifier account. To check the account type, click **SCS Dashboard** on the top right corner of the

screen. Review the role listed for your account. If you are the Responsible Official and your role is Preparer, email AQDImpact@maricopa.gov for help creating a Certifier account.



Step 8 – Emissions Inventory Fees (Title V Facilities Only)

If you are reporting for a Title V facility, you will be automatically redirected to https://paydirect.ca.link2gov.com/MCAQPaymentPortal to pay your emissions inventory fees with a credit card after submitting your emissions inventory.

If paying by check, email EmissionsInventory@maricopa.gov to request an invoice. Make the check payable to Maricopa County Air Quality Department or MCAQD and label the check with the Invoice Number and Facility ID. Checks must be mailed to:

Maricopa County Air Quality Department
3800 N. Central Ave. Suite 1400
Phoenix, AZ 85012

Conclusion: I've submitted, now what?

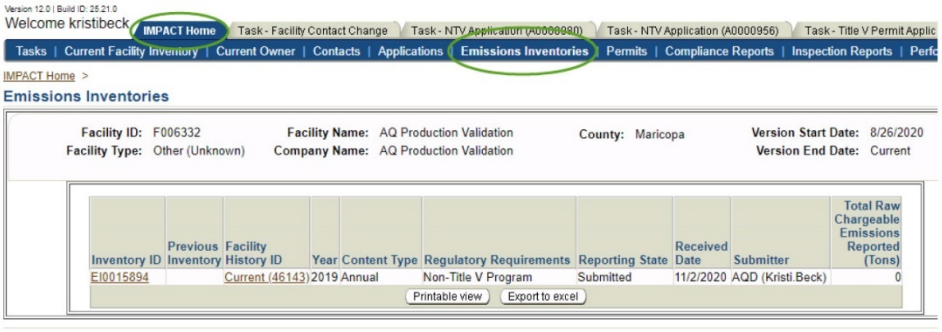
Once you have submitted your emissions inventory, MCAQD will review the reported processes and any attachments. The emissions inventory contact will be the primary contact if there are any questions concerning the submitted report. If there are missing processes or errors, the report will be sent back with revisions requested.

If submitting a revised emissions inventory, create a new emissions inventory as described in Task 1. Click **Copy data from existing emissions inventory** to make a copy of the previously submitted report. Make any required changes following the steps above and include an explanation under **Reason/Explanation for Emissions Inventory Revision.** Once the revisions have been made, submit the revised emissions inventory.

If you have any questions on completing an emissions inventory report, you can contact us at 602-506-6790 or emissionsinventory@maricopa.gov.

View Previous Submissions

Click on the **IMPACT Home** tab at the top of the screen. Click **Emissions Inventories** in the blue bar below the IMPACT Home tab. This screen will list all previous emissions inventories for the facility. Click on **the Inventory ID** to view a previous submission.



Questions

If you have questions or are experiencing issues with the AQD Online Portal, please contact 602-506-6790 or EmissionsInventory@maricopa.gov. Please provide a brief explanation of the question or problem you are encountering and include a screenshot if contacting us via email. If you are encountering errors or malfunctions in the portal, include the following information in your message: the date and time when the error occurred, the browser you were using when the error occurred, and the type of device you were using when the error occurred (i.e., computer, tablet, phone, etc.).

Additional Resources

How to create a Shared CROMERR Services (SCS) electronic signature to access the AQD Online Portal: maricopa.gov/DocumentCenter/View/56270

Emissions inventory instructions and other process specific help sheets: maricopa.gov/5628

Instructions for permit applications, compliance reports, asbestos notifications, performance test protocols, and other documents that can be submitted through the AQD Online portal: maricopa.gov/1820

Appendix B. Rule Effectiveness (RE) Studies

B-1. Introduction

Rule effectiveness (RE) studies are designed to assess the success of regulatory rules at controlling their targeted emissions. It is acknowledged that facilities and source categories subject to control techniques and devices mandated by rules do not always achieve 100% compliance with those requirements. Given this reality, the EPA recommends the use of RE studies to improve the quality of emission estimates presented in emission inventories.

Once an RE rate has been calculated, its value is applied to relevant sources at an individual process level, thus adjusting (i.e., increasing) emission estimates to reflect a lower degree of control efficiency. The following example illustrates how the application of rule effectiveness can significantly affect the resulting emission estimates. The calculations below reflect a process whose reported emissions are controlled via a control device with a nominal 90% control efficiency (CE). In the second equation, an RE rate of 83% is applied to the controlled process.

Equation 1: Emissions before the application of rule effectiveness.

Uncontrolled emissions $\times$ [1 – (CE)] = Emissions after control

100 tons $\times$ [1 – (0.90)] = 10.0 tons

Equation 2: Emissions including the application of an 83% RE.

Uncontrolled emissions $\times$ [1 – (CE $\times$ RE)] = Emissions after control and RE

100 tons $\times$ [1 – (0.90 $\times$ 0.83)] = 25.3 tons

In general, the RE rate is applied to all processes where a control device or control technique is in use. There are, however, some limitations to this blanket rule, as expressed in EPA's most recent guidance:

> *…not all emission estimates involving use of a control device or technique need to be adjusted to account for RE…For example, a state or local agency may conclude that a control device that operates in conjunction with a continuous emissions monitor, or is equipped with an automatic shutdown device, may provide a sufficient level of assurance that intended emission reductions will be achieved, and therefore an adjustment for rule effectiveness is not necessary. Another example would be in instances where a direct determination of emissions, such as via a mass balance calculation, can be made.* (EPA, 2005)

Another complication in any attempt to apply a blanket RE percentage rate occurs where control device efficiencies are extremely high. Some categories of control devices routinely operate at efficiencies of 99% or greater (e.g., baghouses, thermal oxidizers). For these activities, even small adjustments through the application of RE can cause a dramatic, and unrealistic, increase in reported emissions. As an example, a process with a control device of 99.9% efficiency may report controlled emissions of 10 tons. If an RE rate of 85% were applied to this process, the adjusted emissions would total 1,508.5 tons (an increase of nearly 15,000%). In these instances, MCAQD limited rule

effectiveness so that emissions after rule effectiveness was applied were no more than double the emissions before rule effectiveness was applied.

B-2. Calculating Rule Effectiveness Rates for Title V and Non-Title V Facilities

The observed compliance rate in some cases, such as multi-source Title V and non-Title V facilities, can be better described as a rate at which inspection staff issue violations. Inspection staff has a range of experience and training which influences their proficiency in issuing appropriate violations. There may be instances when a rule violation goes unnoticed by staff, or conversely a violation may be issued in error. Even when a compliance rate has a high statistical measure of accuracy, it can fail to reflect several programmatic measures, such as the strength of rule language, departmental enforcement and penalty actions, inspector training programs, educational and public outreach efforts, and other measures that affect overall rule effectiveness. This reality is reflected in earlier EPA guidance:

> *A percentage effectiveness rating is not enough to describe the compliance effectiveness of a rule for a source category. An SSCD [Stationary Source Compliance Division] study should attempt to link the rating to a regulatory agency's overall effort. The study should address the factors that affect the percentage effectiveness rating such as the compliance rate of the sources in a category, inspection frequency and thoroughness, the language of the rule (i.e., wwhetherit has loopholes), and the reporting and recordkeeping by the regulatory agency. Evaluating these factors will provide a more complete evaluation of the effective-ness of a rule.* (EPA, 1994)

To incorporate all the salient factors described above, a matrix was created to calculate a final RE rate. EPA's latest guidance (2005) provides a listing of factors that can impact rule effectiveness rates (e.g., inspector training, frequency of inspections, media outreach, enforcement policies, recordkeeping requirements, etc.), grouped into major categories such as most important factors, important factors and other factors. MCAQD used these suggested factors as the basis for developing the RE matrices contained in Tables B–2 and B–3.

In brief, the compliance rate developed from inspection data accounts for 70% of the overall RE rate, while all other factors account for the remaining 30%. Each factor is scored individually, based upon success in implementing each factor. As an example, the score for the factor "Compliance History" is the compliance rate developed from the study period inspection data, while the score for "Enforcement Penalties" is based upon the timely response to, and settlement of, observed violations associated with the subject rule or source category. The complete matrices for each applicable rule or source category for which rule effectiveness was addressed, are contained in Tables B–2 and B–3.

The data and methods used to develop RE rates for Title V and non-Title V permitted facilities are described below. The resulting rule effectiveness values for 2020 are summarized in Table B–1 below.

Table B–1: Rates of compliance and rule effectiveness for 2020, by permit category.

Source category	Compliance rate *	Rule Effectiveness (RE) rate
Title V facilities	88.44%	89.48%

Source category	Compliance rate *	Rule Effectiveness (RE) rate
Non-Title V facilities	82.88%	86.19%

* Compliance rates for both Title V and Non-Title V facilities are based upon inspections conducted between October 1, 2019 and September 30, 2021, and reflect compliance self-monitoring recordkeeping and reporting practices and facility compliance history. Inspection data before October 1, 2019 was not used because MCAQD implemented a database for inspections in September of 2019.

For emission processes that include a control device or technique that limits ozone formation, separate multi-rule RE rates have been calculated for permitted Title V and non-Title V facilities. Factor-based matrices have been utilized to develop RE rates for Title V and non-Title V facilities. Compliance rates for both Title V and non-Title V facilities are based on two full years of data because compliance information for these sources tends to be more detailed (as reflected in the matrix). The compliance rate for these facilities also includes data on self-monitoring recordkeeping practices in addition to inspection data. The combined scores of the monitoring data and inspection data divided by the 70% of the overall RE rate comprise the "compliance rate" portion of the RE calculation matrix, as shown in Tables B–2 and B–3 below.

Due to the coronavirus pandemic, MCAQD did not conduct unannounced inspections for a portion of the 2020 calendar year. This temporary change to normal operations is reflected in the Unannounced Inspections portion of the rule effectiveness studies.

Table B–2: Rule Effectiveness Matrix for Title V Facilities

Factor	Range		Midpoint	Description	Weight	Value	Score
Monitoring	94%	100%	97%	Source-specific monitoring used for compliance purposes, and monitoring records filed with regulatory agency at least every 4 months.	35%	100%	31.50%
	87%	93%	90%	Source-specific monitoring used as an indicator of compliance, and monitoring records filed with regulatory agency every 6–9 months.			
	81%	86%	84%	Source-specific monitoring used as an indicator of compliance, and monitoring records filed with regulatory agency each year.			

Factor	Range		Midpoint	Description	Weight	Value	Score
	70%	80%	75%	General guidance exists for source-specific enhanced monitoring, and monitoring records required but aren't submitted to regulatory agency.			
	< 70%		35%	No requirements for any type of monitoring.			
Compliance History	94%	100%	97%	The facility has been in compliance for the past eight quarters.	35%	64.71%	21.97%
	87%	93%	90%	The facility is believed to have been in compliance for the past eight quarters, although inspection frequency is such that this can't be positively confirmed.			
	81%	86%	84%	On schedule; the facility is meeting its compliance schedule.			
	70%	80%	75%	In Violation; facility is in violation of emissions and/or procedural requirements.		29.41%	7.72%
	< 70%		35%	High Priority Violator (HPV): the facility is in significant violation of one or more applicable requirement of the CAA.		5.88%	0.72%
Overall Compliance Rate							**88.44%**

Factor	Range		Midpoint	Description	Weight	Value	Score
Type of Inspection	94%	100%	97%	Inspections involve compliance test methods with a high degree of accuracy, such as stack testing or other types of precise emissions measurement.	3%	97%	2.91%
	87%	93%	90%	Inspections involve detailed review of process parameters and inspection of control equipment.			
	81%	86%	84%	Inspections involve review of process and inspection of control equipment.			
	70%	80%	75%	Inspections generally consist of only a records review.			
	< 70%		35%	Inspections most likely consist of visual inspection (e.g., opacity), or drive by.			
Operation and Maintenance (O&M)	94%	100%	97%	Control equipment operators follow and sign daily O&M instructions.	3%	97%	2.91%
	87%	93%	90%	Control equipment operators follow daily O&M instructions.			
	81%	86%	84%	Control equipment operators follow daily or weekly O&M instructions.			
	70%	80%	75%	O&M requirements exist, but on no specific schedule.			
	< 70%		35%	No specific O&M requirements.			

Factor	Range		Midpoint	Description	Weight	Value	Score
Unannounced Inspections	94%	100%	97%	Routinely conducted.	3%	97% x 41.67%	2.91%
	87%	93%	90%	Sometimes done.			
	81%	86%	84%	Done, but infrequently.			
	70%	80%	75%	Rarely done.			
	< 70%		35%	Never done.	3%	35% x 58.33%	0.6%
Enforcement Penalties	94%	100%	97%	Agency has the authority to impose punitive measures, including monetary fines, towards violators such as in delegated Title V Operating Permit programs.	3%	97%	2.91%
	87%	93%	90%				
	81%	86%	84%				
	70%	80%	75%				
	< 70%		35%	Agency does not have sufficient authority to impose punitive measures towards violators.			
Compliance Certifications	94%	100%	97%	Source subject to Title V semiannual compli-ance certification.	2%	97%	1.94%
	87%	93%	90%	Source subject to Title V annual compliance certification.			
	81%	86%	84%	Source not subject to any type of compliance certification.			
	70%	80%	75%	Source not subject to any type of compliance certification.			
	< 70%		35%	Source not subject to any type of compliance certification.			

Factor	Range		Midpoint	Description	Weight	Value	Score
Inspection Frequency	94%	100%	97%	Source(s) are inspected once every 2 years or more frequently.	2%	97%	1.94%
	87%	93%	90%	Source(s) are inspected once every 3 years or more frequently.			
	81%	86%	84%	Source(s) are inspected once every 5 years or more frequently.			
	70%	80%	75%	Inspection of source(s) infrequent; > every 5 years.			
	< 70%		35%	Inspections rarely, if ever, performed.			
EPA HPV Enforcement	94%	100%	97%	Agency has sufficient resources to implement EPA's 9/23/2014 HPV policy.	2%	97%	1.94%
	87%	93%	90%	Agency's resources allow it to implement EPA's 9/23/2014 HPV policy in most instances.			
	81%	86%	84%	Agency's resources allow it to implement EPA's 9/23/2014HPV policy in most instances.			
	70%	80%	75%	Agency's resources allow it to implement EPA's 9/23/2014 HPV policy more often than not.			
	< 70%		35%	Resource constraints prohibit agency from implementing EPA's 9/23/2014 HPV policy in most instances.			

Factor	Range		Midpoint	Description	Weight	Value	Score
Operator Training	94%	100%	97%	Control equipment operators complete a formal training program on use of the equipment, and such program is kept up to date and has been reviewed by the regulatory agency.	2%		
	87%	93%	90%	Control equipment operators complete formal training program, and such program is kept up to date and available for review by the regulatory agency upon request.			
	81%	86%	84%	Control equipment operators complete some amount of formal training.			
	70%	0.8	75%	Control equipment operators receive only on the job training.		75%	1.5%
	< 70%		35%	Control equipment operators receive no specific training.			
Media Publicity	94%	100%	97%	Media publicity of enforcement actions.	2%	97%	1.94%
	87%	93%	90%	Media publicity of enforcement actions.			
	81%	86%	84%	Media publicity of enforcement actions.			
	70%	80%	75%	Media publicity of enforcement actions.			
	< 70%		35%	No media publicity of enforcement actions.			

Factor	Range		Midpoint	Description	Weight	Value	Score
Regulatory Workshops	94%	100%	97%	Regulatory workshops are available annually.	2%	97%	1.94%
	87%	93%	90%	Regulatory workshops are available every 1–2 years.			
	81%	86%	84%	Regulatory workshops are available every 2–3 years.			
	70%	80%	75%	Regulatory workshop not routinely available, but implementing agency mails regulatory information packages out every 2–3 years.			
		< 70%	35%	Regulatory workshops not routinely available. Implementing agency mails regulatory information packages infrequently, if ever.			
Inspector Training	94%	100%	97%	Two weeks of comprehensive basic training, and 2 weeks of source-specific training, updated each year.	2%	97%	1.94%
	87%	93%	90%	One to two weeks of basic training and 1 week of source-specific training, updated every one to two years.			
	81%	86%	84%	One to two weeks of basic training and three to five days of source-specific training, updated every one to two years.			
	70%	80%	75%	One to two weeks of basic training and one to three days of source-specific training, updated every one to two years.			

Factor	Range		Midpoint	Description	Weight	Value	Score
	< 70%		35%	Less than 5 days of basic training and less than 3 days of source-specific training, updated every 2 years or less frequently.			
Testing Guidelines	94%	100%	97%	Specific guidelines and schedule for testing and test methods exist.	2%	97%	1.94%
	87%	93%	90%	Specific guidelines on testing and test methods exist, but no schedule for testing.			
	81%	86%	84%	Specific guidelines on testing and test methods exist, but no schedule for testing.			
	70%	80%	75%	Specific guidelines on testing and test methods, but no schedule for testing.			
	< 70%		35%	Only general guidance on testing, or no mention of testing requirements.			

Factor	Range		Midpoint	Description	Weight	Value	Score
Follow-up Inspections	94%	100%	97%	Follow-up inspections always or almost always conducted (90 % of the time or more).	2%	97%	1.94%
	87%	93%	90%	Follow-up inspections usually conducted (approximately 75% of the time).			
	81%	86%	84%	Follow-up inspections sometimes conducted (approximately 50% of the time).			
	70%	80%	75%	Follow-up inspections infrequently conducted (approximately 25% of the time).			
	< 70%		35%	Follow-up inspections rarely or never conducted (10% of the time or less)			
Overall RE							**89.48%**

Table B–3: Rule Effectiveness Matrix for Non-Title V Facilities

Factor	Range		Midpoint	Description	Weight	Value	Score
Monitoring	94%	100%	97%	Source-specific monitoring used for compliance purposes, and monitoring records filed with regulatory agency at least every 4 months.	35%		
	87%	93%	90%	Source-specific monitoring used as an indicator of compliance, and monitoring records filed with regulatory agency every 6–9 months.			
	81%	86%	84%	Source-specific monitoring used as an indicator of compliance, and monitoring records filed with regulatory agency each year.			
	70%	80%	75%	General guidance exists for source-specific enhanced monitoring, and monitoring records required but aren't submitted to regulatory agency.		75%	26.26%
	< 70%		35%	No requirements for any type of monitoring.			
Compliance History	94%	100%	97%	The facility has been in compliance for the past eight quarters.	35%	97% x 67%	22.63%
	87%	93%	90%	The facility is believed to have been in compliance for the past eight quarters, although inspection frequency is such that this can't be positively confirmed.		90% x 7%	2.28%
	81%	86%	84%	On schedule; the facility is meeting its compliance schedule.			

Factor	Range		Midpoint	Description	Weight	Value	Score
	70%	80%	75%	In Violation; facility is in violation of emissions and/or procedural requirements.		75% x 26%	6.85%
	< 70%		35%	High Priority Violator (HPV): the facility is in significant violation of one or more applicable requirement of the CAA.			
Overall Compliance Rate							**82.88%**
Type of Inspection	94%	100%	97%	Inspections involve compliance test methods with a high degree of accuracy, such as stack testing or other types of precise emissions measurement.	3%	97% x 6%	0.17%
	87%	93%	90%	Inspections involve detailed review of process parameters and inspection of control equipment.		90% x 94%	2.54%
	81%	86%	84%	Inspections involve review of process and inspection of control equipment.			
	70%	80%	75%	Inspections generally consist of only a records review.			
	< 70%		35%	Inspections most likely consist of visual inspection (e.g., opacity), or drive by.			

Factor	Range		Midpoint	Description	Weight	Value	Score
Operation and Maintenance (O&M)	94%	100%	97%	Control equipment operators follow and sign daily O&M instructions.	3%	97%	2.91%
	87%	93%	90%	Control equipment operators follow daily O&M instructions.			
	81%	86%	84%	Control equipment operators follow daily or weekly O&M instructions.			
	70%	80%	75%	O&M requirements exist, but on no specific schedule.			
	< 70%		35%	No specific O&M requirements.			
Unannounced Inspections	94%	100%	97%	Routinely conducted.	3%		
	87%	93%	90%	Sometimes done.		90%	2.70%
	81%	86%	84%	Done, but infrequently.			
	70%	80%	75%	Rarely done.			
	< 70%		35%	Never done.			
Enforcement Penalties	94%	100%	97%	Agency has the authority to impose punitive measures, including monetary fines, towards violators such as in delegated Title V Operating Permit programs.	3%	97%	2.91%
	87%	93%	90%				
	81%	86%	84%				
	70%	80%	75%				
	< 70%		35%	Agency does not have sufficient authority to impose punitive measures towards violators.			

Factor	Range		Midpoint	Description	Weight	Value	Score
Compliance Certifications	94%	100%	97%	Source subject to Title V semiannual compliance certification.	2%		
	87%	93%	90%	Source subject to Title V annual compliance certification.			
	81%	86%	84%	Source not subject to any type of compliance certification.		84%	1.68%
	70%	80%	75%	Source not subject to any type of compliance certification.			
	< 70%		35%	Source not subject to any type of compliance certification.			
Inspection Frequency	94%	100%	97%	Source(s) are inspected once every 2 years or more frequently.	2%	97%	1.94%
	87%	93%	90%	Source(s) are inspected once every 3 years or more frequently.			
	81%	86%	84%	Source(s) are inspected once every 5 years or more frequently.			
	70%	80%	75%	Inspection of source(s) infrequent; > every 5 years.			
	< 70%		35%	Inspections rarely, if ever, performed.			

Factor	Range		Midpoint	Description	Weight	Value	Score
EPA HPV Enforcement	94%	100%	97%	Agency has sufficient resources to implement EPA's 9/23/2014 HPV policy.	2%	97%	1.94%
	87%	93%	90%	Agency's resources allow it to implement EPA's 9/23/2014 HPV policy in most instances.			
	81%	86%	84%	Agency's resources allow it to implement EPA's 9/23/2014HPV policy in most instances.			
	70%	80%	75%	Agency's resources allow it to implement EPA's 9/23/2014 HPV policy more often than not.			
	< 70%		35%	Resource constraints prohibit agency from implementing EPA's 9/23/2014 HPV policy in most instances.			

Factor	Range		Midpoint	Description	Weight	Value	Score
Operator Training	94%	100%	97%	Control equipment operators complete a formal training program on use of the equipment, and such program is kept up to date and has been reviewed by the regulatory agency.	2%		
	87%	93%	90%	Control equipment operators complete formal training program, and such program is kept up to date and available for review by the regulatory agency upon request.			
	81%	86%	84%	Control equipment operators complete some amount of formal training.		84%	1.68%
	70%	0.8	75%	Control equipment operators receive only on the job training.			
	< 70%		35%	Control equipment operators receive no specific training.			
Media Publicity	94%	100%	97%	Media publicity of enforcement actions.	2%	97%	1.94%
	87%	93%	90%	Media publicity of enforcement actions.			
	81%	86%	84%	Media publicity of enforcement actions.			
	70%	80%	75%	Media publicity of enforcement actions.			
	< 70%		35%	No media publicity of enforcement actions.			
Regulatory Workshops	94%	100%	97%	Regulatory workshops are available annually.	2%	97%	1.94%
	87%	93%	90%	Regulatory workshops are available every 1–2 years.			

Factor	Range		Midpoint	Description	Weight	Value	Score
	81%	86%	84%	Regulatory workshops are available every 2–3 years.			
	70%	80%	75%	Regulatory workshop not routinely available, but implementing agency mails regulatory information packages out every 2–3 years.			
		< 70%	35%	Regulatory workshops not routinely available. Implementing agency mails regulatory information packages infrequently, if ever.			
Inspector Training	94%	100%	97%	Two weeks of comprehensive basic training, and 2 weeks of source-specific training, updated each year.	2%	97%	1.94%
	87%	93%	90%	One to two weeks of basic training and 1 week of source-specific training, updated every one to two years.			
	81%	86%	84%	One to two weeks of basic training and three to five days of source-specific training, updated every one to two years.			
	70%	80%	75%	One to two weeks of basic training and one to three days of source-specific training, updated every one to two years.			
	< 70%		35%	Less than 5 days of basic training and less than 3 days of source-specific training, updated every 2 years or less frequently.			

Factor	Range		Midpoint	Description	Weight	Value	Score
Testing Guidelines	94%	100%	97%	Specific guidelines and schedule for testing and test methods exist.	2%	97%	1.94%
	87%	93%	90%	Specific guidelines on testing and test methods exist, but no schedule for testing.			
	81%	86%	84%	Specific guidelines on testing and test methods exist, but no schedule for testing.			
	70%	80%	75%	Specific guidelines on testing and test methods, but no schedule for testing.			
	< 70%		35%	Only general guidance on testing, or no mention of testing requirements.			
Follow-up Inspections	94%	100%	97%	Follow-up inspections always or almost always conducted (90 % of the time or more).	2%	97%	1.94%
	87%	93%	90%	Follow-up inspections usually conducted (approximately 75% of the time).			
	81%	86%	84%	Follow-up inspections sometimes conducted (approximately 50% of the time).			
	70%	80%	75%	Follow-up inspections infrequently conducted (approximately 25% of the time).			
	< 70%		35%	Follow-up inspections rarely or never conducted (10% of the time or less)			
Overall RE							**86.19%**

B-3. References

EPA, 1992. Guidelines for Estimating and Applying Rule Effectiveness for Ozone/CO State Implementation Plan Base Year Inventories. EPA Rep. 452/R-92-010, November 1992.

EPA, 1994. Rule Effectiveness Guidance: Integration of Inventory, Compliance and Assessment Applications. EPA Rep. 452/R-94-001, January 1994.

EPA, 2005. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations. EPA Rep. 454/R-05-001, November 2005.

Appendix C. MOVES3 Input Data and RunSpec Summary (Maricopa County)

MOVES3 Local Input Data (Maricopa County)

[HPMSvTypeYear]

HPMSVtypeID	yearID	HPMSBaseYearVMT
10	2020	216,265,157
25	2020	36,792,345,654
40	2020	78,696,504
50	2020	2,435,463,019
60	2020	891,209,497

[SourceTypeYear]

yearID	sourceTypeID	sourceTypePopulation
2020	11	102,822
2020	21	2,585,430
2020	31	503,886
2020	32	192,968
2020	41	3,803
2020	42	924
2020	43	5,076
2020	51	688
2020	52	95,629
2020	53	4,279
2020	54	12,290
2020	61	10,995
2020	62	16,422

[CountyYear]

countyID	yearID	refuelingVaporProgramAdjust	refuelingSpillProgramAdjust
4013	2020	0.000	0.000

[FuelFormulation]

Fuel Formulation ID	Fuel Subtype ID	RVP	Sulfur Level	ETOH Volume	MTBE Volume	ETBE Volume	TAME Volume	Aromatic Content	Olefin Content	Benzene Content	e200	e300	BioDiesel Ester Volume	Cetane Index	PAH Content	T50	T90
10	10	6.9	30	0	0	0	0	26.1	5.6	1	41.09	83.09	0	0	0	218	329
20	20	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	30	0	7.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	51	7.7	11	85	0	0	0	0	0	0	999	999	0	0	0	999	999
90	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
96	10	8.7	338	0	0	0	0	26.4	11.9	1.64	50	83	0	0	0	199.816	329.409
97	10	6.6	150	0	0	0	0	24	11	0.8	52	84	0	0	0	195.735	324.864
98	12	8.8	30	10	0	0	0	25.77	8.44	0.65	47.61	84.89	0	0	0	212.282	321.719
99	12	8.8	30	10	0	0	0	25.77	8.44	0.65	47.61	84.89	0	0	0	212.282	321.719

9036	12	6.672	6.554	10.494	0	0	0	26.126	2.396	0.17	45.184	86.104	0	0	0	213.668	316.442
9037	12	8.47	5.084	10.492	0	0	0	20.174	1.284	0.142	51.832	89.156	0	0	0	191.01	304.112
9038	12	7.815	7.3	10.515	0	0	0	21.34	1.15	0.1	50.05	88.315	0	0	0	197.265	308.71
25003	21	0	6.48	0	0	0	0	0	0	0	0	0	1.81	0	0	0	0
27001	51	10.5	8	74	0	0	0	0	0	0.16	999	999	0	0	0	999	999
27002	51	7.7	8	74	0	0	0	0	0	0.16	999	999	0	0	0	999	999
28001	30	0	7.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[FuelUsageFraction]

countyID	fuelYearID	modelYearGroupID	sourceBinFuelTypeID	fuelSupplyFuelTypeID	usageFraction
4013	2020	0	1	1	1
4013	2020	0	2	2	1
4013	2020	0	3	3	1
4013	2020	0	5	1	0.982134
4013	2020	0	5	5	0.017866
4013	2020	0	9	9	1

[FuelSupply]

fuelRegionID	fuelYearID	monthGroupID	fuelFormulationID	marketShare	marketShareCV
1570011000	2020	1	90	1	0.5
1570011000	2020	2	90	1	0.5
1570011000	2020	3	90	1	0.5
1570011000	2020	4	90	1	0.5
1570011000	2020	5	90	1	0.5
1570011000	2020	6	90	1	0.5
1570011000	2020	7	90	1	0.5
1570011000	2020	8	90	1	0.5
1570011000	2020	9	90	1	0.5
1570011000	2020	10	90	1	0.5
1570011000	2020	11	90	1	0.5
1570011000	2020	12	90	1	0.5
1570011000	2020	5	9036	1	0.5
1570011000	2020	6	9036	1	0.5
1570011000	2020	7	9036	1	0.5
1570011000	2020	8	9036	1	0.5
1570011000	2020	9	9036	1	0.5
1570011000	2020	1	9037	1	0.5
1570011000	2020	2	9037	1	0.5
1570011000	2020	3	9037	1	0.5
1570011000	2020	11	9037	1	0.5
1570011000	2020	12	9037	1	0.5
1570011000	2020	4	9038	1	0.5
1570011000	2020	10	9038	1	0.5

1570011000	2020	1	25003	1	0.5
1570011000	2020	2	25003	1	0.5
1570011000	2020	3	25003	1	0.5
1570011000	2020	4	25003	1	0.5
1570011000	2020	5	25003	1	0.5
1570011000	2020	6	25003	1	0.5
1570011000	2020	7	25003	1	0.5
1570011000	2020	8	25003	1	0.5
1570011000	2020	9	25003	1	0.5
1570011000	2020	10	25003	1	0.5
1570011000	2020	11	25003	1	0.5
1570011000	2020	12	25003	1	0.5
1570011000	2020	1	27001	1	0.5
1570011000	2020	2	27001	1	0.5
1570011000	2020	3	27001	1	0.5
1570011000	2020	4	27001	1	0.5
1570011000	2020	10	27001	1	0.5
1570011000	2020	11	27001	1	0.5
1570011000	2020	12	27001	1	0.5
1570011000	2020	5	27002	1	0.5
1570011000	2020	6	27002	1	0.5
1570011000	2020	7	27002	1	0.5
1570011000	2020	8	27002	1	0.5
1570011000	2020	9	27002	1	0.5
1570011000	2020	1	28001	1	0.5
1570011000	2020	2	28001	1	0.5
1570011000	2020	3	28001	1	0.5
1570011000	2020	4	28001	1	0.5
1570011000	2020	5	28001	1	0.5
1570011000	2020	6	28001	1	0.5
1570011000	2020	7	28001	1	0.5
1570011000	2020	8	28001	1	0.5
1570011000	2020	9	28001	1	0.5
1570011000	2020	10	28001	1	0.5
1570011000	2020	11	28001	1	0.5
1570011000	2020	12	28001	1	0.5

[ZoneMonthHour]

monthID	zoneID	HourID	temperature	relHumidity
1	40130	1	51.4	58.4

monthID	zoneID	HourID	temperature	relHumidity
1	40130	2	50.5	59.7

monthID	zoneID	HourID	temperature	relHumidity
1	40130	3	49.8	61.0
1	40130	4	49.1	62.2
1	40130	5	48.1	64.4
1	40130	6	47.3	65.8
1	40130	7	47.0	65.7
1	40130	8	47.0	65.6
1	40130	9	50.4	57.4
1	40130	10	54.5	48.2
1	40130	11	58.2	41.8
1	40130	12	61.3	36.7
1	40130	13	63.9	33.1
1	40130	14	65.5	31.0
1	40130	15	66.4	29.5
1	40130	16	67.1	28.3
1	40130	17	66.7	28.6
1	40130	18	64.5	32.1
1	40130	19	61.7	37.3
1	40130	20	59.4	41.8
1	40130	21	57.9	44.9
1	40130	22	55.9	48.5
1	40130	23	54.0	53.2
1	40130	24	52.9	54.4
2	40130	1	54.0	48.7
2	40130	2	53.3	48.7
2	40130	3	51.6	52.1
2	40130	4	50.8	54.4
2	40130	5	50.1	55.0
2	40130	6	49.4	55.8
2	40130	7	48.4	58.4
2	40130	8	49.3	56.2
2	40130	9	53.3	47.8
2	40130	10	57.1	41.1
2	40130	11	60.5	35.8
2	40130	12	63.2	31.2
2	40130	13	65.8	28.2
2	40130	14	67.5	25.9
2	40130	15	68.8	24.2
2	40130	16	69.5	22.4
2	40130	17	69.2	22.8
2	40130	18	67.9	23.8
2	40130	19	65.8	27.1
2	40130	20	63.3	30.6
2	40130	21	60.8	36.0
2	40130	22	59.2	38.8
2	40130	23	57.4	43.0
2	40130	24	55.6	47.1

monthID	zoneID	HourID	temperature	relHumidity
3	40130	1	60.4	52.7
3	40130	2	59.2	54.9
3	40130	3	58.1	57.4
3	40130	4	57.4	60.0
3	40130	5	56.5	62.4
3	40130	6	55.7	63.8
3	40130	7	55.5	64.0
3	40130	8	57.1	61.0
3	40130	9	60.0	54.6
3	40130	10	63.5	47.8
3	40130	11	66.5	42.3
3	40130	12	68.9	37.3
3	40130	13	70.7	34.8
3	40130	14	71.9	32.9
3	40130	15	72.5	32.5
3	40130	16	72.6	31.5
3	40130	17	72.3	31.2
3	40130	18	71.1	33.5
3	40130	19	69.5	36.1
3	40130	20	67.7	38.5
3	40130	21	65.8	43.1
3	40130	22	64.0	47.3
3	40130	23	62.9	49.1
3	40130	24	62.0	51.0
4	40130	1	69.3	30.9
4	40130	2	67.7	33.4
4	40130	3	65.8	36.5
4	40130	4	64.6	37.6
4	40130	5	63.4	39.2
4	40130	6	62.0	42.5
4	40130	7	63.2	41.3
4	40130	8	66.5	35.6
4	40130	9	70.7	29.9
4	40130	10	74.7	25.4
4	40130	11	77.9	22.7
4	40130	12	80.4	19.9
4	40130	13	82.3	18.4
4	40130	14	84.2	16.8
4	40130	15	85.1	16.6
4	40130	16	85.6	16.0
4	40130	17	85.3	16.2
4	40130	18	84.4	16.5
4	40130	19	82.5	17.5
4	40130	20	80.5	19.1
4	40130	21	76.9	23.3
4	40130	22	75.0	25.1

monthID	zoneID	HourID	temperature	relHumidity
4	40130	23	73.8	26.2
4	40130	24	71.2	30.0
5	40130	1	82.2	18.4
5	40130	2	80.6	19.8
5	40130	3	78.2	22.0
5	40130	4	76.7	23.5
5	40130	5	75.0	25.9
5	40130	6	74.1	26.9
5	40130	7	75.8	25.7
5	40130	8	79.4	22.9
5	40130	9	83.3	19.5
5	40130	10	87.0	16.6
5	40130	11	89.8	14.7
5	40130	12	92.5	13.0
5	40130	13	94.6	11.8
5	40130	14	96.4	10.7
5	40130	15	97.7	10.1
5	40130	16	97.9	10.0
5	40130	17	97.7	10.1
5	40130	18	97.1	10.1
5	40130	19	95.6	10.0
5	40130	20	93.0	11.2
5	40130	21	89.8	13.3
5	40130	22	87.8	14.6
5	40130	23	86.4	15.3
5	40130	24	84.4	17.1
6	40130	1	88.5	14.8
6	40130	2	86.0	16.6
6	40130	3	84.2	17.9
6	40130	4	82.6	19.1
6	40130	5	81.0	21.1
6	40130	6	80.0	22.4
6	40130	7	81.8	21.2
6	40130	8	85.0	19.0
6	40130	9	88.6	16.8
6	40130	10	92.0	14.8
6	40130	11	94.9	13.0
6	40130	12	97.6	11.1
6	40130	13	99.8	10.1
6	40130	14	101.7	9.3
6	40130	15	102.7	9.0
6	40130	16	103.2	8.5
6	40130	17	103.2	8.3
6	40130	18	102.2	8.3
6	40130	19	101.2	8.4
6	40130	20	99.0	9.6

monthID	zoneID	HourID	temperature	relHumidity
6	40130	21	95.8	10.7
6	40130	22	92.7	12.3
6	40130	23	91.1	12.9
6	40130	24	89.8	13.4
7	40130	1	95.4	22.6
7	40130	2	94.1	23.9
7	40130	3	92.2	25.9
7	40130	4	91.2	26.7
7	40130	5	90.2	27.9
7	40130	6	89.2	29.5
7	40130	7	90.2	29.7
7	40130	8	92.3	27.5
7	40130	9	95.3	24.3
7	40130	10	98.0	21.8
7	40130	11	100.5	20.1
7	40130	12	102.9	18.0
7	40130	13	104.5	16.6
7	40130	14	106.5	15.5
7	40130	15	107.3	14.9
7	40130	16	108.2	14.3
7	40130	17	107.9	14.1
7	40130	18	107.5	14.0
7	40130	19	106.1	14.9
7	40130	20	104.2	15.9
7	40130	21	102.4	17.2
7	40130	22	99.9	19.9
7	40130	23	98.5	20.5
7	40130	24	97.0	21.8
8	40130	1	94.9	27.6
8	40130	2	93.4	28.8
8	40130	3	92.4	30.1
8	40130	4	91.1	31.6
8	40130	5	90.5	32.6
8	40130	6	89.3	34.4
8	40130	7	90.0	34.1
8	40130	8	92.5	31.0
8	40130	9	95.2	27.9
8	40130	10	98.2	25.0
8	40130	11	101.3	22.4
8	40130	12	103.5	20.4
8	40130	13	105.8	18.5
8	40130	14	107.3	17.3
8	40130	15	108.4	16.4
8	40130	16	109.0	15.7
8	40130	17	108.7	15.8
8	40130	18	108.2	15.4

monthID	zoneID	HourID	temperature	relHumidity
8	40130	19	106.4	16.4
8	40130	20	103.1	19.6
8	40130	21	100.2	23.4
8	40130	22	98.5	24.1
8	40130	23	97.4	24.9
8	40130	24	96.0	26.9
9	40130	1	86.4	25.3
9	40130	2	85.1	25.7
9	40130	3	83.7	27.4
9	40130	4	82.3	29.0
9	40130	5	81.1	30.2
9	40130	6	80.4	31.5
9	40130	7	80.3	31.3
9	40130	8	83.5	28.1
9	40130	9	87.7	24.7
9	40130	10	91.5	22.2
9	40130	11	94.6	20.2
9	40130	12	97.2	17.8
9	40130	13	99.4	16.0
9	40130	14	101.0	15.0
9	40130	15	102.2	14.0
9	40130	16	102.6	13.4
9	40130	17	102.2	13.2
9	40130	18	101.0	12.5
9	40130	19	99.2	13.1
9	40130	20	96.5	14.9
9	40130	21	93.5	17.3
9	40130	22	91.3	19.5
9	40130	23	90.1	20.9
9	40130	24	87.7	23.3
10	40130	1	73.8	26.1
10	40130	2	72.5	27.3
10	40130	3	70.8	28.7
10	40130	4	69.8	29.7
10	40130	5	69.1	29.1
10	40130	6	68.5	29.1
10	40130	7	68.0	29.0
10	40130	8	71.6	25.4
10	40130	9	76.1	22.1
10	40130	10	80.7	19.3
10	40130	11	84.2	17.2
10	40130	12	87.6	15.5
10	40130	13	90.3	13.9
10	40130	14	91.9	12.6
10	40130	15	93.1	11.7
10	40130	16	93.4	11.3

monthID	zoneID	HourID	temperature	relHumidity
10	40130	17	92.7	11.5
10	40130	18	90.9	12.5
10	40130	19	87.5	14.8
10	40130	20	84.0	17.4
10	40130	21	81.9	19.3
10	40130	22	79.7	21.3
10	40130	23	76.8	24.3
10	40130	24	75.4	25.2
11	40130	1	62.2	32.4
11	40130	2	60.8	34.7
11	40130	3	59.1	36.7
11	40130	4	58.8	37.2
11	40130	5	58.3	37.7
11	40130	6	57.5	38.6
11	40130	7	57.4	39.1
11	40130	8	58.5	38.0
11	40130	9	62.9	32.1
11	40130	10	67.0	27.5
11	40130	11	70.9	24.5
11	40130	12	73.8	21.7
11	40130	13	76.0	19.7
11	40130	14	77.7	18.1
11	40130	15	78.8	16.9
11	40130	16	79.0	16.1
11	40130	17	77.9	16.6
11	40130	18	75.2	18.3
11	40130	19	72.1	21.2
11	40130	20	69.3	23.7
11	40130	21	67.7	25.1
11	40130	22	65.9	27.4
11	40130	23	64.0	30.4
11	40130	24	62.7	31.5
12	40130	1	50.3	41.1
12	40130	2	49.4	42.1
12	40130	3	48.3	44.2
12	40130	4	47.8	44.2
12	40130	5	47.4	44.1
12	40130	6	46.5	45.8
12	40130	7	45.9	46.6
12	40130	8	46.0	45.8
12	40130	9	50.2	39.3
12	40130	10	54.5	32.5
12	40130	11	58.6	27.7
12	40130	12	61.6	25.1
12	40130	13	63.6	22.6
12	40130	14	65.5	20.5

monthID	zoneID	HourID	temperature	relHumidity
12	40130	15	66.2	19.6
12	40130	16	66.6	19.3
12	40130	17	65.8	19.8
12	40130	18	63.3	22.8
12	40130	19	60.6	26.4
12	40130	20	58.1	30.1

monthID	zoneID	HourID	temperature	relHumidity
12	40130	21	56.7	31.5
12	40130	22	54.3	35.1
12	40130	23	52.8	37.7
12	40130	24	51.4	40.4

[SourceTypeAgeDistribution]

sourceTypeID	yearID	ageID	ageFraction
11	2020	0	0.07045
11	2020	1	0.026235
11	2020	2	0.046958
11	2020	3	0.045837
11	2020	4	0.049317
11	2020	5	0.056476
11	2020	6	0.052201
11	2020	7	0.045937
11	2020	8	0.039971
11	2020	9	0.026945
11	2020	10	0.021377
11	2020	11	0.044942
11	2020	12	0.045539
11	2020	13	0.060254
11	2020	14	0.059061
11	2020	15	0.051405
11	2020	16	0.036988
11	2020	17	0.043351
11	2020	18	0.033806
11	2020	19	0.028238
11	2020	20	0.024062
11	2020	21	0.020483
11	2020	22	0.014318
11	2020	23	0.011335
11	2020	24	0.010341
11	2020	25	0.008551
11	2020	26	0.006761
11	2020	27	0.006761
11	2020	28	0.004773
11	2020	29	0.003579
11	2020	30	0.003747
21	2020	0	0.07045
21	2020	1	0.033598
21	2020	2	0.065511
21	2020	3	0.072045
21	2020	4	0.070325

sourceTypeID	yearID	ageID	ageFraction
21	2020	5	0.074548
21	2020	6	0.064264
21	2020	7	0.06223
21	2020	8	0.050753
21	2020	9	0.040915
21	2020	10	0.035207
21	2020	11	0.028128
21	2020	12	0.041289
21	2020	13	0.04548
21	2020	14	0.039176
21	2020	15	0.034539
21	2020	16	0.028901
21	2020	17	0.024466
21	2020	18	0.020313
21	2020	19	0.016791
21	2020	20	0.014533
21	2020	21	0.01117
21	2020	22	0.00809
21	2020	23	0.006507
21	2020	24	0.004479
21	2020	25	0.003861
21	2020	26	0.002771
21	2020	27	0.002155
21	2020	28	0.001691
21	2020	29	0.001612
21	2020	30	0.0242
31	2020	0	0.07602
31	2020	1	0.07399
31	2020	2	0.094738
31	2020	3	0.057009
31	2020	4	0.051453
31	2020	5	0.044436
31	2020	6	0.043293
31	2020	7	0.035688
31	2020	8	0.029687
31	2020	9	0.027699

sourceTypeID	yearID	ageID	ageFraction
31	2020	10	0.018854
31	2020	11	0.014894
31	2020	12	0.033962
31	2020	13	0.043487
31	2020	14	0.04551
31	2020	15	0.037568
31	2020	16	0.039044
31	2020	17	0.031527
31	2020	18	0.028291
31	2020	19	0.029807
31	2020	20	0.024255
31	2020	21	0.018251
31	2020	22	0.013518
31	2020	23	0.013556
31	2020	24	0.00923
31	2020	25	0.008765
31	2020	26	0.00724
31	2020	27	0.004757
31	2020	28	0.003264
31	2020	29	0.002792
31	2020	30	0.037415
32	2020	0	0.075933
32	2020	1	0.078577
32	2020	2	0.09529
32	2020	3	0.060917
32	2020	4	0.053073
32	2020	5	0.045497
32	2020	6	0.044233
32	2020	7	0.036619
32	2020	8	0.031311
32	2020	9	0.027917
32	2020	10	0.018681
32	2020	11	0.015179
32	2020	12	0.033933
32	2020	13	0.044352
32	2020	14	0.045083

SourceTypeID	YearID	AgeID	AgeFraction
32	2020	15	0.036868
32	2020	16	0.036904
32	2020	17	0.029673
32	2020	18	0.026464
32	2020	19	0.028065
32	2020	20	0.023138
32	2020	21	0.017456
32	2020	22	0.012822
32	2020	23	0.012779
32	2020	24	0.008777
32	2020	25	0.008343
32	2020	26	0.006836
32	2020	27	0.004522
32	2020	28	0.003095
32	2020	29	0.002667
32	2020	30	0.034995
41	2020	0	0.057645
41	2020	1	0.077134
41	2020	2	0.070351
41	2020	3	0.077327
41	2020	4	0.075777
41	2020	5	0.06549
41	2020	6	0.04743
41	2020	7	0.040082
41	2020	8	0.036554
41	2020	9	0.021307
41	2020	10	0.011364
41	2020	11	0.015974
41	2020	12	0.027625
41	2020	13	0.063955
41	2020	14	0.060319
41	2020	15	0.042606
41	2020	16	0.029691
41	2020	17	0.021551
41	2020	18	0.016242
41	2020	19	0.022298
41	2020	20	0.026944
41	2020	21	0.022301
41	2020	22	0.013017
41	2020	23	0.011377
41	2020	24	0.010203
41	2020	25	0.009661
41	2020	26	0.00609
41	2020	27	0.004299
41	2020	28	0.002955
41	2020	29	0.002132
41	2020	30	0.0103
42	2020	0	0.102814
42	2020	1	0.081169
42	2020	2	0.189394
42	2020	3	0.13961
42	2020	4	0.041126
42	2020	5	0.093074
42	2020	6	0.017316
42	2020	7	0.172078
42	2020	8	0.038961
42	2020	9	0.042208
42	2020	10	0.00974
42	2020	11	0.030303
42	2020	12	0.011905
42	2020	13	0.030303
42	2020	14	0
42	2020	15	0
42	2020	16	0
42	2020	17	0
42	2020	18	0
42	2020	19	0
42	2020	20	0
42	2020	21	0
42	2020	22	0
42	2020	23	0
42	2020	24	0
42	2020	25	0
42	2020	26	0
42	2020	27	0
42	2020	28	0
42	2020	29	0
42	2020	30	0
43	2020	0	0.057608
43	2020	1	0.119315
43	2020	2	0.094798
43	2020	3	0.101336
43	2020	4	0.069897
43	2020	5	0.056677
43	2020	6	0.054066
43	2020	7	0.046681
43	2020	8	0.04914
43	2020	9	0.031006
43	2020	10	0.017758
43	2020	11	0.019019
43	2020	12	0.035614
43	2020	13	0.056703
43	2020	14	0.043938
43	2020	15	0.033023
43	2020	16	0.016886
43	2020	17	0.012297
43	2020	18	0.009013
43	2020	19	0.011745
43	2020	20	0.013276
43	2020	21	0.010657
43	2020	22	0.006593
43	2020	23	0.005554
43	2020	24	0.004748
43	2020	25	0.004415
43	2020	26	0.002988
43	2020	27	0.002155
43	2020	28	0.001485
43	2020	29	0.00147
43	2020	30	0.010139
51	2020	0	0.064702
51	2020	1	0.119166
51	2020	2	0.09468
51	2020	3	0.101209
51	2020	4	0.069809
51	2020	5	0.056455
51	2020	6	0.053709
51	2020	7	0.046372
51	2020	8	0.048681
51	2020	9	0.030716
51	2020	10	0.017592
51	2020	11	0.018788
51	2020	12	0.035182
51	2020	13	0.055855
51	2020	14	0.04328
51	2020	15	0.032529
51	2020	16	0.016585
51	2020	17	0.012078
51	2020	18	0.008826
51	2020	19	0.011501
51	2020	20	0.012961
51	2020	21	0.010404
51	2020	22	0.006437
51	2020	23	0.005406
51	2020	24	0.004621
51	2020	25	0.004359

Source TypeID	YearID	AgeID	AgeFraction
51	2020	26	0.002931
51	2020	27	0.002155
51	2020	28	0.001465
51	2020	29	0.001449
51	2020	30	0.010097
52	2020	0	0.064678
52	2020	1	0.108138
52	2020	2	0.096002
52	2020	3	0.088311
52	2020	4	0.064501
52	2020	5	0.052852
52	2020	6	0.050573
52	2020	7	0.043311
52	2020	8	0.043152
52	2020	9	0.02981
52	2020	10	0.017875
52	2020	11	0.017639
52	2020	12	0.034826
52	2020	13	0.052239
52	2020	14	0.043836
52	2020	15	0.034142
52	2020	16	0.023074
52	2020	17	0.017731
52	2020	18	0.01443
52	2020	19	0.016887
52	2020	20	0.016313
52	2020	21	0.012759
52	2020	22	0.008552
52	2020	23	0.007802
52	2020	24	0.006008
52	2020	25	0.005751
52	2020	26	0.004249
52	2020	27	0.003011
52	2020	28	0.002036
52	2020	29	0.001891
52	2020	30	0.017619
53	2020	0	0.065396
53	2020	1	0.120328
53	2020	2	0.0964
53	2020	3	0.100121
53	2020	4	0.069406
53	2020	5	0.056113
53	2020	6	0.053437
53	2020	7	0.046139
53	2020	8	0.04816

Source TypeID	YearID	AgeID	AgeFraction
53	2020	9	0.030556
53	2020	10	0.017462
53	2020	11	0.0186
53	2020	12	0.034925
53	2020	13	0.055221
53	2020	14	0.042863
53	2020	15	0.032226
53	2020	16	0.016581
53	2020	17	0.012065
53	2020	18	0.008842
53	2020	19	0.01152
53	2020	20	0.012922
53	2020	21	0.010352
53	2020	22	0.006415
53	2020	23	0.005413
53	2020	24	0.004616
53	2020	25	0.004653
53	2020	26	0.003137
53	2020	27	0.002485
53	2020	28	0.001608
53	2020	29	0.001611
53	2020	30	0.010429
54	2020	0	0.0646
54	2020	1	0.119293
54	2020	2	0.094781
54	2020	3	0.101318
54	2020	4	0.069884
54	2020	5	0.056516
54	2020	6	0.053766
54	2020	7	0.046422
54	2020	8	0.048733
54	2020	9	0.030749
54	2020	10	0.017611
54	2020	11	0.018808
54	2020	12	0.035219
54	2020	13	0.055914
54	2020	14	0.043327
54	2020	15	0.032563
54	2020	16	0.016603
54	2020	17	0.012091
54	2020	18	0.008836
54	2020	19	0.011513
54	2020	20	0.012975
54	2020	21	0.010415
54	2020	22	0.006443

Source TypeID	YearID	AgeID	AgeFraction
54	2020	23	0.005412
54	2020	24	0.004626
54	2020	25	0.004142
54	2020	26	0.002788
54	2020	27	0.001926
54	2020	28	0.001367
54	2020	29	0.001352
54	2020	30	0.010006
61	2020	0	0.052247
61	2020	1	0.119504
61	2020	2	0.094949
61	2020	3	0.101497
61	2020	4	0.070008
61	2020	5	0.056875
61	2020	6	0.054361
61	2020	7	0.046935
61	2020	8	0.049505
61	2020	9	0.031236
61	2020	10	0.01789
61	2020	11	0.019198
61	2020	12	0.035949
61	2020	13	0.057353
61	2020	14	0.044442
61	2020	15	0.033401
61	2020	16	0.017115
61	2020	17	0.012464
61	2020	18	0.009154
61	2020	19	0.011928
61	2020	20	0.013512
61	2020	21	0.010847
61	2020	22	0.00671
61	2020	23	0.005665
61	2020	24	0.004843
61	2020	25	0.004542
61	2020	26	0.003
61	2020	27	0.002238
61	2020	28	0.001502
61	2020	29	0.001517
61	2020	30	0.009613
62	2020	0	0.051211
62	2020	1	0.119583
62	2020	2	0.095011
62	2020	3	0.101564
62	2020	4	0.070054
62	2020	5	0.056913

Source TypeID	YearID	AgeID	AgeFraction
62	2020	6	0.054397
62	2020	7	0.046966
62	2020	8	0.049537
62	2020	9	0.031257
62	2020	10	0.017902
62	2020	11	0.019211
62	2020	12	0.035973
62	2020	13	0.057391
62	2020	14	0.044471

Source TypeID	YearID	AgeID	AgeFraction
62	2020	15	0.033423
62	2020	16	0.017126
62	2020	17	0.012472
62	2020	18	0.00916
62	2020	19	0.011936
62	2020	20	0.013521
62	2020	21	0.010854
62	2020	22	0.006715
62	2020	23	0.005669

Source TypeID	YearID	AgeID	AgeFraction
62	2020	24	0.004846
62	2020	25	0.004561
62	2020	26	0.003055
62	2020	27	0.002259
62	2020	28	0.001528
62	2020	29	0.001527
62	2020	30	0.009906

[IMCoverage]

polProcess ID	State ID	County ID	yearID	sourceTypeID	fuelTypeID	IMProgramID	Beg ModelYearID	End ModelYearID	inspectFreq	Test StandardsID	useIMyn	Compliance Factor
101	4	4013	2020	21	1	103	1967	1980	1	13	N	57.6164
101	4	4013	2020	21	1	106	1981	1995	2	31	N	64.12
101	4	4013	2020	21	1	110	1996	2016	2	51	N	90.0428
101	4	4013	2020	21	5	303	1967	1980	1	13	N	57.6164
101	4	4013	2020	21	5	306	1981	1995	2	31	N	64.12
101	4	4013	2020	21	5	310	1996	2016	2	51	N	90.0428
101	4	4013	2020	31	1	103	1967	1980	1	13	N	57.6164
101	4	4013	2020	31	1	106	1981	1995	2	31	N	64.12
101	4	4013	2020	31	1	110	1996	2016	2	51	N	90.0428
101	4	4013	2020	31	5	303	1967	1980	1	13	N	57.6164
101	4	4013	2020	31	5	306	1981	1995	2	31	N	64.12
101	4	4013	2020	31	5	310	1996	2016	2	51	N	90.0428
101	4	4013	2020	32	1	103	1967	1980	1	13	N	57.6164
101	4	4013	2020	32	1	106	1981	1995	2	31	N	64.12
101	4	4013	2020	32	1	110	1996	2016	2	51	N	90.0428
101	4	4013	2020	32	5	303	1967	1980	1	13	N	57.6164
101	4	4013	2020	32	5	306	1981	1995	2	31	N	64.12
101	4	4013	2020	32	5	310	1996	2016	2	51	N	90.0428
101	4	4013	2020	52	1	103	1967	2016	1	13	N	87.2032
102	4	4013	2020	21	1	103	1967	1980	1	13	N	57.6164
102	4	4013	2020	21	1	106	1981	1995	2	31	N	64.12
102	4	4013	2020	21	1	110	1996	2016	2	51	N	90.0428
102	4	4013	2020	21	5	303	1967	1980	1	13	N	57.6164
102	4	4013	2020	21	5	306	1981	1995	2	31	N	64.12
102	4	4013	2020	21	5	310	1996	2016	2	51	N	90.0428
102	4	4013	2020	31	1	103	1967	1980	1	13	N	57.6164
102	4	4013	2020	31	1	106	1981	1995	2	31	N	64.12
102	4	4013	2020	31	1	110	1996	2016	2	51	N	90.0428
102	4	4013	2020	31	5	303	1967	1980	1	13	N	57.6164
102	4	4013	2020	31	5	306	1981	1995	2	31	N	64.12
102	4	4013	2020	31	5	310	1996	2016	2	51	N	90.0428
102	4	4013	2020	32	1	103	1967	1980	1	13	N	57.6164
102	4	4013	2020	32	1	106	1981	1995	2	31	N	64.12
102	4	4013	2020	32	1	110	1996	2016	2	51	N	90.0428
102	4	4013	2020	32	5	303	1967	1980	1	13	N	57.6164
102	4	4013	2020	32	5	306	1981	1995	2	31	N	64.12
102	4	4013	2020	32	5	310	1996	2016	2	51	N	90.0428
102	4	4013	2020	52	1	103	1967	2016	1	13	N	87.2032
112	4	4013	2020	21	1	108	1996	2016	2	43	N	83.814
112	4	4013	2020	21	1	109	1981	1995	2	44	N	64.12
112	4	4013	2020	21	5	308	1996	2016	2	43	N	83.814
112	4	4013	2020	21	5	309	1981	1995	2	44	N	64.12
112	4	4013	2020	31	1	108	1996	2016	2	43	N	83.814
112	4	4013	2020	31	1	109	1981	1995	2	44	N	64.12
112	4	4013	2020	31	5	308	1996	2016	2	43	N	83.814
112	4	4013	2020	31	5	309	1981	1995	2	44	N	64.12
112	4	4013	2020	32	1	108	1996	2016	2	43	N	83.814
112	4	4013	2020	32	1	109	1981	1995	2	44	N	64.12
112	4	4013	2020	32	5	308	1996	2016	2	43	N	83.814
112	4	4013	2020	32	5	309	1981	1995	2	44	N	64.12
112	4	4013	2020	52	1	107	1981	2016	1	41	N	86.2872
201	4	4013	2020	21	1	103	1967	1980	1	13	N	57.6164
201	4	4013	2020	21	1	106	1981	1995	2	31	N	64.12
201	4	4013	2020	21	1	110	1996	2016	2	51	N	90.0428
201	4	4013	2020	21	5	303	1967	1980	1	13	N	57.6164
201	4	4013	2020	21	5	306	1981	1995	2	31	N	64.12
201	4	4013	2020	21	5	310	1996	2016	2	51	N	90.0428
201	4	4013	2020	31	1	103	1967	1980	1	13	N	57.6164
201	4	4013	2020	31	1	106	1981	1995	2	31	N	64.12
201	4	4013	2020	31	1	110	1996	2016	2	51	N	90.0428
201	4	4013	2020	31	5	303	1967	1980	1	13	N	57.6164

polProcess ID	State ID	County ID	yearID	sourceTypeID	fuelTypeID	IMProgramID	Beg ModelYearID	End ModelYearID	inspectFreq	Test StandardsID	useIMyn	Compliance Factor
201	4	4013	2020	31	5	306	1981	1995	2	31	N	64.12
201	4	4013	2020	31	5	310	1996	2016	2	51	N	90.0428
201	4	4013	2020	32	1	103	1967	1980	1	13	N	57.6164
201	4	4013	2020	32	1	106	1981	1995	2	31	N	64.12
201	4	4013	2020	32	1	110	1996	2016	2	51	N	90.0428
201	4	4013	2020	32	5	303	1967	1980	1	13	N	57.6164
201	4	4013	2020	32	5	306	1981	1995	2	31	N	64.12
201	4	4013	2020	32	5	310	1996	2016	2	51	N	90.0428
201	4	4013	2020	52	1	103	1967	2016	1	13	N	87.2032
202	4	4013	2020	21	1	103	1967	1980	1	13	N	57.6164
202	4	4013	2020	21	1	106	1981	1995	2	31	N	64.12
202	4	4013	2020	21	1	110	1996	2016	2	51	N	90.0428
202	4	4013	2020	21	5	303	1967	1980	1	13	N	57.6164
202	4	4013	2020	21	5	306	1981	1995	2	31	N	64.12
202	4	4013	2020	21	5	310	1996	2016	2	51	N	90.0428
202	4	4013	2020	31	1	103	1967	1980	1	13	N	57.6164
202	4	4013	2020	31	1	106	1981	1995	2	31	N	64.12
202	4	4013	2020	31	1	110	1996	2016	2	51	N	90.0428
202	4	4013	2020	31	5	303	1967	1980	1	13	N	57.6164
202	4	4013	2020	31	5	306	1981	1995	2	31	N	64.12
202	4	4013	2020	31	5	310	1996	2016	2	51	N	90.0428
202	4	4013	2020	32	1	103	1967	1980	1	13	N	57.6164
202	4	4013	2020	32	1	106	1981	1995	2	31	N	64.12
202	4	4013	2020	32	1	110	1996	2016	2	51	N	90.0428
202	4	4013	2020	32	5	303	1967	1980	1	13	N	57.6164
202	4	4013	2020	32	5	306	1981	1995	2	31	N	64.12
202	4	4013	2020	32	5	310	1996	2016	2	51	N	90.0428
202	4	4013	2020	52	1	103	1967	2016	1	13	N	87.2032
301	4	4013	2020	21	1	103	1967	1980	1	13	N	57.6164
301	4	4013	2020	21	1	106	1981	1995	2	31	N	64.12
301	4	4013	2020	21	1	110	1996	2016	2	51	N	90.0428
301	4	4013	2020	21	5	303	1967	1980	1	13	N	57.6164
301	4	4013	2020	21	5	306	1981	1995	2	31	N	64.12
301	4	4013	2020	21	5	310	1996	2016	2	51	N	90.0428
301	4	4013	2020	31	1	103	1967	1980	1	13	N	57.6164
301	4	4013	2020	31	1	106	1981	1995	2	31	N	64.12
301	4	4013	2020	31	1	110	1996	2016	2	51	N	90.0428
301	4	4013	2020	31	5	303	1967	1980	1	13	N	57.6164
301	4	4013	2020	31	5	306	1981	1995	2	31	N	64.12
301	4	4013	2020	31	5	310	1996	2016	2	51	N	90.0428
301	4	4013	2020	32	1	103	1967	1980	1	13	N	57.6164
301	4	4013	2020	32	1	106	1981	1995	2	31	N	64.12
301	4	4013	2020	32	1	110	1996	2016	2	51	N	90.0428
301	4	4013	2020	32	5	303	1967	1980	1	13	N	57.6164
301	4	4013	2020	32	5	306	1981	1995	2	31	N	64.12
301	4	4013	2020	32	5	310	1996	2016	2	51	N	90.0428
301	4	4013	2020	52	1	103	1967	2016	1	13	N	87.2032
302	4	4013	2020	21	1	103	1967	1980	1	13	N	57.6164
302	4	4013	2020	21	1	106	1981	1995	2	31	N	64.12
302	4	4013	2020	21	1	110	1996	2016	2	51	N	90.0428
302	4	4013	2020	21	5	303	1967	1980	1	13	N	57.6164
302	4	4013	2020	21	5	306	1981	1995	2	31	N	64.12
302	4	4013	2020	21	5	310	1996	2016	2	51	N	90.0428
302	4	4013	2020	31	1	103	1967	1980	1	13	N	57.6164
302	4	4013	2020	31	1	106	1981	1995	2	31	N	64.12
302	4	4013	2020	31	1	110	1996	2016	2	51	N	90.0428
302	4	4013	2020	31	5	303	1967	1980	1	13	N	57.6164
302	4	4013	2020	31	5	306	1981	1995	2	31	N	64.12
302	4	4013	2020	31	5	310	1996	2016	2	51	N	90.0428
302	4	4013	2020	32	1	103	1967	1980	1	13	N	57.6164
302	4	4013	2020	32	1	106	1981	1995	2	31	N	64.12
302	4	4013	2020	32	1	110	1996	2016	2	51	N	90.0428
302	4	4013	2020	32	5	303	1967	1980	1	13	N	57.6164
302	4	4013	2020	32	5	306	1981	1995	2	31	N	64.12
302	4	4013	2020	32	5	310	1996	2016	2	51	N	90.0428
302	4	4013	2020	52	1	103	1967	2016	1	13	N	87.2032
101	4	4013	2020	21	1	3	1967	1980	1	13	Y	76
102	4	4013	2020	21	1	3	1967	1980	1	13	Y	76
201	4	4013	2020	21	1	3	1967	1980	1	13	Y	76
202	4	4013	2020	21	1	3	1967	1980	1	13	Y	76
301	4	4013	2020	21	1	3	1967	1980	1	13	Y	76
302	4	4013	2020	21	1	3	1967	1980	1	13	Y	76
101	4	4013	2020	21	5	503	1967	1980	1	13	Y	76
102	4	4013	2020	21	5	503	1967	1980	1	13	Y	76
201	4	4013	2020	21	5	503	1967	1980	1	13	Y	76
202	4	4013	2020	21	5	503	1967	1980	1	13	Y	76
301	4	4013	2020	21	5	503	1967	1980	1	13	Y	76
302	4	4013	2020	21	5	503	1967	1980	1	13	Y	76
101	4	4013	2020	31	1	3	1967	1980	1	13	Y	80
102	4	4013	2020	31	1	3	1967	1980	1	13	Y	80
201	4	4013	2020	31	1	3	1967	1980	1	13	Y	80
202	4	4013	2020	31	1	3	1967	1980	1	13	Y	80
301	4	4013	2020	31	1	3	1967	1980	1	13	Y	80
302	4	4013	2020	31	1	3	1967	1980	1	13	Y	80

polProcess ID	State ID	County ID	yearID	sourceTypeID	fuelTypeID	IMProgramID	Beg ModelYearID	End ModelYearID	inspectFreq	Test StandardsID	useIMyn	Compliance Factor
101	4	4013	2020	31	5	503	1967	1980	1	13	Y	80
102	4	4013	2020	31	5	503	1967	1980	1	13	Y	80
201	4	4013	2020	31	5	503	1967	1980	1	13	Y	80
202	4	4013	2020	31	5	503	1967	1980	1	13	Y	80
301	4	4013	2020	31	5	503	1967	1980	1	13	Y	80
302	4	4013	2020	31	5	503	1967	1980	1	13	Y	80
101	4	4013	2020	32	1	3	1967	1980	1	13	Y	79
102	4	4013	2020	32	1	3	1967	1980	1	13	Y	79
201	4	4013	2020	32	1	3	1967	1980	1	13	Y	79
202	4	4013	2020	32	1	3	1967	1980	1	13	Y	79
301	4	4013	2020	32	1	3	1967	1980	1	13	Y	79
302	4	4013	2020	32	1	3	1967	1980	1	13	Y	79
101	4	4013	2020	32	5	503	1967	1980	1	13	Y	79
102	4	4013	2020	32	5	503	1967	1980	1	13	Y	79
201	4	4013	2020	32	5	503	1967	1980	1	13	Y	79
202	4	4013	2020	32	5	503	1967	1980	1	13	Y	79
301	4	4013	2020	32	5	503	1967	1980	1	13	Y	79
302	4	4013	2020	32	5	503	1967	1980	1	13	Y	79
101	4	4013	2020	41	1	4	1967	2015	1	13	Y	89
102	4	4013	2020	41	1	4	1967	2015	1	13	Y	89
201	4	4013	2020	41	1	4	1967	2015	1	13	Y	89
202	4	4013	2020	41	1	4	1967	2015	1	13	Y	89
301	4	4013	2020	41	1	4	1967	2015	1	13	Y	89
302	4	4013	2020	41	1	4	1967	2015	1	13	Y	89
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102	4	4013	2020	41	5	504	1967	2015	1	13	Y	89
201	4	4013	2020	41	5	504	1967	2015	1	13	Y	89
202	4	4013	2020	41	5	504	1967	2015	1	13	Y	89
301	4	4013	2020	41	5	504	1967	2015	1	13	Y	89
302	4	4013	2020	41	5	504	1967	2015	1	13	Y	89
101	4	4013	2020	42	1	4	1967	2015	1	13	Y	89
102	4	4013	2020	42	1	4	1967	2015	1	13	Y	89
201	4	4013	2020	42	1	4	1967	2015	1	13	Y	89
202	4	4013	2020	42	1	4	1967	2015	1	13	Y	89
301	4	4013	2020	42	1	4	1967	2015	1	13	Y	89
302	4	4013	2020	42	1	4	1967	2015	1	13	Y	89
101	4	4013	2020	42	5	504	1967	2015	1	13	Y	89
102	4	4013	2020	42	5	504	1967	2015	1	13	Y	89
201	4	4013	2020	42	5	504	1967	2015	1	13	Y	89
202	4	4013	2020	42	5	504	1967	2015	1	13	Y	89
301	4	4013	2020	42	5	504	1967	2015	1	13	Y	89
302	4	4013	2020	42	5	504	1967	2015	1	13	Y	89
101	4	4013	2020	43	1	4	1967	2015	1	13	Y	88
102	4	4013	2020	43	1	4	1967	2015	1	13	Y	88
201	4	4013	2020	43	1	4	1967	2015	1	13	Y	88
202	4	4013	2020	43	1	4	1967	2015	1	13	Y	88
301	4	4013	2020	43	1	4	1967	2015	1	13	Y	88
302	4	4013	2020	43	1	4	1967	2015	1	13	Y	88
101	4	4013	2020	43	5	504	1967	2015	1	13	Y	88
102	4	4013	2020	43	5	504	1967	2015	1	13	Y	88
201	4	4013	2020	43	5	504	1967	2015	1	13	Y	88
202	4	4013	2020	43	5	504	1967	2015	1	13	Y	88
301	4	4013	2020	43	5	504	1967	2015	1	13	Y	88
302	4	4013	2020	43	5	504	1967	2015	1	13	Y	88
101	4	4013	2020	51	1	4	1967	2015	1	13	Y	91
102	4	4013	2020	51	1	4	1967	2015	1	13	Y	91
201	4	4013	2020	51	1	4	1967	2015	1	13	Y	91
202	4	4013	2020	51	1	4	1967	2015	1	13	Y	91
301	4	4013	2020	51	1	4	1967	2015	1	13	Y	91
302	4	4013	2020	51	1	4	1967	2015	1	13	Y	91
101	4	4013	2020	51	5	504	1967	2015	1	13	Y	91
102	4	4013	2020	51	5	504	1967	2015	1	13	Y	91
201	4	4013	2020	51	5	504	1967	2015	1	13	Y	91
202	4	4013	2020	51	5	504	1967	2015	1	13	Y	91
301	4	4013	2020	51	5	504	1967	2015	1	13	Y	91
302	4	4013	2020	51	5	504	1967	2015	1	13	Y	91
101	4	4013	2020	52	1	4	1967	2015	1	13	Y	90
102	4	4013	2020	52	1	4	1967	2015	1	13	Y	90
201	4	4013	2020	52	1	4	1967	2015	1	13	Y	90
202	4	4013	2020	52	1	4	1967	2015	1	13	Y	90
301	4	4013	2020	52	1	4	1967	2015	1	13	Y	90
302	4	4013	2020	52	1	4	1967	2015	1	13	Y	90
101	4	4013	2020	52	5	504	1967	2015	1	13	Y	90
102	4	4013	2020	52	5	504	1967	2015	1	13	Y	90
201	4	4013	2020	52	5	504	1967	2015	1	13	Y	90
202	4	4013	2020	52	5	504	1967	2015	1	13	Y	90
301	4	4013	2020	52	5	504	1967	2015	1	13	Y	90
302	4	4013	2020	52	5	504	1967	2015	1	13	Y	90
101	4	4013	2020	53	1	4	1967	2015	1	13	Y	90
102	4	4013	2020	53	1	4	1967	2015	1	13	Y	90
201	4	4013	2020	53	1	4	1967	2015	1	13	Y	90
202	4	4013	2020	53	1	4	1967	2015	1	13	Y	90
301	4	4013	2020	53	1	4	1967	2015	1	13	Y	90
302	4	4013	2020	53	1	4	1967	2015	1	13	Y	90

polProcess ID	State ID	County ID	yearID	sourceTypeID	fuelTypeID	IMProgramID	Beg ModelYearID	End ModelYearID	inspectFreq	Test StandardsID	useIMyn	Compliance Factor
101	4	4013	2020	53	5	504	1967	2015	1	13	Y	90
102	4	4013	2020	53	5	504	1967	2015	1	13	Y	90
201	4	4013	2020	53	5	504	1967	2015	1	13	Y	90
202	4	4013	2020	53	5	504	1967	2015	1	13	Y	90
301	4	4013	2020	53	5	504	1967	2015	1	13	Y	90
302	4	4013	2020	53	5	504	1967	2015	1	13	Y	90
101	4	4013	2020	54	1	4	1967	2015	1	13	Y	90
102	4	4013	2020	54	1	4	1967	2015	1	13	Y	90
201	4	4013	2020	54	1	4	1967	2015	1	13	Y	90
202	4	4013	2020	54	1	4	1967	2015	1	13	Y	90
301	4	4013	2020	54	1	4	1967	2015	1	13	Y	90
302	4	4013	2020	54	1	4	1967	2015	1	13	Y	90
101	4	4013	2020	54	5	504	1967	2015	1	13	Y	90
102	4	4013	2020	54	5	504	1967	2015	1	13	Y	90
201	4	4013	2020	54	5	504	1967	2015	1	13	Y	90
202	4	4013	2020	54	5	504	1967	2015	1	13	Y	90
301	4	4013	2020	54	5	504	1967	2015	1	13	Y	90
302	4	4013	2020	54	5	504	1967	2015	1	13	Y	90
101	4	4013	2020	61	1	4	1967	2015	1	13	Y	88
102	4	4013	2020	61	1	4	1967	2015	1	13	Y	88
201	4	4013	2020	61	1	4	1967	2015	1	13	Y	88
202	4	4013	2020	61	1	4	1967	2015	1	13	Y	88
301	4	4013	2020	61	1	4	1967	2015	1	13	Y	88
302	4	4013	2020	61	1	4	1967	2015	1	13	Y	88
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102	4	4013	2020	61	5	504	1967	2015	1	13	Y	88
201	4	4013	2020	61	5	504	1967	2015	1	13	Y	88
202	4	4013	2020	61	5	504	1967	2015	1	13	Y	88
301	4	4013	2020	61	5	504	1967	2015	1	13	Y	88
302	4	4013	2020	61	5	504	1967	2015	1	13	Y	88
101	4	4013	2020	62	1	4	1967	2015	1	13	Y	88
102	4	4013	2020	62	1	4	1967	2015	1	13	Y	88
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301	4	4013	2020	62	1	4	1967	2015	1	13	Y	88
302	4	4013	2020	62	1	4	1967	2015	1	13	Y	88
101	4	4013	2020	62	5	504	1967	2015	1	13	Y	88
102	4	4013	2020	62	5	504	1967	2015	1	13	Y	88
201	4	4013	2020	62	5	504	1967	2015	1	13	Y	88
202	4	4013	2020	62	5	504	1967	2015	1	13	Y	88
301	4	4013	2020	62	5	504	1967	2015	1	13	Y	88
302	4	4013	2020	62	5	504	1967	2015	1	13	Y	88
101	4	4013	2020	21	1	6	1981	1995	2	33	Y	83
102	4	4013	2020	21	1	6	1981	1995	2	33	Y	83
201	4	4013	2020	21	1	6	1981	1995	2	33	Y	83
202	4	4013	2020	21	1	6	1981	1995	2	33	Y	83
301	4	4013	2020	21	1	6	1981	1995	2	33	Y	83
302	4	4013	2020	21	1	6	1981	1995	2	33	Y	83
101	4	4013	2020	21	5	506	1981	1995	2	33	Y	83
102	4	4013	2020	21	5	506	1981	1995	2	33	Y	83
201	4	4013	2020	21	5	506	1981	1995	2	33	Y	83
202	4	4013	2020	21	5	506	1981	1995	2	33	Y	83
301	4	4013	2020	21	5	506	1981	1995	2	33	Y	83
302	4	4013	2020	21	5	506	1981	1995	2	33	Y	83
101	4	4013	2020	31	1	6	1981	1995	2	33	Y	82
102	4	4013	2020	31	1	6	1981	1995	2	33	Y	82
201	4	4013	2020	31	1	6	1981	1995	2	33	Y	82
202	4	4013	2020	31	1	6	1981	1995	2	33	Y	82
301	4	4013	2020	31	1	6	1981	1995	2	33	Y	82
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101	4	4013	2020	31	5	506	1981	1995	2	33	Y	82
102	4	4013	2020	31	5	506	1981	1995	2	33	Y	82
201	4	4013	2020	31	5	506	1981	1995	2	33	Y	82
202	4	4013	2020	31	5	506	1981	1995	2	33	Y	82
301	4	4013	2020	31	5	506	1981	1995	2	33	Y	82
302	4	4013	2020	31	5	506	1981	1995	2	33	Y	82
101	4	4013	2020	32	1	6	1981	1995	2	33	Y	78
102	4	4013	2020	32	1	6	1981	1995	2	33	Y	78
201	4	4013	2020	32	1	6	1981	1995	2	33	Y	78
202	4	4013	2020	32	1	6	1981	1995	2	33	Y	78
301	4	4013	2020	32	1	6	1981	1995	2	33	Y	78
302	4	4013	2020	32	1	6	1981	1995	2	33	Y	78
101	4	4013	2020	32	5	506	1981	1995	2	33	Y	78
102	4	4013	2020	32	5	506	1981	1995	2	33	Y	78
201	4	4013	2020	32	5	506	1981	1995	2	33	Y	78
202	4	4013	2020	32	5	506	1981	1995	2	33	Y	78
301	4	4013	2020	32	5	506	1981	1995	2	33	Y	78
302	4	4013	2020	32	5	506	1981	1995	2	33	Y	78
112	4	4013	2020	21	1	11	1967	1980	1	41	Y	79
113	4	4013	2020	21	1	11	1967	1980	1	41	Y	79
112	4	4013	2020	21	5	511	1967	1980	1	41	Y	79
113	4	4013	2020	21	5	511	1967	1980	1	41	Y	79
112	4	4013	2020	31	1	11	1967	1980	1	41	Y	82
113	4	4013	2020	31	1	11	1967	1980	1	41	Y	82

polProcess ID	State ID	County ID	yearID	sourceTypeID	fuelTypeID	IMProgramID	Beg ModelYearID	End ModelYearID	inspectFreq	Test StandardsID	useIMyn	Compliance Factor
112	4	4013	2020	31	5	511	1967	1980	1	41	Y	82
113	4	4013	2020	31	5	511	1967	1980	1	41	Y	82
112	4	4013	2020	32	1	11	1967	1980	1	41	Y	82
113	4	4013	2020	32	1	11	1967	1980	1	41	Y	82
112	4	4013	2020	32	5	511	1967	1980	1	41	Y	82
113	4	4013	2020	32	5	511	1967	1980	1	41	Y	82
112	4	4013	2020	41	1	7	1967	2015	1	41	Y	89
113	4	4013	2020	41	1	7	1967	2015	1	41	Y	89
112	4	4013	2020	41	5	507	1967	2015	1	41	Y	89
113	4	4013	2020	41	5	507	1967	2015	1	41	Y	89
112	4	4013	2020	42	1	7	1967	2015	1	41	Y	89
113	4	4013	2020	42	1	7	1967	2015	1	41	Y	89
112	4	4013	2020	42	5	507	1967	2015	1	41	Y	89
113	4	4013	2020	42	5	507	1967	2015	1	41	Y	89
112	4	4013	2020	43	1	7	1967	2015	1	41	Y	88
113	4	4013	2020	43	1	7	1967	2015	1	41	Y	88
112	4	4013	2020	43	5	507	1967	2015	1	41	Y	88
113	4	4013	2020	43	5	507	1967	2015	1	41	Y	88
112	4	4013	2020	51	1	7	1967	2015	1	41	Y	91
113	4	4013	2020	51	1	7	1967	2015	1	41	Y	91
112	4	4013	2020	51	5	507	1967	2015	1	41	Y	91
113	4	4013	2020	51	5	507	1967	2015	1	41	Y	91
112	4	4013	2020	52	1	7	1967	2015	1	41	Y	91
113	4	4013	2020	52	1	7	1967	2015	1	41	Y	91
112	4	4013	2020	52	5	507	1967	2015	1	41	Y	91
113	4	4013	2020	52	5	507	1967	2015	1	41	Y	91
112	4	4013	2020	53	1	7	1967	2015	1	41	Y	91
113	4	4013	2020	53	1	7	1967	2015	1	41	Y	91
112	4	4013	2020	53	5	507	1967	2015	1	41	Y	91
113	4	4013	2020	53	5	507	1967	2015	1	41	Y	91
112	4	4013	2020	54	1	7	1967	2015	1	41	Y	90
113	4	4013	2020	54	1	7	1967	2015	1	41	Y	90
112	4	4013	2020	54	5	507	1967	2015	1	41	Y	90
113	4	4013	2020	54	5	507	1967	2015	1	41	Y	90
112	4	4013	2020	61	1	7	1967	2015	1	41	Y	88
113	4	4013	2020	61	1	7	1967	2015	1	41	Y	88
112	4	4013	2020	61	5	507	1967	2015	1	41	Y	88
113	4	4013	2020	61	5	507	1967	2015	1	41	Y	88
112	4	4013	2020	62	1	7	1967	2015	1	41	Y	88
113	4	4013	2020	62	1	7	1967	2015	1	41	Y	88
112	4	4013	2020	62	5	507	1967	2015	1	41	Y	88
113	4	4013	2020	62	5	507	1967	2015	1	41	Y	88
112	4	4013	2020	21	1	9	1981	1995	2	44	Y	83
113	4	4013	2020	21	1	9	1981	1995	2	44	Y	83
112	4	4013	2020	21	5	509	1981	1995	2	44	Y	83
113	4	4013	2020	21	5	509	1981	1995	2	44	Y	83
112	4	4013	2020	31	1	9	1981	1995	2	44	Y	83
113	4	4013	2020	31	1	9	1981	1995	2	44	Y	83
112	4	4013	2020	31	5	509	1981	1995	2	44	Y	83
113	4	4013	2020	31	5	509	1981	1995	2	44	Y	83
112	4	4013	2020	32	1	9	1981	1995	2	44	Y	78
113	4	4013	2020	32	1	9	1981	1995	2	44	Y	78
112	4	4013	2020	32	5	509	1981	1995	2	44	Y	78
113	4	4013	2020	32	5	509	1981	1995	2	44	Y	78
112	4	4013	2020	21	1	8	1996	2015	2	45	Y	91
113	4	4013	2020	21	1	8	1996	2015	2	45	Y	91
112	4	4013	2020	21	5	508	1996	2015	2	45	Y	91
113	4	4013	2020	21	5	508	1996	2015	2	45	Y	91
112	4	4013	2020	31	1	8	1996	2015	2	45	Y	90
113	4	4013	2020	31	1	8	1996	2015	2	45	Y	90
112	4	4013	2020	31	5	508	1996	2015	2	45	Y	90
113	4	4013	2020	31	5	508	1996	2015	2	45	Y	90
112	4	4013	2020	32	1	8	1996	2015	2	45	Y	84
113	4	4013	2020	32	1	8	1996	2015	2	45	Y	84
112	4	4013	2020	32	5	508	1996	2015	2	45	Y	84
113	4	4013	2020	32	5	508	1996	2015	2	45	Y	84
101	4	4013	2020	21	1	10	1996	2015	2	51	Y	91
102	4	4013	2020	21	1	10	1996	2015	2	51	Y	91
201	4	4013	2020	21	1	10	1996	2015	2	51	Y	91
202	4	4013	2020	21	1	10	1996	2015	2	51	Y	91
301	4	4013	2020	21	1	10	1996	2015	2	51	Y	91
302	4	4013	2020	21	1	10	1996	2015	2	51	Y	91
101	4	4013	2020	21	5	510	1996	2015	2	51	Y	91
102	4	4013	2020	21	5	510	1996	2015	2	51	Y	91
201	4	4013	2020	21	5	510	1996	2015	2	51	Y	91
202	4	4013	2020	21	5	510	1996	2015	2	51	Y	91
301	4	4013	2020	21	5	510	1996	2015	2	51	Y	91
302	4	4013	2020	21	5	510	1996	2015	2	51	Y	91
101	4	4013	2020	31	1	10	1996	2015	2	51	Y	89
102	4	4013	2020	31	1	10	1996	2015	2	51	Y	89
201	4	4013	2020	31	1	10	1996	2015	2	51	Y	89
202	4	4013	2020	31	1	10	1996	2015	2	51	Y	89
301	4	4013	2020	31	1	10	1996	2015	2	51	Y	89
302	4	4013	2020	31	1	10	1996	2015	2	51	Y	89

polProcess ID	State ID	County ID	yearID	sourceTypeID	fuelTypeID	IMProgramID	Beg ModelYearID	End ModelYearID	inspectFreq	Test StandardsID	useIMyn	Compliance Factor
101	4	4013	2020	31	5	510	1996	2015	2	51	Y	89
102	4	4013	2020	31	5	510	1996	2015	2	51	Y	89
201	4	4013	2020	31	5	510	1996	2015	2	51	Y	89
202	4	4013	2020	31	5	510	1996	2015	2	51	Y	89
301	4	4013	2020	31	5	510	1996	2015	2	51	Y	89
302	4	4013	2020	31	5	510	1996	2015	2	51	Y	89
101	4	4013	2020	32	1	10	1996	2015	2	51	Y	83
102	4	4013	2020	32	1	10	1996	2015	2	51	Y	83
201	4	4013	2020	32	1	10	1996	2015	2	51	Y	83
202	4	4013	2020	32	1	10	1996	2015	2	51	Y	83
301	4	4013	2020	32	1	10	1996	2015	2	51	Y	83
302	4	4013	2020	32	1	10	1996	2015	2	51	Y	83
101	4	4013	2020	32	5	510	1996	2015	2	51	Y	83
102	4	4013	2020	32	5	510	1996	2015	2	51	Y	83
201	4	4013	2020	32	5	510	1996	2015	2	51	Y	83
202	4	4013	2020	32	5	510	1996	2015	2	51	Y	83
301	4	4013	2020	32	5	510	1996	2015	2	51	Y	83
302	4	4013	2020	32	5	510	1996	2015	2	51	Y	83

RoadTypeDistribution]

sourceTypeID	roadTypeID	roadTypeVMTFraction
11	1	0.00000
11	2	0.01685
11	3	0.04380
11	4	0.28608
11	5	0.65327
21	1	0.00000
21	2	0.02143
21	3	0.04357
21	4	0.37692
21	5	0.55808
31	1	0.00000
31	2	0.02143
31	3	0.04357
31	4	0.37692
31	5	0.55808
32	1	0.00000
32	2	0.02143
32	3	0.04357
32	4	0.37692
32	5	0.55808
41	1	0.00000
41	2	0.13707
41	3	0.04796
41	4	0.48657
41	5	0.32841
42	1	0.00000
42	2	0.13707
42	3	0.04796
42	4	0.48657
42	5	0.32841
43	1	0.00000
43	2	0.13707
43	3	0.04796
43	4	0.48657
43	5	0.32841
51	1	0.00000
51	2	0.08587
51	3	0.05065
51	4	0.57493
51	5	0.28855
52	1	0.00000
52	2	0.08587
52	3	0.05065
52	4	0.57493
52	5	0.28855
53	1	0.00000
53	2	0.08587
53	3	0.05065
53	4	0.57493
53	5	0.28855
54	1	0.00000
54	2	0.08587
54	3	0.05065
54	4	0.57493
54	5	0.28855
61	1	0.00000
61	2	0.29809
61	3	0.04501
61	4	0.51390
61	5	0.14300
62	1	0.00000
62	2	0.29809
62	3	0.04501
62	4	0.51390
62	5	0.14300

[MonthVMTFraction]

sourceTypeID	monthID	monthVMTFraction
11	1	0.097327
21	1	0.097327
31	1	0.097327
32	1	0.097327
41	1	0.097327
42	1	0.097327
43	1	0.097327
51	1	0.097327
52	1	0.097327
53	1	0.097327
54	1	0.097327
61	1	0.097327
62	1	0.097327
11	2	0.092650
21	2	0.092650
31	2	0.092650
32	2	0.092650
41	2	0.092650
42	2	0.092650
43	2	0.092650

sourceTypeID	monthID	monthVMTFraction
51	2	0.092650
52	2	0.092650
53	2	0.092650
54	2	0.092650
61	2	0.092650
62	2	0.092650
11	3	0.085825
21	3	0.085825
31	3	0.085825
32	3	0.085825
41	3	0.085825
42	3	0.085825
43	3	0.085825
51	3	0.085825
52	3	0.085825
53	3	0.085825
54	3	0.085825
61	3	0.085825
62	3	0.085825
11	4	0.061975
21	4	0.061975
31	4	0.061975
32	4	0.061975
41	4	0.061975
42	4	0.061975
43	4	0.061975
51	4	0.061975
52	4	0.061975
53	4	0.061975
54	4	0.061975
61	4	0.061975
62	4	0.061975
11	5	0.073574
21	5	0.073574
31	5	0.073574
32	5	0.073574
41	5	0.073574
42	5	0.073574
43	5	0.073574
51	5	0.073574
52	5	0.073574
53	5	0.073574
54	5	0.073574
61	5	0.073574
62	5	0.073574
11	6	0.077762
21	6	0.077762
31	6	0.077762
32	6	0.077762
41	6	0.077762
42	6	0.077762
43	6	0.077762
51	6	0.077762
52	6	0.077762
53	6	0.077762
54	6	0.077762
61	6	0.077762
62	6	0.077762
11	7	0.077056
21	7	0.077056
31	7	0.077056
32	7	0.077056
41	7	0.077056
42	7	0.077056
43	7	0.077056
51	7	0.077056
52	7	0.077056
53	7	0.077056
54	7	0.077056
61	7	0.077056
62	7	0.077056
11	8	0.081820
21	8	0.081820
31	8	0.081820
32	8	0.081820
41	8	0.081820
42	8	0.081820
43	8	0.081820
51	8	0.081820
52	8	0.081820
53	8	0.081820
54	8	0.081820
61	8	0.081820
62	8	0.081820
11	9	0.083512
21	9	0.083512
31	9	0.083512
32	9	0.083512
41	9	0.083512
42	9	0.083512
43	9	0.083512
51	9	0.083512

sourceTypeID	monthID	monthVMTFraction
52	9	0.083512
53	9	0.083512
54	9	0.083512
61	9	0.083512
62	9	0.083512
11	10	0.089830
21	10	0.089830
31	10	0.089830
32	10	0.089830
41	10	0.089830
42	10	0.089830
43	10	0.089830
51	10	0.089830
52	10	0.089830
53	10	0.089830
54	10	0.089830
61	10	0.089830
62	10	0.089830
11	11	0.088435
21	11	0.088435
31	11	0.088435
32	11	0.088435
41	11	0.088435
42	11	0.088435
43	11	0.088435
51	11	0.088435
52	11	0.088435
53	11	0.088435
54	11	0.088435
61	11	0.088435
62	11	0.088435
11	12	0.090235
21	12	0.090235
31	12	0.090235
32	12	0.090235
41	12	0.090235
42	12	0.090235
43	12	0.090235
51	12	0.090235
52	12	0.090235
53	12	0.090235
54	12	0.090235
61	12	0.090235
62	12	0.090235

[DayVMTFraction] (July 2020)

Source TypeID	Month ID	Road TypeID	dayID	Day VMTFraction
11	7	1	5	0.766590
21	7	1	5	0.766590
31	7	1	5	0.766590
32	7	1	5	0.766590
41	7	1	5	0.766590
42	7	1	5	0.766590
43	7	1	5	0.766590
51	7	1	5	0.766590
52	7	1	5	0.766590
53	7	1	5	0.766590
54	7	1	5	0.766590
61	7	1	5	0.766590
62	7	1	5	0.766590
11	7	2	5	0.767169
21	7	2	5	0.767169
31	7	2	5	0.767169
32	7	2	5	0.767169
41	7	2	5	0.767169
42	7	2	5	0.767169
43	7	2	5	0.767169
51	7	2	5	0.767169
52	7	2	5	0.767169
53	7	2	5	0.767169
54	7	2	5	0.767169
61	7	2	5	0.767169
62	7	2	5	0.767169
11	7	3	5	0.766169
21	7	3	5	0.766169
31	7	3	5	0.766169
32	7	3	5	0.766169
41	7	3	5	0.766169
42	7	3	5	0.766169
43	7	3	5	0.766169
51	7	3	5	0.766169
52	7	3	5	0.766169
53	7	3	5	0.766169
54	7	3	5	0.766169
61	7	3	5	0.766169
62	7	3	5	0.766169
11	7	4	5	0.767169
21	7	4	5	0.767169
31	7	4	5	0.767169
32	7	4	5	0.767169
41	7	4	5	0.767169
42	7	4	5	0.767169
43	7	4	5	0.767169
51	7	4	5	0.767169
52	7	4	5	0.767169
53	7	4	5	0.767169
54	7	4	5	0.767169
61	7	4	5	0.767169
62	7	4	5	0.767169
11	7	5	5	0.766169
21	7	5	5	0.766169
31	7	5	5	0.766169
32	7	5	5	0.766169
41	7	5	5	0.766169
42	7	5	5	0.766169
43	7	5	5	0.766169
51	7	5	5	0.766169
52	7	5	5	0.766169
53	7	5	5	0.766169
54	7	5	5	0.766169
61	7	5	5	0.766169
62	7	5	5	0.766169
11	7	1	2	0.233410
21	7	1	2	0.233410
31	7	1	2	0.233410
32	7	1	2	0.233410
41	7	1	2	0.233410
42	7	1	2	0.233410
43	7	1	2	0.233410
51	7	1	2	0.233410
52	7	1	2	0.233410
53	7	1	2	0.233410
54	7	1	2	0.233410
61	7	1	2	0.233410
62	7	1	2	0.233410
11	7	2	2	0.232831
21	7	2	2	0.232831
31	7	2	2	0.232831
32	7	2	2	0.232831
41	7	2	2	0.232831
42	7	2	2	0.232831
43	7	2	2	0.232831
51	7	2	2	0.232831

Source TypeID	Month ID	Road TypeID	dayID	Day VMTFraction
52	7	2	2	0.232831
53	7	2	2	0.232831
54	7	2	2	0.232831
61	7	2	2	0.232831
62	7	2	2	0.232831
11	7	3	2	0.233831
21	7	3	2	0.233831
31	7	3	2	0.233831
32	7	3	2	0.233831
41	7	3	2	0.233831
42	7	3	2	0.233831
43	7	3	2	0.233831
51	7	3	2	0.233831
52	7	3	2	0.233831
53	7	3	2	0.233831
54	7	3	2	0.233831
61	7	3	2	0.233831
62	7	3	2	0.233831
11	7	4	2	0.232831
21	7	4	2	0.232831
31	7	4	2	0.232831
32	7	4	2	0.232831
41	7	4	2	0.232831
42	7	4	2	0.232831
43	7	4	2	0.232831
51	7	4	2	0.232831
52	7	4	2	0.232831
53	7	4	2	0.232831
54	7	4	2	0.232831
61	7	4	2	0.232831
62	7	4	2	0.232831
11	7	5	2	0.233831
21	7	5	2	0.233831
31	7	5	2	0.233831
32	7	5	2	0.233831
41	7	5	2	0.233831
42	7	5	2	0.233831
43	7	5	2	0.233831
51	7	5	2	0.233831
52	7	5	2	0.233831
53	7	5	2	0.233831
54	7	5	2	0.233831
61	7	5	2	0.233831
62	7	5	2	0.233831

[HourVMTFraction] (SourceTypeID 21: Passenger Car)

Source	Road	dayID	hourID	hourVMT
21	1	5	1	0.008267
21	1	5	2	0.006433
21	1	5	3	0.006676
21	1	5	4	0.011278
21	1	5	5	0.028076
21	1	5	6	0.039805
21	1	5	7	0.049891
21	1	5	8	0.057923
21	1	5	9	0.054920
21	1	5	10	0.054672
21	1	5	11	0.055782
21	1	5	12	0.057667
21	1	5	13	0.060445
21	1	5	14	0.064991
21	1	5	15	0.067787
21	1	5	16	0.068523
21	1	5	17	0.068624
21	1	5	18	0.064840
21	1	5	19	0.050057
21	1	5	20	0.038283
21	1	5	21	0.030838
21	1	5	22	0.023774
21	1	5	23	0.018093
21	1	5	24	0.012353
21	2	5	1	0.008486
21	2	5	2	0.006760
21	2	5	3	0.006822
21	2	5	4	0.010873
21	2	5	5	0.027636
21	2	5	6	0.039261
21	2	5	7	0.050152
21	2	5	8	0.059197
21	2	5	9	0.056414
21	2	5	10	0.054529
21	2	5	11	0.055252
21	2	5	12	0.057561
21	2	5	13	0.059886
21	2	5	14	0.064113
21	2	5	15	0.066784
21	2	5	16	0.067238
21	2	5	17	0.067362
21	2	5	18	0.064484
21	2	5	19	0.050704
21	2	5	20	0.038627
21	2	5	21	0.031322
21	2	5	22	0.024670
21	2	5	23	0.018903
21	2	5	24	0.012965
21	3	5	1	0.008108
21	3	5	2	0.006194
21	3	5	3	0.006570
21	3	5	4	0.011574
21	3	5	5	0.028396
21	3	5	6	0.040201
21	3	5	7	0.049701
21	3	5	8	0.056995
21	3	5	9	0.053834
21	3	5	10	0.054776
21	3	5	11	0.056168
21	3	5	12	0.057745
21	3	5	13	0.060851
21	3	5	14	0.065631
21	3	5	15	0.068517
21	3	5	16	0.069459
21	3	5	17	0.069543
21	3	5	18	0.065100
21	3	5	19	0.049586
21	3	5	20	0.038032
21	3	5	21	0.030486
21	3	5	22	0.023122
21	3	5	23	0.017504
21	3	5	24	0.011908
21	4	5	1	0.008486
21	4	5	2	0.006760
21	4	5	3	0.006822
21	4	5	4	0.010873
21	4	5	5	0.027636
21	4	5	6	0.039261
21	4	5	7	0.050152
21	4	5	8	0.059197
21	4	5	9	0.056414
21	4	5	10	0.054529
21	4	5	11	0.055252
21	4	5	12	0.057561
21	4	5	13	0.059886
21	4	5	14	0.064113
21	4	5	15	0.066784
21	4	5	16	0.067238
21	4	5	17	0.067362
21	4	5	18	0.064484
21	4	5	19	0.050704
21	4	5	20	0.038627
21	4	5	21	0.031322
21	4	5	22	0.024670
21	4	5	23	0.018903
21	4	5	24	0.012965
21	5	5	1	0.008108
21	5	5	2	0.006194
21	5	5	3	0.006570
21	5	5	4	0.011574
21	5	5	5	0.028396
21	5	5	6	0.040201
21	5	5	7	0.049701
21	5	5	8	0.056995
21	5	5	9	0.053834
21	5	5	10	0.054776
21	5	5	11	0.056168
21	5	5	12	0.057745
21	5	5	13	0.060851
21	5	5	14	0.065631
21	5	5	15	0.068517
21	5	5	16	0.069459
21	5	5	17	0.069543
21	5	5	18	0.065100
21	5	5	19	0.049586
21	5	5	20	0.038032
21	5	5	21	0.030486
21	5	5	22	0.023122
21	5	5	23	0.017504
21	5	5	24	0.011908
21	1	2	1	0.014193
21	1	2	2	0.010173
21	1	2	3	0.008572
21	1	2	4	0.008646
21	1	2	5	0.013301
21	1	2	6	0.021968
21	1	2	7	0.030803
21	1	2	8	0.036857
21	1	2	9	0.044568
21	1	2	10	0.054934
21	1	2	11	0.062589
21	1	2	12	0.067555
21	1	2	13	0.070204
21	1	2	14	0.070849
21	1	2	15	0.069378
21	1	2	16	0.067186
21	1	2	17	0.064332
21	1	2	18	0.060248
21	1	2	19	0.055515
21	1	2	20	0.048154
21	1	2	21	0.042155
21	1	2	22	0.033958
21	1	2	23	0.025878
21	1	2	24	0.017986
21	2	2	1	0.015296
21	2	2	2	0.011294
21	2	2	3	0.009507
21	2	2	4	0.009206
21	2	2	5	0.014050
21	2	2	6	0.021782
21	2	2	7	0.030193
21	2	2	8	0.035795
21	2	2	9	0.042929
21	2	2	10	0.053068
21	2	2	11	0.061003
21	2	2	12	0.067064
21	2	2	13	0.069749
21	2	2	14	0.070158
21	2	2	15	0.068705
21	2	2	16	0.066215

Source	Road	dayID	hourID	hourVMT
21	2	2	17	0.063170
21	2	2	18	0.060433
21	2	2	19	0.056317
21	2	2	20	0.048723
21	2	2	21	0.043317
21	2	2	22	0.035832
21	2	2	23	0.027175
21	2	2	24	0.019018
21	3	2	1	0.013395
21	3	2	2	0.009362
21	3	2	3	0.007895
21	3	2	4	0.008240
21	3	2	5	0.012758
21	3	2	6	0.022102
21	3	2	7	0.031244
21	3	2	8	0.037625
21	3	2	9	0.045755
21	3	2	10	0.056285
21	3	2	11	0.063737
21	3	2	12	0.067911
21	3	2	13	0.070533
21	3	2	14	0.071350
21	3	2	15	0.069865
21	3	2	16	0.067889
21	3	2	17	0.065174
21	3	2	18	0.060114
21	3	2	19	0.054934
21	3	2	20	0.047742
21	3	2	21	0.041314
21	3	2	22	0.032600
21	3	2	23	0.024938
21	3	2	24	0.017238
21	4	2	1	0.015296
21	4	2	2	0.011294
21	4	2	3	0.009507
21	4	2	4	0.009206
21	4	2	5	0.014050
21	4	2	6	0.021782
21	4	2	7	0.030193
21	4	2	8	0.035795

Source	Road	dayID	hourID	hourVMT
21	4	2	9	0.042929
21	4	2	10	0.053068
21	4	2	11	0.061003
21	4	2	12	0.067064
21	4	2	13	0.069749
21	4	2	14	0.070158
21	4	2	15	0.068705
21	4	2	16	0.066215
21	4	2	17	0.063170
21	4	2	18	0.060433
21	4	2	19	0.056317
21	4	2	20	0.048723
21	4	2	21	0.043317
21	4	2	22	0.035832
21	4	2	23	0.027175
21	4	2	24	0.019018
21	5	2	1	0.013395
21	5	2	2	0.009362
21	5	2	3	0.007895
21	5	2	4	0.008240
21	5	2	5	0.012758
21	5	2	6	0.022102
21	5	2	7	0.031244
21	5	2	8	0.037625
21	5	2	9	0.045755
21	5	2	10	0.056285
21	5	2	11	0.063737
21	5	2	12	0.067911
21	5	2	13	0.070533
21	5	2	14	0.071350
21	5	2	15	0.069865
21	5	2	16	0.067889
21	5	2	17	0.065174
21	5	2	18	0.060114
21	5	2	19	0.054934
21	5	2	20	0.047742
21	5	2	21	0.041314
21	5	2	22	0.032600
21	5	2	23	0.024938
21	5	2	24	0.017238

[AvgSpeedDistribution] (SourceTypeID 21: Passenger Car and RoadTypeID 5: Urban Restricted Access)

Source TypeID	Road TypeID	Hour DayID	avgSpeed BinID	avgSpeed Fraction
21	5	15	1	0.000000
21	5	15	2	0.000919
21	5	15	3	0.005931
21	5	15	4	0.054255
21	5	15	5	0.188021
21	5	15	6	0.274763
21	5	15	7	0.237089
21	5	15	8	0.176777
21	5	15	9	0.057156
21	5	15	10	0.002529
21	5	15	11	0.001116
21	5	15	12	0.001149
21	5	15	13	0.000294
21	5	15	14	0.000000
21	5	15	15	0.000000
21	5	15	16	0.000000
21	5	25	1	0.000000
21	5	25	2	0.000919
21	5	25	3	0.005931
21	5	25	4	0.054255
21	5	25	5	0.188021
21	5	25	6	0.274763
21	5	25	7	0.237089
21	5	25	8	0.176777
21	5	25	9	0.057156
21	5	25	10	0.002529
21	5	25	11	0.001116
21	5	25	12	0.001149
21	5	25	13	0.000294
21	5	25	14	0.000000

Source TypeID	Road TypeID	Hour DayID	avgSpeed BinID	avgSpeed Fraction
21	5	25	15	0.000000
21	5	25	16	0.000000
21	5	35	1	0.000000
21	5	35	2	0.000919
21	5	35	3	0.005931
21	5	35	4	0.054255
21	5	35	5	0.188021
21	5	35	6	0.274763
21	5	35	7	0.237089
21	5	35	8	0.176777
21	5	35	9	0.057156
21	5	35	10	0.002529
21	5	35	11	0.001116
21	5	35	12	0.001149
21	5	35	13	0.000294
21	5	35	14	0.000000
21	5	35	15	0.000000
21	5	35	16	0.000000
21	5	45	1	0.000000
21	5	45	2	0.000919
21	5	45	3	0.005931
21	5	45	4	0.054255
21	5	45	5	0.188021
21	5	45	6	0.274763
21	5	45	7	0.237089
21	5	45	8	0.176777
21	5	45	9	0.057156
21	5	45	10	0.002529
21	5	45	11	0.001116
21	5	45	12	0.001149

Source TypeID	Road TypeID	Hour DayID	avgSpeed BinID	avgSpeed Fraction
21	5	45	13	0.000294
21	5	45	14	0.000000
21	5	45	15	0.000000
21	5	45	16	0.000000
21	5	55	1	0.000000
21	5	55	2	0.000919
21	5	55	3	0.005931
21	5	55	4	0.054255
21	5	55	5	0.188021
21	5	55	6	0.274763
21	5	55	7	0.237089
21	5	55	8	0.176777
21	5	55	9	0.057156
21	5	55	10	0.002529
21	5	55	11	0.001116
21	5	55	12	0.001149
21	5	55	13	0.000294
21	5	55	14	0.000000
21	5	55	15	0.000000
21	5	55	16	0.000000
21	5	65	1	0.000000
21	5	65	2	0.000919
21	5	65	3	0.005931
21	5	65	4	0.054255
21	5	65	5	0.188021
21	5	65	6	0.274763
21	5	65	7	0.237089
21	5	65	8	0.176777
21	5	65	9	0.057156
21	5	65	10	0.002529
21	5	65	11	0.001116
21	5	65	12	0.001149
21	5	65	13	0.000294
21	5	65	14	0.000000
21	5	65	15	0.000000
21	5	65	16	0.000000
21	5	75	1	0.000000
21	5	75	2	0.005554
21	5	75	3	0.029942
21	5	75	4	0.118213
21	5	75	5	0.247465
21	5	75	6	0.307335
21	5	75	7	0.167285
21	5	75	8	0.096306
21	5	75	9	0.025305
21	5	75	10	0.000716
21	5	75	11	0.001368
21	5	75	12	0.000383
21	5	75	13	0.000128
21	5	75	14	0.000000
21	5	75	15	0.000000
21	5	75	16	0.000000
21	5	85	1	0.000000
21	5	85	2	0.005554
21	5	85	3	0.029942
21	5	85	4	0.118213
21	5	85	5	0.247465
21	5	85	6	0.307335
21	5	85	7	0.167285
21	5	85	8	0.096306
21	5	85	9	0.025305
21	5	85	10	0.000716
21	5	85	11	0.001368
21	5	85	12	0.000383
21	5	85	13	0.000128
21	5	85	14	0.000000
21	5	85	15	0.000000
21	5	85	16	0.000000
21	5	95	1	0.000000
21	5	95	2	0.005554
21	5	95	3	0.029942
21	5	95	4	0.118213
21	5	95	5	0.247465
21	5	95	6	0.307335
21	5	95	7	0.167285
21	5	95	8	0.096306
21	5	95	9	0.025305

Source TypeID	Road TypeID	Hour DayID	avgSpeed BinID	avgSpeed Fraction
21	5	95	10	0.000716
21	5	95	11	0.001368
21	5	95	12	0.000383
21	5	95	13	0.000128
21	5	95	14	0.000000
21	5	95	15	0.000000
21	5	95	16	0.000000
21	5	105	1	0.000000
21	5	105	2	0.001102
21	5	105	3	0.009586
21	5	105	4	0.059375
21	5	105	5	0.199995
21	5	105	6	0.301927
21	5	105	7	0.226382
21	5	105	8	0.156444
21	5	105	9	0.041360
21	5	105	10	0.001503
21	5	105	11	0.001036
21	5	105	12	0.001013
21	5	105	13	0.000277
21	5	105	14	0.000000
21	5	105	15	0.000000
21	5	105	16	0.000000
21	5	115	1	0.000000
21	5	115	2	0.001102
21	5	115	3	0.009586
21	5	115	4	0.059375
21	5	115	5	0.199995
21	5	115	6	0.301927
21	5	115	7	0.226382
21	5	115	8	0.156444
21	5	115	9	0.041360
21	5	115	10	0.001503
21	5	115	11	0.001036
21	5	115	12	0.001013
21	5	115	13	0.000277
21	5	115	14	0.000000
21	5	115	15	0.000000
21	5	115	16	0.000000
21	5	125	1	0.000000
21	5	125	2	0.001102
21	5	125	3	0.009586
21	5	125	4	0.059375
21	5	125	5	0.199995
21	5	125	6	0.301927
21	5	125	7	0.226382
21	5	125	8	0.156444
21	5	125	9	0.041360
21	5	125	10	0.001503
21	5	125	11	0.001036
21	5	125	12	0.001013
21	5	125	13	0.000277
21	5	125	14	0.000000
21	5	125	15	0.000000
21	5	125	16	0.000000
21	5	135	1	0.000000
21	5	135	2	0.001102
21	5	135	3	0.009586
21	5	135	4	0.059375
21	5	135	5	0.199995
21	5	135	6	0.301927
21	5	135	7	0.226382
21	5	135	8	0.156444
21	5	135	9	0.041360
21	5	135	10	0.001503
21	5	135	11	0.001036
21	5	135	12	0.001013
21	5	135	13	0.000277
21	5	135	14	0.000000
21	5	135	15	0.000000
21	5	135	16	0.000000
21	5	145	1	0.000000
21	5	145	2	0.001102
21	5	145	3	0.009586
21	5	145	4	0.059375
21	5	145	5	0.199995
21	5	145	6	0.301927

Source TypeID	Road TypeID	Hour DayID	avgSpeed BinID	avgSpeed Fraction
21	5	145	7	0.226382
21	5	145	8	0.156444
21	5	145	9	0.041360
21	5	145	10	0.001503
21	5	145	11	0.001036
21	5	145	12	0.001013
21	5	145	13	0.000277
21	5	145	14	0.000000
21	5	145	15	0.000000
21	5	145	16	0.000000
21	5	155	1	0.000000
21	5	155	2	0.004399
21	5	155	3	0.038927
21	5	155	4	0.157206
21	5	155	5	0.303988
21	5	155	6	0.312270
21	5	155	7	0.117996
21	5	155	8	0.049183
21	5	155	9	0.013889
21	5	155	10	0.000931
21	5	155	11	0.000941
21	5	155	12	0.000223
21	5	155	13	0.000047
21	5	155	14	0.000000
21	5	155	15	0.000000
21	5	155	16	0.000000
21	5	165	1	0.000000
21	5	165	2	0.004399
21	5	165	3	0.038927
21	5	165	4	0.157206
21	5	165	5	0.303988
21	5	165	6	0.312270
21	5	165	7	0.117996
21	5	165	8	0.049183
21	5	165	9	0.013889
21	5	165	10	0.000931
21	5	165	11	0.000941
21	5	165	12	0.000223
21	5	165	13	0.000047
21	5	165	14	0.000000
21	5	165	15	0.000000
21	5	165	16	0.000000
21	5	175	1	0.000000
21	5	175	2	0.004399
21	5	175	3	0.038927
21	5	175	4	0.157206
21	5	175	5	0.303988
21	5	175	6	0.312270
21	5	175	7	0.117996
21	5	175	8	0.049183
21	5	175	9	0.013889
21	5	175	10	0.000931
21	5	175	11	0.000941
21	5	175	12	0.000223
21	5	175	13	0.000047
21	5	175	14	0.000000
21	5	175	15	0.000000
21	5	175	16	0.000000
21	5	185	1	0.000000
21	5	185	2	0.004399
21	5	185	3	0.038927
21	5	185	4	0.157206
21	5	185	5	0.303988
21	5	185	6	0.312270
21	5	185	7	0.117996
21	5	185	8	0.049183
21	5	185	9	0.013889
21	5	185	10	0.000931
21	5	185	11	0.000941
21	5	185	12	0.000223
21	5	185	13	0.000047
21	5	185	14	0.000000
21	5	185	15	0.000000
21	5	185	16	0.000000
21	5	195	1	0.000000
21	5	195	2	0.000919
21	5	195	3	0.005931

Source TypeID	Road TypeID	Hour DayID	avgSpeed BinID	avgSpeed Fraction
21	5	195	4	0.054255
21	5	195	5	0.188021
21	5	195	6	0.274763
21	5	195	7	0.237089
21	5	195	8	0.176777
21	5	195	9	0.057156
21	5	195	10	0.002529
21	5	195	11	0.001116
21	5	195	12	0.001149
21	5	195	13	0.000294
21	5	195	14	0.000000
21	5	195	15	0.000000
21	5	195	16	0.000000
21	5	205	1	0.000000
21	5	205	2	0.000919
21	5	205	3	0.005931
21	5	205	4	0.054255
21	5	205	5	0.188021
21	5	205	6	0.274763
21	5	205	7	0.237089
21	5	205	8	0.176777
21	5	205	9	0.057156
21	5	205	10	0.002529
21	5	205	11	0.001116
21	5	205	12	0.001149
21	5	205	13	0.000294
21	5	205	14	0.000000
21	5	205	15	0.000000
21	5	205	16	0.000000
21	5	215	1	0.000000
21	5	215	2	0.000919
21	5	215	3	0.005931
21	5	215	4	0.054255
21	5	215	5	0.188021
21	5	215	6	0.274763
21	5	215	7	0.237089
21	5	215	8	0.176777
21	5	215	9	0.057156
21	5	215	10	0.002529
21	5	215	11	0.001116
21	5	215	12	0.001149
21	5	215	13	0.000294
21	5	215	14	0.000000
21	5	215	15	0.000000
21	5	215	16	0.000000
21	5	225	1	0.000000
21	5	225	2	0.000919
21	5	225	3	0.005931
21	5	225	4	0.054255
21	5	225	5	0.188021
21	5	225	6	0.274763
21	5	225	7	0.237089
21	5	225	8	0.176777
21	5	225	9	0.057156
21	5	225	10	0.002529
21	5	225	11	0.001116
21	5	225	12	0.001149
21	5	225	13	0.000294
21	5	225	14	0.000000
21	5	225	15	0.000000
21	5	225	16	0.000000
21	5	235	1	0.000000
21	5	235	2	0.000919
21	5	235	3	0.005931
21	5	235	4	0.054255
21	5	235	5	0.188021
21	5	235	6	0.274763
21	5	235	7	0.237089
21	5	235	8	0.176777
21	5	235	9	0.057156
21	5	235	10	0.002529
21	5	235	11	0.001116
21	5	235	12	0.001149
21	5	235	13	0.000294
21	5	235	14	0.000000
21	5	235	15	0.000000
21	5	235	16	0.000000

Source TypeID	Road TypeID	Hour DayID	avgSpeed BinID	avgSpeed Fraction
21	5	245	1	0.000000
21	5	245	2	0.000919
21	5	245	3	0.005931
21	5	245	4	0.054255
21	5	245	5	0.188021
21	5	245	6	0.274763
21	5	245	7	0.237089
21	5	245	8	0.176777
21	5	245	9	0.057156
21	5	245	10	0.002529
21	5	245	11	0.001116
21	5	245	12	0.001149
21	5	245	13	0.000294
21	5	245	14	0.000000
21	5	245	15	0.000000
21	5	245	16	0.000000
21	5	12	1	0.000000
21	5	12	2	0.000000
21	5	12	3	0.000000
21	5	12	4	0.000000
21	5	12	5	0.000000
21	5	12	6	0.000000
21	5	12	7	0.137994
21	5	12	8	0.862006
21	5	12	9	0.000000
21	5	12	10	0.000000
21	5	12	11	0.000000
21	5	12	12	0.000000
21	5	12	13	0.000000
21	5	12	14	0.000000
21	5	12	15	0.000000
21	5	12	16	0.000000
21	5	22	1	0.000000
21	5	22	2	0.000000
21	5	22	3	0.000000
21	5	22	4	0.000000
21	5	22	5	0.000000
21	5	22	6	0.000000
21	5	22	7	0.137994
21	5	22	8	0.862006
21	5	22	9	0.000000
21	5	22	10	0.000000
21	5	22	11	0.000000
21	5	22	12	0.000000
21	5	22	13	0.000000
21	5	22	14	0.000000
21	5	22	15	0.000000
21	5	22	16	0.000000
21	5	32	1	0.000000
21	5	32	2	0.000000
21	5	32	3	0.000000
21	5	32	4	0.000000
21	5	32	5	0.000000
21	5	32	6	0.000000
21	5	32	7	0.137994
21	5	32	8	0.862006
21	5	32	9	0.000000
21	5	32	10	0.000000
21	5	32	11	0.000000
21	5	32	12	0.000000
21	5	32	13	0.000000
21	5	32	14	0.000000
21	5	32	15	0.000000
21	5	32	16	0.000000
21	5	42	1	0.000000
21	5	42	2	0.000000
21	5	42	3	0.000000
21	5	42	4	0.000000
21	5	42	5	0.000000
21	5	42	6	0.000000
21	5	42	7	0.137994
21	5	42	8	0.862006
21	5	42	9	0.000000
21	5	42	10	0.000000
21	5	42	11	0.000000
21	5	42	12	0.000000
21	5	42	13	0.000000

Source TypeID	Road TypeID	Hour DayID	avgSpeed BinID	avgSpeed Fraction
21	5	42	14	0.000000
21	5	42	15	0.000000
21	5	42	16	0.000000
21	5	52	1	0.000000
21	5	52	2	0.000000
21	5	52	3	0.000000
21	5	52	4	0.000000
21	5	52	5	0.000000
21	5	52	6	0.000000
21	5	52	7	0.137994
21	5	52	8	0.862006
21	5	52	9	0.000000
21	5	52	10	0.000000
21	5	52	11	0.000000
21	5	52	12	0.000000
21	5	52	13	0.000000
21	5	52	14	0.000000
21	5	52	15	0.000000
21	5	52	16	0.000000
21	5	62	1	0.000000
21	5	62	2	0.000000
21	5	62	3	0.000000
21	5	62	4	0.000000
21	5	62	5	0.000000
21	5	62	6	0.000000
21	5	62	7	0.137994
21	5	62	8	0.862006
21	5	62	9	0.000000
21	5	62	10	0.000000
21	5	62	11	0.000000
21	5	62	12	0.000000
21	5	62	13	0.000000
21	5	62	14	0.000000
21	5	62	15	0.000000
21	5	62	16	0.000000
21	5	72	1	0.000000
21	5	72	2	0.000000
21	5	72	3	0.000000
21	5	72	4	0.000000
21	5	72	5	0.000000
21	5	72	6	0.000000
21	5	72	7	0.185049
21	5	72	8	0.814951
21	5	72	9	0.000000
21	5	72	10	0.000000
21	5	72	11	0.000000
21	5	72	12	0.000000
21	5	72	13	0.000000
21	5	72	14	0.000000
21	5	72	15	0.000000
21	5	72	16	0.000000
21	5	82	1	0.000000
21	5	82	2	0.000000
21	5	82	3	0.000000
21	5	82	4	0.000000
21	5	82	5	0.000000
21	5	82	6	0.000000
21	5	82	7	0.185049
21	5	82	8	0.814951
21	5	82	9	0.000000
21	5	82	10	0.000000
21	5	82	11	0.000000
21	5	82	12	0.000000
21	5	82	13	0.000000
21	5	82	14	0.000000
21	5	82	15	0.000000
21	5	82	16	0.000000
21	5	92	1	0.000000
21	5	92	2	0.000000
21	5	92	3	0.000000
21	5	92	4	0.000000
21	5	92	5	0.000000
21	5	92	6	0.000000
21	5	92	7	0.185049
21	5	92	8	0.814951
21	5	92	9	0.000000
21	5	92	10	0.000000

Source TypeID	Road TypeID	Hour DayID	avgSpeed BinID	avgSpeed Fraction
21	5	92	11	0.000000
21	5	92	12	0.000000
21	5	92	13	0.000000
21	5	92	14	0.000000
21	5	92	15	0.000000
21	5	92	16	0.000000
21	5	102	1	0.000000
21	5	102	2	0.000000
21	5	102	3	0.000000
21	5	102	4	0.000000
21	5	102	5	0.000000
21	5	102	6	0.000000
21	5	102	7	0.365281
21	5	102	8	0.634719
21	5	102	9	0.000000
21	5	102	10	0.000000
21	5	102	11	0.000000
21	5	102	12	0.000000
21	5	102	13	0.000000
21	5	102	14	0.000000
21	5	102	15	0.000000
21	5	102	16	0.000000
21	5	112	1	0.000000
21	5	112	2	0.000000
21	5	112	3	0.000000
21	5	112	4	0.000000
21	5	112	5	0.000000
21	5	112	6	0.000000
21	5	112	7	0.365281
21	5	112	8	0.634719
21	5	112	9	0.000000
21	5	112	10	0.000000
21	5	112	11	0.000000
21	5	112	12	0.000000
21	5	112	13	0.000000
21	5	112	14	0.000000
21	5	112	15	0.000000
21	5	112	16	0.000000
21	5	122	1	0.000000
21	5	122	2	0.000000
21	5	122	3	0.000000
21	5	122	4	0.000000
21	5	122	5	0.000000
21	5	122	6	0.000000
21	5	122	7	0.365281
21	5	122	8	0.634719
21	5	122	9	0.000000
21	5	122	10	0.000000
21	5	122	11	0.000000
21	5	122	12	0.000000
21	5	122	13	0.000000
21	5	122	14	0.000000
21	5	122	15	0.000000
21	5	122	16	0.000000
21	5	132	1	0.000000
21	5	132	2	0.000000
21	5	132	3	0.000000
21	5	132	4	0.000000
21	5	132	5	0.000000
21	5	132	6	0.000000
21	5	132	7	0.365281
21	5	132	8	0.634719
21	5	132	9	0.000000
21	5	132	10	0.000000
21	5	132	11	0.000000
21	5	132	12	0.000000
21	5	132	13	0.000000
21	5	132	14	0.000000
21	5	132	15	0.000000
21	5	132	16	0.000000
21	5	142	1	0.000000
21	5	142	2	0.000000
21	5	142	3	0.000000
21	5	142	4	0.000000
21	5	142	5	0.000000
21	5	142	6	0.000000
21	5	142	7	0.365281

Source TypeID	Road TypeID	Hour DayID	avgSpeed BinID	avgSpeed Fraction
21	5	142	8	0.634719
21	5	142	9	0.000000
21	5	142	10	0.000000
21	5	142	11	0.000000
21	5	142	12	0.000000
21	5	142	13	0.000000
21	5	142	14	0.000000
21	5	142	15	0.000000
21	5	142	16	0.000000
21	5	152	1	0.000000
21	5	152	2	0.000000
21	5	152	3	0.000000
21	5	152	4	0.000000
21	5	152	5	0.000000
21	5	152	6	0.000000
21	5	152	7	0.222566
21	5	152	8	0.777434
21	5	152	9	0.000000
21	5	152	10	0.000000
21	5	152	11	0.000000
21	5	152	12	0.000000
21	5	152	13	0.000000
21	5	152	14	0.000000
21	5	152	15	0.000000
21	5	152	16	0.000000
21	5	162	1	0.000000
21	5	162	2	0.000000
21	5	162	3	0.000000
21	5	162	4	0.000000
21	5	162	5	0.000000
21	5	162	6	0.000000
21	5	162	7	0.222566
21	5	162	8	0.777434
21	5	162	9	0.000000
21	5	162	10	0.000000
21	5	162	11	0.000000
21	5	162	12	0.000000
21	5	162	13	0.000000
21	5	162	14	0.000000
21	5	162	15	0.000000
21	5	162	16	0.000000
21	5	172	1	0.000000
21	5	172	2	0.000000
21	5	172	3	0.000000
21	5	172	4	0.000000
21	5	172	5	0.000000
21	5	172	6	0.000000
21	5	172	7	0.222566
21	5	172	8	0.777434
21	5	172	9	0.000000
21	5	172	10	0.000000
21	5	172	11	0.000000
21	5	172	12	0.000000
21	5	172	13	0.000000
21	5	172	14	0.000000
21	5	172	15	0.000000
21	5	172	16	0.000000
21	5	182	1	0.000000
21	5	182	2	0.000000
21	5	182	3	0.000000
21	5	182	4	0.000000
21	5	182	5	0.000000
21	5	182	6	0.000000
21	5	182	7	0.222566
21	5	182	8	0.777434
21	5	182	9	0.000000
21	5	182	10	0.000000
21	5	182	11	0.000000
21	5	182	12	0.000000
21	5	182	13	0.000000
21	5	182	14	0.000000
21	5	182	15	0.000000
21	5	182	16	0.000000
21	5	192	1	0.000000
21	5	192	2	0.000000
21	5	192	3	0.000000
21	5	192	4	0.000000

Source TypeID	Road TypeID	Hour DayID	avgSpeed BinID	avgSpeed Fraction
21	5	192	5	0.000000
21	5	192	6	0.000000
21	5	192	7	0.137994
21	5	192	8	0.862006
21	5	192	9	0.000000
21	5	192	10	0.000000
21	5	192	11	0.000000
21	5	192	12	0.000000
21	5	192	13	0.000000
21	5	192	14	0.000000
21	5	192	15	0.000000
21	5	192	16	0.000000
21	5	202	1	0.000000
21	5	202	2	0.000000
21	5	202	3	0.000000
21	5	202	4	0.000000
21	5	202	5	0.000000
21	5	202	6	0.000000
21	5	202	7	0.137994
21	5	202	8	0.862006
21	5	202	9	0.000000
21	5	202	10	0.000000
21	5	202	11	0.000000
21	5	202	12	0.000000
21	5	202	13	0.000000
21	5	202	14	0.000000
21	5	202	15	0.000000
21	5	202	16	0.000000
21	5	212	1	0.000000
21	5	212	2	0.000000
21	5	212	3	0.000000
21	5	212	4	0.000000
21	5	212	5	0.000000
21	5	212	6	0.000000
21	5	212	7	0.137994
21	5	212	8	0.862006
21	5	212	9	0.000000
21	5	212	10	0.000000
21	5	212	11	0.000000
21	5	212	12	0.000000
21	5	212	13	0.000000
21	5	212	14	0.000000
21	5	212	15	0.000000
21	5	212	16	0.000000
21	5	222	1	0.000000
21	5	222	2	0.000000

Source TypeID	Road TypeID	Hour DayID	avgSpeed BinID	avgSpeed Fraction
21	5	222	3	0.000000
21	5	222	4	0.000000
21	5	222	5	0.000000
21	5	222	6	0.000000
21	5	222	7	0.137994
21	5	222	8	0.862006
21	5	222	9	0.000000
21	5	222	10	0.000000
21	5	222	11	0.000000
21	5	222	12	0.000000
21	5	222	13	0.000000
21	5	222	14	0.000000
21	5	222	15	0.000000
21	5	222	16	0.000000
21	5	232	1	0.000000
21	5	232	2	0.000000
21	5	232	3	0.000000
21	5	232	4	0.000000
21	5	232	5	0.000000
21	5	232	6	0.000000
21	5	232	7	0.137994
21	5	232	8	0.862006
21	5	232	9	0.000000
21	5	232	10	0.000000
21	5	232	11	0.000000
21	5	232	12	0.000000
21	5	232	13	0.000000
21	5	232	14	0.000000
21	5	232	15	0.000000
21	5	232	16	0.000000
21	5	242	1	0.000000
21	5	242	2	0.000000
21	5	242	3	0.000000
21	5	242	4	0.000000
21	5	242	5	0.000000
21	5	242	6	0.000000
21	5	242	7	0.137994
21	5	242	8	0.862006
21	5	242	9	0.000000
21	5	242	10	0.000000
21	5	242	11	0.000000
21	5	242	12	0.000000
21	5	242	13	0.000000
21	5	242	14	0.000000
21	5	242	15	0.000000
21	5	242	16	0.000000

[AVFT] (SourceTypeID 42: Transit Bus)

Source TypeID	Model YearID	Fuel TypeID	Eng TechID	fuelEng Fraction
42	1960	1	1	0.000000
42	1960	2	1	1.000000
42	1960	3	1	0.000000
42	1961	1	1	0.000000
42	1961	2	1	1.000000
42	1961	3	1	0.000000
42	1962	1	1	0.000000
42	1962	2	1	1.000000
42	1962	3	1	0.000000
42	1963	1	1	0.000000
42	1963	2	1	1.000000
42	1963	3	1	0.000000
42	1964	1	1	0.000000

Source TypeID	Model YearID	Fuel TypeID	Eng TechID	fuelEng Fraction
42	1964	2	1	1.000000
42	1964	3	1	0.000000
42	1965	1	1	0.000000
42	1965	2	1	1.000000
42	1965	3	1	0.000000
42	1966	1	1	0.000000
42	1966	2	1	1.000000
42	1966	3	1	0.000000
42	1967	1	1	0.000000
42	1967	2	1	1.000000
42	1967	3	1	0.000000
42	1968	1	1	0.000000
42	1968	2	1	1.000000

Source TypeID	Model YearID	Fuel TypeID	Eng TechID	fuelEng Fraction
42	1968	3	1	0.000000
42	1969	1	1	0.000000
42	1969	2	1	1.000000
42	1969	3	1	0.000000
42	1970	1	1	0.000000
42	1970	2	1	1.000000
42	1970	3	1	0.000000
42	1971	1	1	0.000000
42	1971	2	1	1.000000
42	1971	3	1	0.000000
42	1972	1	1	0.000000
42	1972	2	1	1.000000
42	1972	3	1	0.000000
42	1973	1	1	0.000000
42	1973	2	1	1.000000
42	1973	3	1	0.000000
42	1974	1	1	0.000000
42	1974	2	1	1.000000
42	1974	3	1	0.000000
42	1975	1	1	0.000000
42	1975	2	1	1.000000
42	1975	3	1	0.000000
42	1976	1	1	0.000000
42	1976	2	1	1.000000
42	1976	3	1	0.000000
42	1977	1	1	0.000000
42	1977	2	1	1.000000
42	1977	3	1	0.000000
42	1978	1	1	0.000000
42	1978	2	1	1.000000
42	1978	3	1	0.000000
42	1979	1	1	0.000000
42	1979	2	1	1.000000
42	1979	3	1	0.000000
42	1980	1	1	0.000000
42	1980	2	1	1.000000
42	1980	3	1	0.000000
42	1981	1	1	0.000000
42	1981	2	1	1.000000
42	1981	3	1	0.000000
42	1982	1	1	0.000000
42	1982	2	1	1.000000
42	1982	3	1	0.000000
42	1983	1	1	0.000000
42	1983	2	1	1.000000

Source TypeID	Model YearID	Fuel TypeID	Eng TechID	fuelEng Fraction
42	1983	3	1	0.000000
42	1984	1	1	0.001639
42	1984	2	1	0.998361
42	1984	3	1	0.000000
42	1985	1	1	0.003180
42	1985	2	1	0.996820
42	1985	3	1	0.000000
42	1986	1	1	0.004762
42	1986	2	1	0.995238
42	1986	3	1	0.000000
42	1987	1	1	0.000000
42	1987	2	1	1.000000
42	1987	3	1	0.000000
42	1988	1	1	0.000879
42	1988	2	1	0.999121
42	1988	3	1	0.000000
42	1989	1	1	0.000000
42	1989	2	1	0.999440
42	1989	3	1	0.000560
42	1990	1	1	0.001386
42	1990	2	1	0.998614
42	1990	3	1	0.000000
42	1991	1	1	0.003914
42	1991	2	1	0.996086
42	1991	3	1	0.000000
42	1992	1	1	0.000850
42	1992	2	1	0.988095
42	1992	3	1	0.011054
42	1993	1	1	0.005233
42	1993	2	1	0.929356
42	1993	3	1	0.065411
42	1994	1	1	0.013284
42	1994	2	1	0.950985
42	1994	3	1	0.035731
42	1995	1	1	0.031597
42	1995	2	1	0.881597
42	1995	3	1	0.086806
42	1996	1	1	0.010136
42	1996	2	1	0.927298
42	1996	3	1	0.062566
42	1997	1	1	0.001076
42	1997	2	1	0.895615
42	1997	3	1	0.103309
42	1998	1	1	0.001219
42	1998	2	1	0.897367

Source TypeID	Model YearID	Fuel TypeID	Eng TechID	fuelEng Fraction
42	1998	3	1	0.101414
42	1999	1	1	0.001580
42	1999	2	1	0.907942
42	1999	3	1	0.090478
42	2000	1	1	0.067590
42	2000	2	1	0.845526
42	2000	3	1	0.086884
42	2001	1	1	0.097174
42	2001	2	1	0.811221
42	2001	3	1	0.091605
42	2002	1	1	0.118837
42	2002	2	1	0.767464
42	2002	3	1	0.113698
42	2003	1	1	0.142492
42	2003	2	1	0.791905
42	2003	3	1	0.065603
42	2004	1	1	0.162960
42	2004	2	1	0.802204
42	2004	3	1	0.034836
42	2005	1	1	0.161788
42	2005	2	1	0.776347
42	2005	3	1	0.061866
42	2006	1	1	0.173180
42	2006	2	1	0.803633
42	2006	3	1	0.023186
42	2007	1	1	0.000000
42	2007	2	1	1.000000
42	2007	3	1	0.000000
42	2008	1	1	0.000000
42	2008	2	1	0.909091
42	2008	3	1	0.090909
42	2009	1	1	0.000000
42	2009	2	1	0.000000
42	2009	3	1	1.000000
42	2010	1	1	0.000000
42	2010	2	1	1.000000
42	2010	3	1	0.000000
42	2011	1	1	0.000000
42	2011	2	1	0.435897
42	2011	3	1	0.564103
42	2012	1	1	0.000000
42	2012	2	1	0.000000
42	2012	3	1	1.000000
42	2013	1	1	0.018868
42	2013	2	1	0.025157
42	2013	3	1	0.955975
42	2014	1	1	0.187500
42	2014	2	1	0.812500
42	2014	3	1	0.000000
42	2015	1	1	0.069767
42	2015	2	1	0.000000
42	2015	3	1	0.930233
42	2016	1	1	0.000000
42	2016	2	1	0.552632
42	2016	3	1	0.447368
42	2017	1	1	0.046512
42	2017	2	1	0.232558
42	2017	3	1	0.720930
42	2018	1	1	0.034286
42	2018	2	1	0.228571
42	2018	3	1	0.737143
42	2019	1	1	0.160000
42	2019	2	1	0.360000
42	2019	3	1	0.480000
42	2020	1	1	0.010526
42	2020	2	1	0.536842
42	2020	3	1	0.452632
42	2021	1	1	0.137906
42	2021	2	1	0.802787
42	2021	3	1	0.059307
42	2022	1	1	0.137906
42	2022	2	1	0.802787
42	2022	3	1	0.059307
42	2023	1	1	0.137906
42	2023	2	1	0.802787
42	2023	3	1	0.059307
42	2024	1	1	0.137906
42	2024	2	1	0.802787
42	2024	3	1	0.059307
42	2025	1	1	0.137906
42	2025	2	1	0.802787
42	2025	3	1	0.059307
42	2026	1	1	0.137906
42	2026	2	1	0.802787
42	2026	3	1	0.059307
42	2027	1	1	0.137906
42	2027	2	1	0.802787
42	2027	3	1	0.059307
42	2028	1	1	0.137906
42	2028	2	1	0.802787

Source TypeID	Model YearID	Fuel TypeID	Eng TechID	fuelEng Fraction
42	2028	3	1	0.059307
42	2029	1	1	0.137906
42	2029	2	1	0.802787
42	2029	3	1	0.059307
42	2030	1	1	0.137906
42	2030	2	1	0.802787
42	2030	3	1	0.059307
42	2031	1	1	0.137906
42	2031	2	1	0.802787
42	2031	3	1	0.059307
42	2032	1	1	0.137906
42	2032	2	1	0.802787
42	2032	3	1	0.059307
42	2033	1	1	0.137906
42	2033	2	1	0.802787
42	2033	3	1	0.059307
42	2034	1	1	0.137906
42	2034	2	1	0.802787
42	2034	3	1	0.059307
42	2035	1	1	0.137906
42	2035	2	1	0.802787
42	2035	3	1	0.059307
42	2036	1	1	0.137906
42	2036	2	1	0.802787
42	2036	3	1	0.059307
42	2037	1	1	0.137906
42	2037	2	1	0.802787
42	2037	3	1	0.059307
42	2038	1	1	0.137906
42	2038	2	1	0.802787
42	2038	3	1	0.059307
42	2039	1	1	0.137906
42	2039	2	1	0.802787
42	2039	3	1	0.059307
42	2040	1	1	0.137906
42	2040	2	1	0.802787
42	2040	3	1	0.059307
42	2041	1	1	0.137906
42	2041	2	1	0.802787
42	2041	3	1	0.059307
42	2042	1	1	0.137906
42	2042	2	1	0.802787
42	2042	3	1	0.059307
42	2043	1	1	0.137906
42	2043	2	1	0.802787

Source TypeID	Model YearID	Fuel TypeID	Eng TechID	fuelEng Fraction
42	2043	3	1	0.059307
42	2044	1	1	0.137906
42	2044	2	1	0.802787
42	2044	3	1	0.059307
42	2045	1	1	0.137906
42	2045	2	1	0.802787
42	2045	3	1	0.059307
42	2046	1	1	0.137906
42	2046	2	1	0.802787
42	2046	3	1	0.059307
42	2047	1	1	0.137906
42	2047	2	1	0.802787
42	2047	3	1	0.059307
42	2048	1	1	0.137906
42	2048	2	1	0.802787
42	2048	3	1	0.059307
42	2049	1	1	0.137906
42	2049	2	1	0.802787
42	2049	3	1	0.059307
42	2050	1	1	0.137906
42	2050	2	1	0.802787
42	2050	3	1	0.059307
42	2051	1	1	0.137906
42	2051	2	1	0.802787
42	2051	3	1	0.059307
42	2052	1	1	0.137906
42	2052	2	1	0.802787
42	2052	3	1	0.059307
42	2053	1	1	0.137906
42	2053	2	1	0.802787
42	2053	3	1	0.059307
42	2054	1	1	0.137906
42	2054	2	1	0.802787
42	2054	3	1	0.059307
42	2055	1	1	0.137906
42	2055	2	1	0.802787
42	2055	3	1	0.059307
42	2056	1	1	0.137906
42	2056	2	1	0.802787
42	2056	3	1	0.059307
42	2057	1	1	0.137906
42	2057	2	1	0.802787
42	2057	3	1	0.059307
42	2058	1	1	0.137906
42	2058	2	1	0.802787

Source TypeID	Model YearID	Fuel TypeID	Eng TechID	fuelEng Fraction
42	2058	3	1	0.059307
42	2059	1	1	0.137906
42	2059	2	1	0.802787
42	2059	3	1	0.059307

Source TypeID	Model YearID	Fuel TypeID	Eng TechID	fuelEng Fraction
42	2060	1	1	0.137906
42	2060	2	1	0.802787
42	2060	3	1	0.059307

RunSpec Summary (Maricopa County)
* Output Database Server Name: [using default]

* Scale:
Domain/Scale: County
Calculation Type: Inventory

* Time Spans:
Time Aggregation Level: Hour
Years: 2020
Months: January - December
Days: Weekend and Weekdays
Hours: Start Hour 00:00 - 00:59 | End Hour 23:00 - 23:59

* Geographic Bounds:
Region: County
Selections: ARIZONA - Maricopa County
Domain Input Database: c04013y2020

* Vehicles/Equipment
On Road Vehicle Equipment:
Compressed natural Gas (CNG) - Other Buses
Compressed natural Gas (CNG) - Transit Bus
Compressed natural Gas (CNG) - School Bus
Compressed natural Gas (CNG) - Refuse Truck
Compressed natural Gas (CNG) - Single Unit Short-haul Truck
Compressed natural Gas (CNG) - Single Unit Long-haul Truck
Compressed natural Gas (CNG) - Motor Home
Compressed natural Gas (CNG) - Combination Short-haul Truck
Diesel Fuel - Passenger Car
Diesel Fuel - Passenger Truck
Diesel Fuel - Light Commercial Truck
Diesel Fuel - Other Buses
Diesel Fuel - Transit Bus
Diesel Fuel - School Bus
Diesel Fuel - Refuse Truck
Diesel Fuel - Single Unit Short-haul Truck
Diesel Fuel - Single Unit Long-haul Truck
Diesel Fuel - Motor Home
Diesel Fuel - Combination Short-haul Truck
Diesel Fuel - Combination Long-haul Truck
Electricity - Passenger Car
Electricity - Passenger Truck
Electricity - Light Commercial Truck
Ethanol (E-85) - Passenger Car
Ethanol (E-85) - Passenger Truck

Ethanol (E-85) - Light Commercial Truck
Gasoline - Motorcycle
Gasoline - Passenger Car
Gasoline - Passenger Truck
Gasoline - Light Commercial Truck
Gasoline - Other Buses
Gasoline - Transit Bus
Gasoline - School Bus
Gasoline - Refuse Truck
Gasoline - Single Unit Short-haul Truck
Gasoline - Single Unit Long-haul Truck
Gasoline - Motor Home
Gasoline - Combination Short-haul Truck

* Road Type
Off-Network
Rural Restricted Access
Rural Unrestricted Access
Urban Restricted Access
Urban Unrestricted Access

* Pollutants and Processes
Total Gaseous Hydrocarbons - Running Exhaust
Total Gaseous Hydrocarbons - Start Exhaust
Total Gaseous Hydrocarbons - Evap Permeation
Total Gaseous Hydrocarbons - Evap Fuel Vapor Venting
Total Gaseous Hydrocarbons - Evap Fuel Leaks
Total Gaseous Hydrocarbons - Crankcase Running Exhaust
Total Gaseous Hydrocarbons - Crankcase Start Exhaust
Total Gaseous Hydrocarbons - Crankcase Extended Idle Exhaust
Total Gaseous Hydrocarbons - Refueling Displacement Vapor Loss
Total Gaseous Hydrocarbons - Refueling Spillage Loss
Total Gaseous Hydrocarbons - Extended Idle Exhaust
Total Gaseous Hydrocarbons - Auxiliary Power Exhaust
Carbon Monoxide (CO) - Running Exhaust
Carbon Monoxide (CO) - Start Exhaust
Carbon Monoxide (CO) - Crankcase Running Exhaust
Carbon Monoxide (CO) - Crankcase Start Exhaust
Carbon Monoxide (CO) - Crankcase Extended Idle Exhaust
Carbon Monoxide (CO) - Extended Idle Exhaust
Carbon Monoxide (CO) - Auxiliary Power Exhaust
Oxides of Nitrogen (NOx) - Running Exhaust
Oxides of Nitrogen (NOx) - Start Exhaust
Oxides of Nitrogen (NOx) - Crankcase Running Exhaust
Oxides of Nitrogen (NOx) - Crankcase Start Exhaust
Oxides of Nitrogen (NOx) - Crankcase Extended Idle Exhaust

Oxides of Nitrogen (NOx) - Extended Idle Exhaust
Oxides of Nitrogen (NOx) - Auxiliary Power Exhaust
Methane (CH4) - Running Exhaust
Methane (CH4) - Start Exhaust
Methane (CH4) - Crankcase Running Exhaust
Methane (CH4) - Crankcase Start Exhaust
Methane (CH4) - Crankcase Extended Idle Exhaust
Methane (CH4) - Refueling Displacement Vapor Loss
Methane (CH4) - Refueling Spillage Loss
Methane (CH4) - Extended Idle Exhaust
Methane (CH4) - Auxiliary Power Exhaust
Non-Methane Hydrocarbons - Running Exhaust
Non-Methane Hydrocarbons - Start Exhaust
Non-Methane Hydrocarbons - Evap Permeation
Non-Methane Hydrocarbons - Evap Fuel Vapor Venting
Non-Methane Hydrocarbons - Evap Fuel Leaks
Non-Methane Hydrocarbons - Crankcase Running Exhaust
Non-Methane Hydrocarbons - Crankcase Start Exhaust
Non-Methane Hydrocarbons - Crankcase Extended Idle Exhaust
Non-Methane Hydrocarbons - Refueling Displacement Vapor Loss
Non-Methane Hydrocarbons - Refueling Spillage Loss
Non-Methane Hydrocarbons - Extended Idle Exhaust
Non-Methane Hydrocarbons - Auxiliary Power Exhaust
Non-Methane Organic Gases - Running Exhaust
Non-Methane Organic Gases - Start Exhaust
Non-Methane Organic Gases - Evap Permeation
Non-Methane Organic Gases - Evap Fuel Vapor Venting
Non-Methane Organic Gases - Evap Fuel Leaks
Non-Methane Organic Gases - Crankcase Running Exhaust
Non-Methane Organic Gases - Crankcase Start Exhaust
Non-Methane Organic Gases - Crankcase Extended Idle Exhaust
Non-Methane Organic Gases - Refueling Displacement Vapor Loss
Non-Methane Organic Gases - Refueling Spillage Loss
Non-Methane Organic Gases - Extended Idle Exhaust
Non-Methane Organic Gases - Auxiliary Power Exhaust
Total Organic Gases - Running Exhaust
Total Organic Gases - Start Exhaust
Total Organic Gases - Evap Permeation
Total Organic Gases - Evap Fuel Vapor Venting
Total Organic Gases - Evap Fuel Leaks
Total Organic Gases - Crankcase Running Exhaust
Total Organic Gases - Crankcase Start Exhaust
Total Organic Gases - Crankcase Extended Idle Exhaust
Total Organic Gases - Refueling Displacement Vapor Loss
Total Organic Gases - Refueling Spillage Loss
Total Organic Gases - Extended Idle Exhaust

Total Organic Gases - Auxiliary Power Exhaust
Volatile Organic Compounds - Running Exhaust
Volatile Organic Compounds - Start Exhaust
Volatile Organic Compounds - Evap Permeation
Volatile Organic Compounds - Evap Fuel Vapor Venting
Volatile Organic Compounds - Evap Fuel Leaks
Volatile Organic Compounds - Crankcase Running Exhaust
Volatile Organic Compounds - Crankcase Start Exhaust
Volatile Organic Compounds - Crankcase Extended Idle Exhaust
Volatile Organic Compounds - Refueling Displacement Vapor Loss
Volatile Organic Compounds - Refueling Spillage Loss
Volatile Organic Compounds - Extended Idle Exhaust
Volatile Organic Compounds - Auxiliary Power Exhaust

* Output
General Output:
Output Database: c04013y2020_out
Units: Mass Units (Grams)
Energy Units (Joules)
Distance Units (Miles)
Activity: Distance Traveled
Source Hours
Hotelling Hours
Source Hours Operating
Source Hours Parked
Population
Starts
Output Emissions Detail:
Output Aggregation: Time (24-Hour Day)
Geographic (COUNTY)
For All Vehicle/Equipment Categories: Fuel Type
Emission Process
On Road: Road Type
Source Use Type
Regulatory Class

Appendix D. Emissions from Facilities Treated as Nonpoint Sources in the 2020 Periodic Emissions Inventory

The table below lists facilities whose reported 2020 emissions have been included in the area source categories of this 2020 Periodic Emissions Inventory for Ozone Precursors.

Table D–1: Emissions (tons/year) from facilities whose emissions are reflected in nonpoint source categories in the 2020 Periodic Emissions Inventory.

Facility ID	Facility Name	Address	CO	NO_X	VOC
F000002	Green Acres Mortuary and Cemetery	401 N. Hayden Rd., Scottsdale	0.0	0.0	0.0
F000003	Empire Machinery Co	1725 S. Country Club Dr., Mesa	1.5	4.5	3.7
F000005	Phoenix Newspapers Inc	22600 N. 19th Ave., Phoenix	0.2	0.5	2.9
F000021	Salt River Project - Horseshoe Dam	N. Horseshoe Dam Rd., Cave Creek	3.0	2.4	0.7
F000022	Oldcastle Precast Inc	411 E. Frye Rd., Chandler	0.0	0.0	5.3
F000030	Crafco	6975 W. Crafco Way., Chandler	0.2	0.3	0.1
F000032	Phoenix Heat Treating Inc	2405 W. Mohave Rd., Phoenix	1.3	1.5	1.7
F000033	Star Roofing Inc	9201 N. 9th Ave., Phoenix			0.8
F000037	Palo Verde Nuclear Generating Station	5801 S. Wintersburg Rd., Tonopah	14.8	56.7	8.6
F000042	APS Aligned Energy Data Center	2500 W. Union Hills Dr., Phoenix	7.2	7.2	0.8
F000048	Northwest Water Reclamation Plant	960 N. Riverview, Mesa	4.0	3.9	1.2
F000066	City Of Mesa - Mesa Arts Center	1 E. Main St., Mesa	2.9	3.8	0.8
F000079	Glendale Mun Sanitary Landfill/Fld Oper	11480 W. Glendale Ave., Glendale	9.4	5.4	2.3
F000096	Sunstate Equipment Co LLC	7722 W. Olive Ave., Peoria			0.4
F000107	Magellan Aerospace	5440 W. Missouri Ave., Glendale	0.8	1.0	23.0
F000108	Madison Granite Supplies	29925 N. North Valley Pkwy., Phoenix	42.6	21.4	4.6
F000110	Bp Graphics Inc	3940 W. Montecito Ave., Phoenix			2.4
F000111	Phoenix Indian Medical Center	4212 N. 16th St., Phoenix	0.6	1.5	0.1
F000113	Superlite Block	301 E. Baseline Rd., Gilbert	0.2	0.3	0.0
F000114	Hydro Conduit Corp	1011 S. 43rd Ave., Phoenix	0.0	0.0	0.0
F000123	Building Products Co	4850 W. Buckeye Rd., Phoenix	7.6	3.1	1.5
F000125	Boral Roofing LLC	1832 S. 51st Ave., Phoenix	0.4	0.5	1.9

Facility ID	Facility Name	Address	CO	NO_X	VOC
F000126	Corrosion Engineering, Inc.	145 S. Nina Circle, Mesa	0.6	0.8	10.4
F000128	United Dairymen Of Arizona	2008 S. Hardy Dr., Tempe	47.6	28.3	2.9
F000132	AF Lorts Manufacturing Company Inc	15836 W. Eddie Albert Way., Goodyear			10.7
F000133	The Boeing Company	5000 E. McDowell Rd., Mesa	1.5	1.9	23.8
F000148	Schuff Steel Co	420 S. 19th Ave., Phoenix			2.0
F000150	Western Stucco Products Co Inc	6101 N. 53rd Dr., Glendale			
F000151	Copper State Rubber Of Arizona	10485 W. Roosevelt St., Avondale	0.2	0.2	2.2
F000154	Carl T. Hayden VA Medical Center	650 E. Indian School Rd., Phoenix	2.1	1.9	0.5
F000159	Olson Precast Of Arizona Inc	3045 S. 35th Ave., Phoenix			1.2
F000173	East Valley Bus Operations and Maintenance	2050 W. Rio Salado Pkwy., Tempe	0.1	0.3	0.1
F000180	Pioneer Landscaping Materials Inc	31906 W. Camelback Rd., Buckeye			3.2
F000186	Tech Group Phoenix	470 W. Vaughn St., Tempe			5.4
F000192	Marlam Industries Inc	834 E. Hammond Ln., Phoenix	0.0	0.0	24.6
F000202	Cutter Aviation Deer Valley	732 W. Deer Valley Rd., Phoenix			17.4
F000204	Storopack Inc	1423 S. 9th St., Phoenix	0.1	0.1	2.7
F000205	Coreslab Structures (Ariz) Inc	5026 S. 43rd Ave., Phoenix			6.2
F000211	Parker Hannifin Corp	7777 N. Glen Harbor Blvd., Glendale			37.1
F000216	Western Area Power Admin	615 S. 43rd Ave., Phoenix	0.1	0.3	0.0
F000218	Gold Bond Building Products LLC	1414 E. Hadley St., Phoenix	23.3	16.3	13.4
F000219	Standard Printing Co Inc	3540 W. Lincoln St., Phoenix	0.0	0.0	0.5
F000220	Rogers Corporation - Roosevelt Ave Facility	100 S. Roosevelt Ave., Chandler	12.0	1.8	9.0
F000221	Coplin Mfg Inc	7505 W. Washington St., Tolleson			2.9
F000266	Red Mountain Mining Inc	4520 N. Power Rd., Mesa	1.0	4.7	0.7
F000273	Meldrum Mortuary and Crematory	52 N. MacDonald., Mesa	0.0	0.1	0.0

Facility ID	Facility Name	Address	CO	NO_X	VOC
F000275	Best Funeral Services, Inc.	9380 W. Peoria Ave., Peoria	0.1	1.2	0.0
F000278	Kilauea Crushers Inc	Highway 74, Wickenburg	4.2	19.7	1.6
F000279	Kilauea Crushers Inc	16402 S. Tuthill Rd., Buckeye	4.1	19.1	1.6
F000282	Ironwood Lithographers Inc	455 S. 52nd St., Tempe			0.2
F000285	Brewer Cote Of Arizona	5226 W. Missouri Ave., Glendale	0.0		0.0
F000287	Jeld-Wen Inc	1002 S. 54th Ave., Phoenix			0.7
F000293	Sportex Apparel Of Arizona Inc	2020 W. 4th St., Tempe	0.0	0.0	0.8
F000301	ZF Passive Safety Systems US Inc	11202 E. Germann Rd., Mesa	0.3	0.4	4.2
F000317	Morton Salt Inc	13000 W. Glendale Ave., Glendale	0.5	0.7	0.2
F000389	Buse Printing and Advertising - Harvard	1616 E. Harvard St., Phoenix			1.3
F000390	Buse Printing and Advertising - 21st	903 N. 21st Ave., Phoenix			1.3
F000396	JPCI Services	4702 E. Virginia St., Mesa			2.7
F000398	Copperstate Cabinet Co Inc	1932 W. North Ln., Phoenix			6.7
F000412	Independent Newsmedia Inc Usa	23043 N. 16th Ln., Phoenix			2.0
F000413	Atlas Roofing Corporation	40 S. 45th Ave., Phoenix	0.0	0.0	9.9
F000414	Shamrock Foods Co	2228 N. Black Canyon Hwy., Phoenix	9.4	11.2	1.6
F000418	Courier Graphics Corp	2621 S. 37th St., Phoenix	0.4	0.5	0.6
F000419	Medtronic - Tempe	2343 W. Medtronic Way., Tempe	0.8	0.9	16.7
F000434	Baker Commodities	3602 W. Elwood St., Phoenix	0.0	4.3	2.5
F000435	American Fence and Security Co Inc	2737 West Virginia Ave., Phoenix			7.6
F000437	Mission Uniform and Linen Service	2652 S. 16th St., Phoenix	1.9	2.9	0.1
F000444	Cavco Industries LLC - Durango Plant	2502 W. Durango St., Phoenix			9.5
F000447	Henry Products Inc	302 S. 23rd Ave., Phoenix	0.4	0.5	17.1
F000449	Quality Block Inc	3035 S. 35th Ave., Phoenix	1.1	1.3	0.1
F000452	Forest Designs	3230 E. Roeser Rd., Phoenix			6.6
F000454	Able Steel Fabricators	4150 E. Quartz Circle, Mesa			2.8
F000456	Glenn Weinberger Topsoil Inc	3425 S. 43rd Ave., Phoenix			0.5

Facility ID	Facility Name	Address	CO	NO_X	VOC
F000462	Swift Transportation Co Inc	2200 S. 75th Ave., Phoenix	0.2	0.3	3.9
F000464	ATandT AZ 3340	1231 W. University Dr., Mesa	0.2	1.0	0.0
F000468	Farmer's Gin Inc	8400 S. Turner Rd., Buckeye	0.0	0.1	0.0
F000469	Oakcraft Inc	7733 W. Olive Ave., Peoria	0.1	0.1	71.8
F000470	Phoenix Metalcraft Inc	3845 N. 29th Ave., Phoenix			0.9
F000523	Southwest Airlines Co	4153 E. Sky Harbor Blvd., Phoenix	0.3	0.6	3.9
F000536	Pete King Construction Company	11040 N. 19th Ave., Phoenix			0.0
F000634	Parks and Sons Of Sun City Inc	11629 NW. Grand Ave., El Mirage	0.0	0.0	2.5
F000641	Calvert Oil Co	214 E. Arizona Eastern Ave., Buckeye			0.6
F000647	OT Caljet	57 N. 57th Ave., Phoenix			8.4
F000657	Holsum Bakery Inc	2322 W. Lincoln St., Phoenix	2.3	2.8	7.1
F000658	Holsum Bakery	9600 W. Buckeye Rd., Tolleson	1.2	1.4	5.7
F000666	The Inventure Group Inc	3500 S. La Cometa, Goodyear	4.1	4.9	0.4
F000686	Arizona Galvanizing, Inc.	15775 W. Elwood St., Goodyear	3.3	2.3	0.2
F000702	Intel Corp Chandler Campus (Fab 6)	5000 W. Chandler Blvd., Chandler	8.1	10.7	23.1
F000719	Purcells Western States Tire	420 S. 35th Ave., Phoenix	0.0	0.0	5.3
F000726	Schreiber Foods Inc	2122 S. Hardy Dr., Tempe	9.9	11.8	0.6
F000729	Mesa Fully Formed LLC	1111 S. Sirrine St., Mesa			8.4
F000751	Ben Franklin Press Inc	910 S. Hohokam Dr., Tempe			1.0
F000752	Hickman's Egg Ranch	32425 W. Salome Highway, Arlington	1.2	4.0	1.9
F000757	United Printing and Mailing	4833 S. 38th St., Phoenix			5.7
F000763	Arizona State University Tempe Campus	1551 S. Rural Rd., Tempe	10.4	23.2	1.8
F000789	Microchip Technology Inc	1200 S. 52nd St., Tempe	5.2	8.2	7.2
F000792	Pilot Travel Center #1180	41112 W. Indian School Rd., Tonopah			1.8
F000803	Litho Tech Inc	2020 N. 22nd Ave., Phoenix			1.5
F000804	Craftsmen In Wood Mfg. Co.	5441 W. Hadley St., Phoenix	0.2	0.1	4.3
F000806	Thermo Fluids Inc.	4301 W. Jefferson St., Phoenix			0.1
F000808	Amber Steel Fabrication Inc	11331 E. Germann Rd., Chandler			18.5

Facility ID	Facility Name	Address	CO	NO_X	VOC
F000809	Sumco Southwest Corporation	19801 N. Tatum Blvd., Phoenix	2.1	12.3	9.7
F000810	Serenity Mortuary Services	2514 S. 6th Ave., Phoenix	0.1	2.2	0.0
F000815	Camino Del Sol Funeral Chapel and Cremation	13738 W. Camino Del Sol, Sun City West	0.0	0.4	0.0
F000824	Western States Petroleum	450 S. 15th Ave., Phoenix			11.3
F000834	Paradise Memorial Crematory	9300 E. Shea Blvd., Scottsdale	0.2	2.9	0.1
F000858	International Printing Company	2241 S. 7th St., Phoenix			0.9
F000873	Catalina Roofing and Supply Inc	2021 W. Williams Dr., Phoenix			0.1
F000876	Don Sanderson Ford Inc	6400 N. 51st Ave., Glendale	0.0	0.0	2.1
F001186	91st Ave Wastewater Treatment Plant	5615 S. 91st Ave., Tolleson	1.6	4.2	1.9
F001209	SR 85 Landfill	28633 W. Patterson Rd., Buckeye	8.2	6.8	1.9
F001216	City Clerk Dept Printing and Design Svcs	2640 S. 22nd Ave., Phoenix			0.1
F001256	Costco Wholesale #427	15255 N. Hayden Rd., Scottsdale			7.9
F001257	Costco Wholesale #436	1445 W. Elliot Rd., Tempe			13.9
F001258	Costco Wholesale #465	4502 E. Oak St., Phoenix			13.9
F001259	Costco Wholesale #481	1415 N. Arizona Ave., Gilbert			16.1
F001260	Costco Gasoline #665	1646 W. Montebello Ave., Phoenix			10.7
F001261	Costco Gasoline #490	19001 N. 27th Ave., Phoenix			17.0
F001262	Costco Wholesale #674	17550 N. 79th Ave., Glendale			16.6
F001263	Costco Wholesale #691	10000 W. McDowell Rd., Avondale			14.6
F001264	Costco Wholesale #736	595 S. Galleria Way., Chandler			15.3
F001265	Costco Gasoline #644	2002 E. Pecos Rd., Gilbert			16.8
F001266	Costco Gasoline #738	2454 E. Beardsley Rd., Phoenix			15.5
F001267	Costco Gasoline Loc. 827 (Air)	3801 N. 33rd Ave., Phoenix			8.3
F001268	Costco Gasoline #1028	7525 E. Hampton Rd., Mesa			17.7
F001269	Costco Wholesale #1058	4550 E. Cactus Rd., Phoenix			15.0
F001270	Honor Health Shea Medical Center	9003 E. Shea Blvd., Scottsdale	9.2	13.0	4.9
F001280	ASPC-Lewis	26700 S. Highway 85, Buckeye	3.3	8.9	2.7

Facility ID	Facility Name	Address	CO	NO_X	VOC
F001328	Pet and Animal Lovers Service (Pals)	3629 N. 40th Ave., Phoenix	0.1	2.7	0.0
F001331	Quikjet - Monroe I and II Terminals	5119 W. Monroe St., Phoenix	0.2	0.1	49.7
F001332	Caljet	125 N. 53rd Ave., Phoenix	0.1	0.0	39.8
F001334	Phoenix-Mesa Gateway Airport Authority	5835 S. Sossaman Rd., Mesa	0.3	1.4	1.2
F001347	Southwest Regional Landfill	24427 S. Highway 85, Buckeye	3.1	18.5	6.9
F001363	JW Marriott Desert Ridge Hotel	5350 E. Marriott Dr., Phoenix	3.0	3.6	0.4
F001375	ME Global Inc	5857 S. Kyrene Rd., Tempe	53.4	17.3	8.6
F001385	Arizona Custom Cabinets Inc	8729 N. 78th Ave., Peoria			4.2
F001391	Allied Tube And Conduit	2525 N. 27th Ave., Phoenix	0.4	0.5	9.8
F001392	Quickrete Companies - Arizona	26807 W. Baseline Rd., Buckeye	1.7	3.0	0.2
F001407	Honor Health Deer Valley Medical Center	19829 N. 27th Ave., Phoenix	2.8	4.5	0.3
F001408	Honor Health John C. Lincoln Medical Center	250 E. Dunlap Ave., Phoenix	3.8	5.3	0.3
F001423	Superlite Block	4021 S. 19th Ave., Phoenix	0.2	0.3	0.0
F001424	Superlite West Phoenix	4626 N. 42nd Ave., Phoenix	0.6	0.7	0.0
F001438	Panoramic Press Inc	2920 N. 35th St., Phoenix			1.0
F001443	Pan Glo Services LLC	2401 W. Sherman St., Phoenix	0.4	0.5	84.3
F001449	S-L Snacks Az, LLC	1200 N. Bullard Ave., Goodyear	6.9	8.2	9.3
F001450	Bartlett Lake Marina	20808 E. Bartlett Dam Rd., Carefree	3.8	17.8	3.4
F001451	Print Time	2634 S. 16th St., Phoenix			0.1
F001458	Ping Inc	2201 W. Desert Cove Ave., Phoenix	0.1	0.2	9.6
F001460	Speedflo Business Forms	5606 N. 54th Ave., Glendale			0.6
F001473	Super Radiator Coils Ltd	2610 S. 21st St., Phoenix	0.3	0.3	0.0
F001481	Pepsico	409 S. 104th Ave., Tolleson	14.2	7.0	8.0
F001482	Ameripride Linen and Apparel Service	6025 W. Van Buren St., Phoenix	1.1	1.3	0.2
F001495	Banner Baywood Medical Center	6644 E. Baywood Ave., Mesa	0.5	1.5	0.1
F001496	Banner Boswell Medical Center	10401 W. Thunderbird Blvd., Sun City	0.3	1.3	0.1
F001497	Banner Good Samaritan Medical Center	1111 E. McDowell Rd., Phoenix	36.0	44.9	2.5

Facility ID	Facility Name	Address	CO	NO_X	VOC
F001498	Banner Desert Medical Center	1400 S. Dobson Rd., Mesa	1.5	5.9	0.5
F001499	Banner Thunderbird Medical Center	5555 W. Thunderbird Rd., Glendale	3.1	4.5	0.3
F001500	Banner Mesa Medical Center	525 W. Brown Rd., Mesa	0.5	1.1	0.1
F001502	Banner Gateway Medical Center	1900 N. Higley Rd., Gilbert	2.3	3.1	0.2
F001507	St Luke's Medical Center	1800 E. Van Buren St., Phoenix	0.1	2.2	0.1
F001512	Schaumaplast Precision Foam Molding LP	21 N. 39th Ave., Phoenix	0.0	0.0	9.8
F001525	Chandler Regional Medical Center	1955 W. Frye Rd., Chandler	2.7	3.9	0.9
F001528	Honeywell International Inc	1300 W. Warner Rd., Tempe	1.7	2.2	10.9
F001530	Honeywell Engines Sys and Service Phx R and O	1944 E. Sky Harbor Circle, Phoenix	0.6	3.2	4.0
F001548	Eagle Roofing Products	4602 W. Elwood St., Phoenix	1.1	1.4	2.0
F001553	MCI	3415 E. Indian School Rd., Phoenix	0.8	3.3	0.1
F001554	One Touch Point-West	525 W. Alameda Dr., Tempe			1.8
F001560	Coffman Specialties Inc	Loop 101 and SR 51 interchange., Phoenix	0.3	1.8	0.1
F001564	Michael L Riddle Painting Inc	5922 N. Black Canyon Highway, Phoenix			15.8
F001568	Hanson Aggregates, LLC - 51st Avenue	4002 S. 51st Ave., Phoenix	8.6	4.1	2.9
F001569	River Ranch Plant #40	5159 N. El Mirage Rd., Litchfield Park	0.0	0.0	0.4
F001570	Hanson Aggregates LLC	33500 W. Indian School Rd., Tonopah	0.4	1.7	0.1
F001571	Hanson Aggregates, LLC	6204 W. Southern Ave., Laveen	0.0	0.0	0.0
F001573	Creative Printing And Packaging	2741 W. Palm Lane, Phoenix			0.3
F001581	Vulcan Materials Co-Western Division	14521 N. 115th Ave., El Mirage	18.4	7.7	5.2
F001582	Vulcan Materials Co-Western Division	4830 S. 43rd Ave., Phoenix	7.3	7.8	1.7
F001584	Vulcan Materials Co	7845 W. Broadway Rd., Phoenix	5.0	5.9	2.9
F001624	Love's Country Store #296	820 W. Pima Rd., Gila Bend			2.9
F001630	Burdette Cabinet Co	3941 N. Higley Rd., Mesa			2.2

Facility ID	Facility Name	Address	CO	NO_X	VOC
F001640	Upper Crust Bakery	3655 W. Washington St., Phoenix	0.4	1.7	9.6
F001642	Patrician Marble Co	3333 W. Osborn Rd., Phoenix			1.0
F001680	Transdev Services Inc	2225 W. Lower Buckeye Rd., Phoenix	0.2	0.3	0.2
F001682	Mayo Clinic Arizona	13400 E. Shea Blvd., Scottsdale	2.5	3.6	3.6
F001684	Fisher Sand and Gravel	3515 N. El Mirage Rd., Glendale	33.5	12.4	12.3
F001685	Southwest Asphalt	7th Ave., Phoenix	24.1	18.7	7.2
F001686	Fisher Sand and Gravel Co	4001 S. 15th Ave., Phoenix	0.4	1.3	0.1
F001690	American Italian Pasta Co	495 S. 99th Ave., Tolleson	2.5	3.0	0.2
F001703	Adesa Phoenix LLC	400 N. Beck Ave., Chandler	0.3	0.4	1.2
F001736	Target Financial Services Tempe	8550 S. Priest Dr., Tempe	0.1	0.4	0.0
F001748	Smart Practice	3400 E. McDowell Rd., Phoenix			0.5
F001753	Pro Petroleum Phoenix Terminal	408 S. 43rd Ave., Phoenix	0.0	0.0	6.4
F001764	Special Devices Inc	3431 N. Reseda Circle, Mesa	0.4	0.0	8.9
F001789	Flipchip International	3701 E. University Dr., Phoenix	0.3	0.3	11.4
F001793	Phoenix Precast Products Inc	1856 E. Deer Valley Rd., Phoenix	0.1	0.7	0.1
F001798	Swim Platforms, Inc.	3220 S. 38th St., Phoenix			5.6
F001802	Chemresearch Co Inc	1130 W. Hilton Ave., Phoenix	1.4	1.7	6.3
F001844	Solvent Recy-Clean	1850 W. Broadway Rd., Phoenix	0.0	0.0	0.6
F001851	Allen Cremation Center Horne LLC	1110 S. Horne, Mesa	0.0	0.6	0.0
F001857	Rogers Corporation - Price Road Facility	165 S. Price Rd., Chandler	0.0	0.1	0.1
F001859	Sun Land Materials	6950 W. Southern Ave., Laveen	0.4	1.8	0.1
F001918	Legends Furniture	10300 W. Buckeye Rd., Tolleson			46.5
F001923	Fuji Film Electronic Materials USA	6550 S. Mountain Rd., Mesa	1.5	1.8	5.3
F001928	St. Joseph's Hospital and Medical Center	350 W. Thomas Rd., Phoenix	4.8	5.7	0.7
F001952	Memorial Towers Limited Partnership	1405 S. 7th Ave., Phoenix	0.1	0.2	0.0
F001975	Common Market Equipment East	26700 S. Highway 85, Buckeye			14.7
F001986	Collaborative Research Bldg	13208 E. Shea Blvd., Scottsdale	1.0	1.2	0.1

Facility ID	Facility Name	Address	CO	NO_X	VOC
F001993	Capitol Litho Corporation	2301 N. 16th St., Phoenix			0.8
F001997	Prisma Graphic Corporation	2937 E. Broadway Rd., Phoenix	0.1	0.2	2.9
F002010	Cereus Graphics, Inc.	2950 E. Broadway Rd., Phoenix			2.4
F002026	Contractors Landfill and Recycling	2425 N. Center St., Mesa	1.0	4.7	0.4
F002135	Wickenburg Funeral Homes Inc	187 N. Adams St., Wickenburg	0.0	0.1	0.0
F002204	ADOT Sign Factory	2104 S. 22nd Ave., Phoenix			0.1
F002252	Wood Unlimited Inc (Air)	9801 N. Litchfield Rd., Waddell	1.3	5.8	0.5
F002256	Doubletree Paper Mill LLC	31201 W. Thayer Rd., Gila Bend	20.1	15.3	9.7
F002276	Insulfoam	3401 W. Cocopah St., Phoenix	0.9	2.1	73.9
F002281	Digital Realty Trust	120 E. Van Buren St., Phoenix	0.9	3.8	0.1
F002285	Arizona Landfill and Recycling	2750 S. 11th Ave., Phoenix	0.0	0.4	0.0
F002323	Regency Mortuary Services Inc	9850 W. Thunderbird Rd., Sun City	0.0	0.7	0.0
F002329	Qwest Corp Dba Century Link Qc	3640 E. Indian School Rd., Phoenix	0.1	0.4	0.0
F002371	All Pets Great And Small	5357 E. Main St., Mesa	0.1	1.0	0.0
F002382	Mayo Clinic Hospital	5777 E. Mayo Blvd., Phoenix	3.5	5.3	1.3
F002383	Phoenix Baptist Hospital	2000 W. Bethany Home Rd., Phoenix	1.8	2.7	0.3
F002384	Tecta America Arizona LLC	1900 N. Scottsdale Rd., Tempe			0.1
F002418	Sam's Club #6605	1225 N. Gilbert Rd., Gilbert	0.0	0.0	8.8
F002421	Business Cards Tomorrow	1130 W. Geneva Dr., Tempe			1.0
F002430	Level (3) Communications LLC Phx - 16th St	811 S. 16th St., Phoenix	0.1	0.3	0.0
F002454	L3Harris	1215 S. 52nd St., Tempe	0.0	0.0	11.9
F002504	Solana Generating Station	57750 S. Painted Rock Dam Rd., Gila Bend	0.6	1.1	51.6
F002512	International Flora Technologies	28633 W. Patterson Rd., Buckeye	0.1	0.1	1.9
F002513	International Paper Company	660 S. 83rd Ave., Tolleson	2.6	1.0	1.7
F002568	Cemex - 19th Ave Plant	3640 S. 19th Ave., Phoenix	0.0	0.2	0.0
F002571	Cemex - 7th Street Plant	23210 N. 7th St., Phoenix	0.0	0.1	0.0
F002572	CEMEX Construction Materials South LLC	24004 N. 107th Ave., Sun City	0.0	0.1	0.0

Facility ID	Facility Name	Address	CO	NO_X	VOC
F002594	Vulcan Materials Company	3410 E. Virginia St., Mesa	20.1	5.7	5.1
F002596	Crown Press Inc	2450 S. 24th St., Phoenix			0.1
F002597	Architectural Millwork Design Inc	330 W. Melinda Lane, Phoenix			2.0
F002599	Heritage Crematory	12525 NW. Grand Ave., El Mirage	0.0	0.5	0.0
F002601	JBS Tolleson Inc	651 S. 91st Ave., Tolleson	3.9	14.9	7.8
F002604	Banner Del Webb Medical Center	14502 W. Meeker Blvd., Sun City West	0.7	1.4	0.1
F002609	Transwestern Pipeline Company, LLC	W. Table Mesa Rd., New River	6.1	5.1	2.2
F002628	Maax Spas Industries Corp	25605 S. Arizona Ave., Chandler			43.5
F002632	Lifeplan Crematorium Inc	1216 N. 17th Ave., Phoenix	0.5	0.6	0.1
F002655	Phoenix Data Center	615 N. 48th St., Phoenix	2.8	12.8	1.0
F002660	Cemex - West Plant	11701 W. Indian School Rd., Avondale	0.0	0.2	0.0
F002662	Quality Emulsions, LLC	308 S. Lebaron., Mesa	0.8	1.0	0.5
F002663	Belmark	405 N. 75th Ave., Phoenix			3.8
F002670	Mountain View Funeral Home And Cemetery	7900 E. Main St., Mesa	0.0	0.3	0.1
F002680	Goodrich Corporation	3414 S. 5th St., Phoenix	0.1	0.1	5.1
F002724	Custom Fab Inc	3065 S. 43rd Ave., Phoenix	0.3	0.4	3.4
F002747	Circle K Terminal LLC	5333 W. Van Buren St., Phoenix			25.6
F002752	Courtyard and Residence Inn Phoenix	2029 W. Whispering Wind Dr., Phoenix	0.3	0.4	0.1
F002757	Fiserv	240 N. Roosevelt Ave., Chandler	0.3	2.7	0.1
F002790	Choice Printing Inc.	3654 W. Osborn Rd., Phoenix			0.4
F002793	The Hillman Group Inc	8990 S. Kyrene Rd., Tempe	0.0	0.0	0.2
F002800	CSE Operating I LLC	29115 W. Broadway Rd., Buckeye	9.3	5.8	0.1
F002864	Heliae Development LLC	614 E. Germann Rd., Gilbert	0.0	0.0	0.4
F002865	LGS AZ LLC DBA Look Trailers	8230 N. El Mirage Rd., El Mirage			9.6
F002882	Custom Landscape Materials - Big Horn	Aguila Rd., Aguila	1.6	7.5	0.6
F002883	Custom Landscape Materials - Belmont	Vulture Mine Rd. and Wickenburg Rd., Wickenburg	0.3	1.9	0.1
F002884	Custom Landscape Materials LLC	Miller Rd., Buckeye	0.1	0.3	0.0

Facility ID	Facility Name	Address	CO	NO_X	VOC
F002891	Allied Packaging Corporation	5640 S. 16th St., Phoenix	1.9	4.3	1.3
F002910	Digital Realty Trust Chandler, LLC	2121 S. Price Rd., Chandler	2.6	4.6	0.4
F002923	City Square - 3838 N Central Ave	3838 N. Central Ave., Phoenix	0.3	0.5	0.0
F002924	Arizona Department of Corrections Perryville	2105 N. Citrus Rd., Goodyear	1.1	5.0	2.3
F002939	APS 501/502 Service Center	502 S. 2nd Ave., Phoenix	0.1	0.1	0.0
F002943	Cafe Valley Inc	7000 W. Buckeye Rd., Phoenix	2.6	3.1	18.5
F002953	Solar and Renewables Management LLC	29505 W. Southern Ave., Buckeye	13.9	9.3	0.5
F002957	Durango Complex	3225 W. Durango St., Phoenix	6.3	12.9	1.7
F003012	Nexeo Solutions, LLC	6839 W. Chicago St., Chandler			0.4
F003093	Imsamet Of Arizona	3829 S. Estrella Pkwy., Goodyear	62.6	10.9	12.0
F003112	Maricopa County Special Health Care District	2601 E. Roosevelt St., Phoenix	4.3	5.8	0.3
F003136	Master Block	12620 W. Butler Dr., El Mirage	0.2	0.2	0.0
F003154	Team Print Media	2002 N. 23rd Ave., Phoenix			6.2
F003163	Donnelley Financial, LLC	1500 N. Central Ave., Phoenix	0.0	0.6	0.0
F003187	Rohrer Corporation	159 W. 1st Ave., Mesa			6.6
F003220	American Contract Systems Inc	7300 W. Detroit St., Chandler			1.6
F003245	CyrusOne LLC	2335 S. Ellis St., Chandler	1.5	13.5	0.7
F003259	Bridgestone Americas Tire Operations	6533 S. Mountain Rd., Mesa	0.0	0.0	4.5
F003260	Firebird Products, LLC	6010 N. 53rd Dr., Glendale			4.5
F003293	4 Over International	3055 S. 44th St., Phoenix			4.6
F003299	Asm Lithography	2650 W. Geronimo Pl., Chandler	0.0	0.1	0.0
F003328	Stryker Sustainability Solutions, Inc.	10232 S. 51st St., Phoenix	0.0	0.1	0.0
F003337	Southwest Products Corporation	11690 N. 132nd Ave., Surprise	0.1	0.1	9.5
F003340	Canam Steel Corporation	22253 W. Southern Ave., Buckeye			11.3
F003342	Phoenix Packaging Operations, LLC	464 E. Chilton Dr., Chandler			8.7
F003372	Bimbo Bakeries USA, Inc	738 W. Van Buren St., Phoenix	1.5	1.8	10.2

Facility ID	Facility Name	Address	CO	NO_X	VOC
F003392	Platypus Development LLC	3740 S. Signal Butte Rd., Mesa	0.6	2.5	0.1
F003399	Hydro Extrusion North America, LLC	249 S. 51st Ave., Phoenix	8.3	8.5	3.9
F003401	Arrowhead Hospital	18701 N. 67th Ave., Glendale	1.9	3.2	0.1
F003409	Western Refining	3050 S. 19th Ave., Phoenix	1.0	1.8	0.5
F003424	Turning Technologies, LLC	14557 N. 82nd St., Scottsdale			0.4
F003426	Crown Custom Millwork	2740 W. Deer Valley Rd., Phoenix			4.2
F003427	Crothall Laundry Services	4445 S. 36th St., Phoenix	4.3	5.1	0.3
F003440	Cubic Tech Corporation	4511 E. Ivy St., Mesa	0.0	0.0	0.9
F003458	El Mirage Transmix Facility	12126 W. Olive Ave., El Mirage	3.0	4.3	8.8
F003467	Trafficade Signs And Sales	2544 W. McDowell Rd., Phoenix			0.1
F003478	Duro Hilex Poly	4 S. 84th Ave., Tolleson			1.5
F003538	Bonded Materials	4330 N. 43rd Ave., Phoenix			1.0
F003542	Shutterfly, Inc.	7195 S. Shutterfly Way., Tempe			24.5
F003545	Calportland	11500 W. Beardsley Rd., Sun City	8.2	32.8	2.0
F003546	Calportland Company	31805 W. Southern Ave., Buckeye	0.0	0.1	0.0
F003548	Entrusted Pets, Inc.	2237 S. 15th St., Phoenix	0.0	0.2	0.0
F003555	Corporate Properties Tempe SPE, LLC	300 E. Rio Salado Pkwy., Tempe	0.9	4.1	0.3
F003606	Vulcan Asphalt LLC	3640 S. 19th Ave., Phoenix	3.2	1.5	0.7
F003607	Vulcan Asphalt LLC	2835 W. Broadway Rd., Phoenix	36.6	6.3	12.7
F003647	Infineon Technologies Epi Services Inc	550 W. Juanita Ave., Mesa	0.1	0.3	1.4
F003654	Ninety-First Avenue Renewable Biogas LLC	5615 S. 91st Ave., Tolleson	0.5	1.3	0.1
F003666	NXP Semiconductors	1300 N. Alma School Rd., Chandler	11.1	17.6	17.2
F003675	Hollyfrontier Asphalt Company LLC	7110 W. Northern Ave., Glendale	7.4	8.9	5.4
F003678	LMK_PHX	4010 N. 3rd St., Phoenix	0.3	4.6	0.1
F003697	Barrel O' Fun Snack Food Southwest	7330 W. Sherman St., Phoenix	26.4	28.0	2.8
F003730	Pure Pack Technologies Division	5417 S. 37th St., Phoenix	0.1	0.2	6.2

Facility ID	Facility Name	Address	CO	NO_X	VOC
F003780	City of Phoenix - Goodyear Airport	1658 S. Litchfield Rd., Goodyear	0.1	0.3	0.1
F003781	City of Phoenix - Deer Valley Airport	702 W. Deer Valley Rd., Phoenix	0.0	0.0	0.1
F003805	East Valley Crematory, LLC	33 N. Centennial Way., Mesa	0.0	0.4	0.0
F003808	Realty Sign Company	2629 E. McDowell Rd., Phoenix			7.7
F003809	Manheim Phoenix	201 N. 83rd Ave., Tolleson	0.2	0.4	2.2
F003838	Esplanade Owner, Lp C/O Lba Realty	2525 E. Camelback Rd., Phoenix	0.1	0.3	0.0
F003847	La Fiesta Label And Packaging	6162 W. Detroit St., Chandler			0.3
F003850	All Faith Mortuary Services	2324 W. Holly St., Phoenix	0.0	0.7	0.0
F003854	AAH Ironwood Custom Finishing LLC	1822 E. Madison St., Phoenix			3.3
F003855	American Airlines	4000 E. Sky Harbor Blvd., Phoenix	0.5	0.8	4.6
F003858	Swissport Fueling Services, Inc.	3400 E. Sky Harbor Blvd., Phoenix			2.8
F003868	Old Town Fiberglass, Inc.	18 N. 57th Dr., Phoenix			4.2
F003876	Revolution Industrial	372 N. Roosevelt Ave., Chandler			2.9
F003877	Vulture Mine	36610 N. 355th Ave., Wickenburg	17.7	2.0	1.0
F003915	Forterra Pipe and Precast, LLC	12600 W. Northern Ave., El Mirage	0.9	0.4	0.0
F003972	F and B Manufacturing LLC	4245 N. 40th Ave., Phoenix			0.4
F003980	Dunn-Edwards Corporation	520 S. 67th Ave., Phoenix	0.0	0.1	27.8
F003984	Ball Metal Beverage Container Corp	4455 N. Cotton Lane, Goodyear	8.6	10.2	113.4
F003996	American Ad Bag Company, LLC	4935 W. Missouri Ave., Glendale			5.8
F004060	Ergon Asphalt and Emulsions, Inc.- Chandler AZ	6940 W. Chandler Blvd., Chandler	1.6	1.9	2.0
F004066	Cremation Center Of Arizona	1544 W. Grant St., Phoenix	0.1	1.5	0.0
F004071	Galfab LLC	4020 S. 15th Ave., Phoenix			3.1
F004084	Fiberglass Designs LLC	128 W. Maricopa Freeway, Phoenix			4.1

Facility ID	Facility Name	Address	CO	NO_X	VOC
F004085	CAD Enterprises	302 S. 52nd Ave., Phoenix			0.2
F004099	Moran Manufacturing LLC	6902 W. Hadley St., Phoenix	0.0	0.0	3.8
F004104	Cintas Corporation	4804 W. Roosevelt St., Phoenix	0.1	0.1	0.0
F004109	Lasting Paws	3131 W. Clarendon Ave., Phoenix	0.3	4.9	0.1
F004130	Silent-Aire USA, Inc	280 E. Germann Rd., Gilbert	0.2	0.2	9.8
F004152	Deca Cremation Services, Inc.	2139 S. 15th St., Phoenix	0.0	0.6	0.0
F004153	ICP Group	4565 W. Watkins St., Phoenix			4.8
F004182	Portable HMA Plant #2	3190 S. Gilbert Rd., Chandler	16.5	7.5	6.1
F004183	Alliant Techsystems Operations	3309 N. Reseda Cir., Mesa	0.3	0.0	2.1
F004205	Rysso Peters	2525 W. Coronado Rd., Phoenix			5.0
F004209	Aligned Energy Data Centers (Phoenix) LLC	2500 W. Union Hills Dr., Phoenix	0.4	1.4	0.0
F004215	Asphalt Terminals LLC	1935 W. McDowell Rd., Phoenix	5.4	3.3	1.5
F004221	Granite Express Pioneer	Section 19 7N 2W, Morristown	0.6	3.0	0.2
F004229	INAP (Internap Corporation)	2500 W. Frye Rd., Chandler	0.1	0.3	0.0
F006226	Paradise Valley Community College	18401 N. 32nd St., Phoenix	0.1	0.2	0.0
F006245	Dormakaba Usa Inc	1120 N. 47th Ave., Phoenix			0.9
F006256	On Semiconductor Corporation	5005 E. McDowell Rd., Phoenix	2.2	2.6	0.3
F006274	Apache Equipment Corporation	5757 W. Jefferson St., Phoenix			0.1
F006303	Koalaty Embroidery, Inc.	1501 E. Jackson St., Phoenix			0.2
F006312	Dolphin Inc	440 N. 51st Ave., Phoenix	0.8	1.0	0.4
F006315	6A-B1 (N)	24201 N. Cave Creek Rd., Phoenix	0.0	0.5	0.0
F006316	Exxon	10120 W. Bell Rd., Sun City			0.3
F006329	Goodfellow Corporation	12639 W. Butler Dr., El Mirage		0.2	1.6
F006330	Cintas Corporation	5501 W. Hadley St., Phoenix	0.4	0.5	0.0
F006334	Valley Metro Light Rail Ops and Maint Center	605 S. 48th St., Phoenix	0.1	0.2	1.5
F006337	NATIONAL PUMP COMPANY	7706 N. 71st Ave., Glendale			0.2
F006345	MI AMIGO REDI-MIX, LLC	2055 N. 28th Ave., Phoenix	0.7	3.2	0.3

Facility ID	Facility Name	Address	CO	NO_X	VOC
F006346	ACKER-STONE INDUSTRIES (ARIZONA), INC.	31906 W. Camelback Rd., Buckeye	0.0	0.0	0.0
F006355	Northrop Grumman	1575 S. Price Rd., Chandler	0.1	0.6	1.3
F006378	Phoenix Crematory	2620 W. Roosevelt St., Phoenix	0.1	2.2	0.0
F006380	Sunland Asphalt and Construction, Inc.	775 W. Elwood St., Phoenix	0.0	0.0	3.5
F006394	Cactus Transport, Inc.	8211 W. Sherman St., Tolleson	0.0	0.1	2.3
F006433	Handley Precast Systems, Inc.	440 E. Pinnacle Peak Rd., Phoenix	0.3	1.2	0.1
F006450	Barnes Aerospace Inc	3201 E. Broadway Rd., Phoenix			0.4
F006456	Revspring Inc.	23751 N. 23rd Ave., Phoenix	0.0	0.2	7.6
F006473	Sculpture Arts Atelier	227 S. Rockford Dr., Tempe	0.0	0.1	0.0
F006474	TAE Aerospace	7879 E. Beck Ln., Scottsdale			1.0
F006475	Copper State Bolt and Nut Company	3637 N. 34th Ave., Phoenix			2.6
F006476	Scenic Industries LLC	4224 W. Clarendon Ave., Phoenix			0.2
F006487	Trimaco	13600 W. Sweetwater Ave., Surprise			2.8
F006491	O'Neil Printing, Inc.	4303 E. Cotton Center Blvd., Phoenix			1.2
F006508	Gordongraphics, Inc.	1507 W. Parkside Lane, Phoenix			0.1
F006679	Portable HMA Plant #3	Tuthill Rd. and 203rd Ave., Buckeye	0.0	0.2	0.1
F006697	CalPortland 161R New River Plant	39333 N. New River Rd., Peoria	8.7	2.9	0.5
F038230	Mark Anthony Brewing	9601 N. Reems Rd., Waddell	0.8	1.0	1.7

Appendix E. Responsiveness Summary

The 2020 Periodic Emissions Inventory for Ozone Precursors was made available for public review from September 29, 2022 through October 31, 2022. A Notice of Availability was published in the Arizona Business Gazette on September 29, 2022 and October 6, 2022. The Notice of Availability was also posted on AZCentral.com from September 29, 2022 through October 6, 2022. No comments were received during the public comment period and there were no requests for a public hearing.

Figure E–1: Affidavit of Publication in the Arizona Business Gazette.

Arizona Business Gazette
The business resource

PO BOX 194
Phoenix, Arizona 85001-0194
(602) 444-7315 FAX (602) 444-5901

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PNI-Arizona Business Gazette

AFFIDAVIT OF PUBLICATION

MC AIR QUALITY DIV
301 W JEFFERSON ST # 410
PHOENIX, AZ 85003-2157

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Order # 0005425394 # of Affidavits: 1

P.O #

Issues Dated:

09/29/22, 10/06/22

STATE OF WISCONSIN
COUNTY OF BROWN } SS.

I, being first duly sworn, upon oath deposes and says: That I am the legal clerk of the Arizona Republic, a newspaper of general circulation in the counties of Maricopa, Coconino, Pima and Pinal, in the State of Arizona, published weekly at Phoenix, Arizona, and that the copy hereto attached is a true copy of the advertisement published in the said paper in the issue(s) dated indicated.

Sworn to before me this
6 TH day of
OCTOBER 2022

Notary Public

My Commission expires: 9/9/25

NOTICE OF 30-DAY COMMENT PERIOD FOR 2020 PERIODIC EMISSIONS INVENTORY (PEI) FOR OZONE PRECURSORS AND PARTICULATE MATTER The Maricopa County Air Quality Department (MCAQD) posted the draft PEI reports for ozone and particulate matter. The draft PEI for ozone includes emission estimates for three precursors to ozone formation: volatile organic compounds, carbon monoxide, and nitrogen oxides. Annual and season-day emissions are calculated for Maricopa County, the 2008 8-hour ozone nonattainment area, and the 2015 8-hour ozone nonattainment area. The draft PEI for particulate matter includes emission estimates for particulate matter less than 10 and 2.5 microns in diameter (PM10 and PM2.5), as well as three particulate matter precursors: nitrogen oxides, sulfur oxides, and ammonia. Annual and typical daily emissions are calculated for Maricopa County and the PM10 nonattainment area. MCAQD invites the public to review the draft PEI for ozone precursors and the draft PEI for particulate matter at www.maricopa.gov/2652 and to submit your comments to Maricopa County Air Quality Department, Emissions Inventory Unit, 301 W. Jefferson St., Suite 410, Phoenix, AZ 85004, or by email to Emissionsinventory@maricopa.gov. Comments must be received no later than October 31, 2022. Interested persons may request a public hearing in writing. Requests for a public hearing must be received prior to October 31, 2022. MCAQD will take reasonable measures to provide access to department services to individuals with limited ability to speak, write, or understand English and/or to those with disabilities. Requests for language interpretation services or for disability accommodations must be made at least 48 hours in advance by contacting: 602-506-6443. MCAQD tomará las medidas necesarias para brindar acceso a los servicios del departamento a personas que no dominan el idioma inglés y/o personas con discapacidades. Las solicitudes de servicios de interpretación de otro idioma o adaptaciones para discapacitados deben realizarse con al menos 48 horas de anticipación comuníquese con: 602-506-6443
Pub: Sept 29, Oct 6, 2022

RECEIVED
OCT 14 2022
MARICOPA COUNTY
AIR QUALITY DEPARTMENT

VICKY FELTY
Notary Public
State of Wisconsin