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Maricopa.gov/AQ

Reporting Emissions from Electrical Generating Units (EGU)

Emissions Inventory Help Sheet

Maricopa County Air Quality Department

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What to Report

Facilities with electrical generating units (EGU) must report emissions of particulate matter (PM) primary, PM_{10} primary, $PM_{2.5}$ primary, carbon monoxide, nitrogen oxides, sulfur dioxide, volatile organic compounds (VOC), ammonia, and hazardous air pollutants.

PM primary refers to all particulate matter emissions (filterable and condensable) from an emissions process. PM_{10} primary refers to all PM primary that measures less than 10 microns in diameter. $PM_{2.5}$ primary refers to all PM primary that measures less than 2.5 microns in diameter. PM_{10} primary and $PM_{2.5}$ primary are both subsets of PM primary.

Power plants must report emissions from all activities except insignificant activities. This may include cooling towers, solvent use, surface coating, unpaved roads, and other types of emissions processes. Refer to the emissions inventory instructions and other process specific help sheets at maricopa.gov/5628 to report emissions from other types of emission units.

How to Report

This help sheet shows emissions inventory preparers how to accurately report emissions from electrical generating units in the AQD Online Portal. First, preparers will use the "Task-Facility Inventory Change" tab to structure the emission units, processes, control equipment, and release points. Then, preparers will use the "Task-Emissions Inventory" tab to enter the operating schedule, throughput, and emissions factors for each process.

Task – Facility Inventory Change

Step 1

Click on the **Task-Facility Inventory Change** tab at the top of the page.

Step 2

Verify that the facility inventory tree shows all of the electrical generating units at the facility with the correct source classification code(s) SCC codes, control equipment, and release points.

Emission Units

There should be one EGU emission unit for each utility boiler and each combustion turbine at the facility.

Emissions Processes

Each emission unit must have one emissions process for each type of fuel burned in the EGU. Use the following SCC depending on the type of electrical generating unit and the type of fuel.

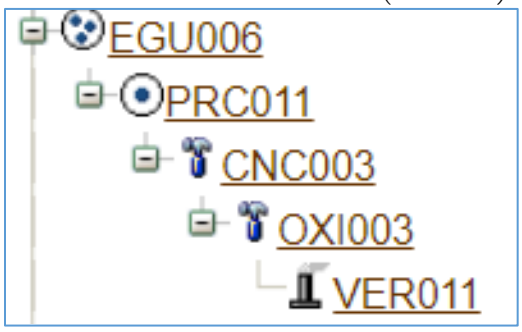
- Stationary gas turbines
  - Natural gas – 20100201
  - Distillate oil – 20100101
- Utility boilers

- Natural gas (normal firing > 100 MMBtu/hour) – 10100601
- Natural gas (normal firing ≤ 100 MMBtu/hour) – 10100602
- Natural gas (tangential firing) – 10100604
- Distillate oil – 10100501

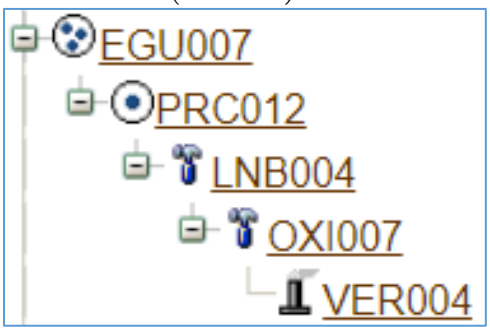
Control Equipment
Each control device at the facility must be created as control equipment and associated with the emissions process it controls. If there are multiple controls on an emissions process, they must be associated with the emissions process so that the air flow in the facility inventory is the same as the air flow at the facility.

Release points
There should be one EGU emission unit for each utility boiler and each combustion turbine at the facility.

Examples
An electrical generating unit (EGU006) that burns natural gas (PRC011) and is controlled by selective catalytic reduction (CNC003), followed by an oxidation catalyst (OXI003), which vents to a vertical stack (VER011).

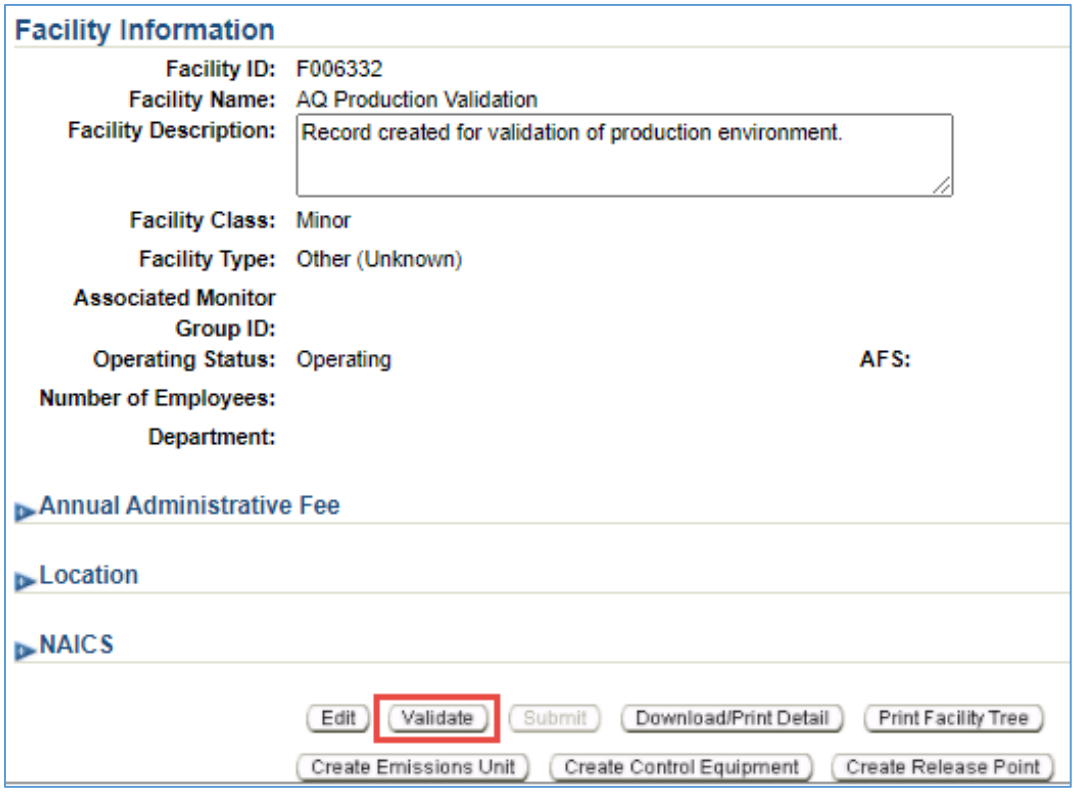


An electrical generating unit (EGU007) that burns natural gas (PRC012) with low-NOx burners (LNB004) and is controlled by an oxidation catalyst (OXI007), which to a vertical stack (VER004).

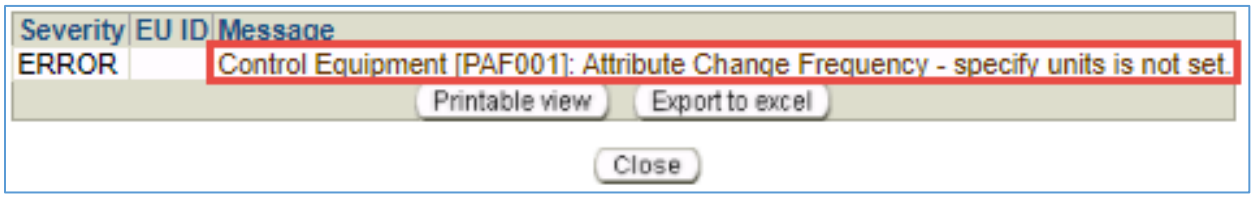


Step 3

Validate Facility Inventory Changes
If changes are made to emissions units, processes, control devices, or release points, you must validate the "Task – Facility Inventory Change." Click on the **Facility ID** at the top of the Facility Inventory Tree. At the bottom of the Facility Information screen click **Validate**.



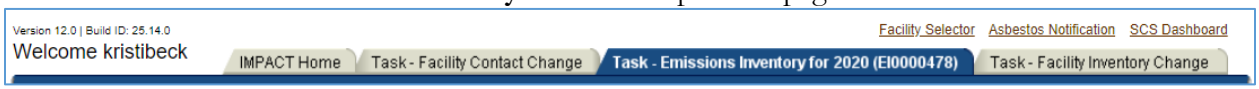
If there are errors that need to be corrected, a pop-up window will appear. Click on the error message to be directed to the screen that contains the error that must be corrected. Correct all errors and repeat step 5 to validate the facility inventory changes.



Task – Emissions Inventory for Reporting Year

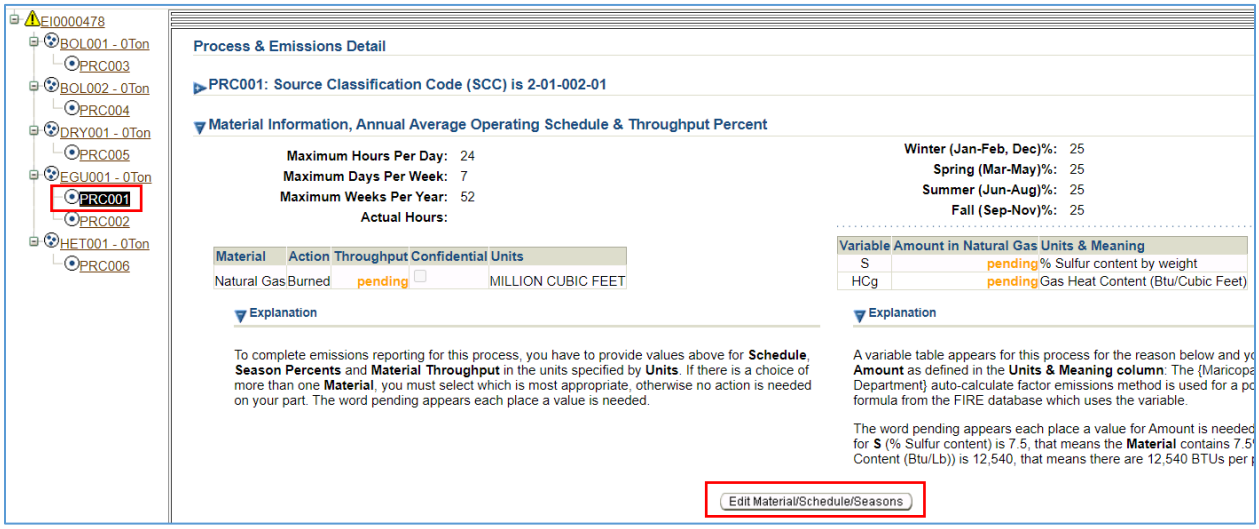
Step 1

Click on the **Task-Emissions Inventory** tab at the top of the page.



Step 2

Click on the process attached to the EGU emission unit (**PRC001**) in the **Emissions Inventory Tree** on the left side of the screen. In the middle of the screen, click **Edit Material/Schedule/Seasons**.



1. Enter the **maximum number of hours per day**, **maximum number of days per week**, and the **maximum number of weeks per year** the emissions process operated.

2. Enter the **actual hours** of operation for the emissions process.

3. Enter the fuel **throughput** in the units specified in the AQD Online Portal.

   Natural gas: Convert from MMBtu (million British thermal units) to million cubic feet (MMcf) using the heat content of the gas (measured in Btu/cf).

   $$MMcf = MMBtu \div heat\ content$$

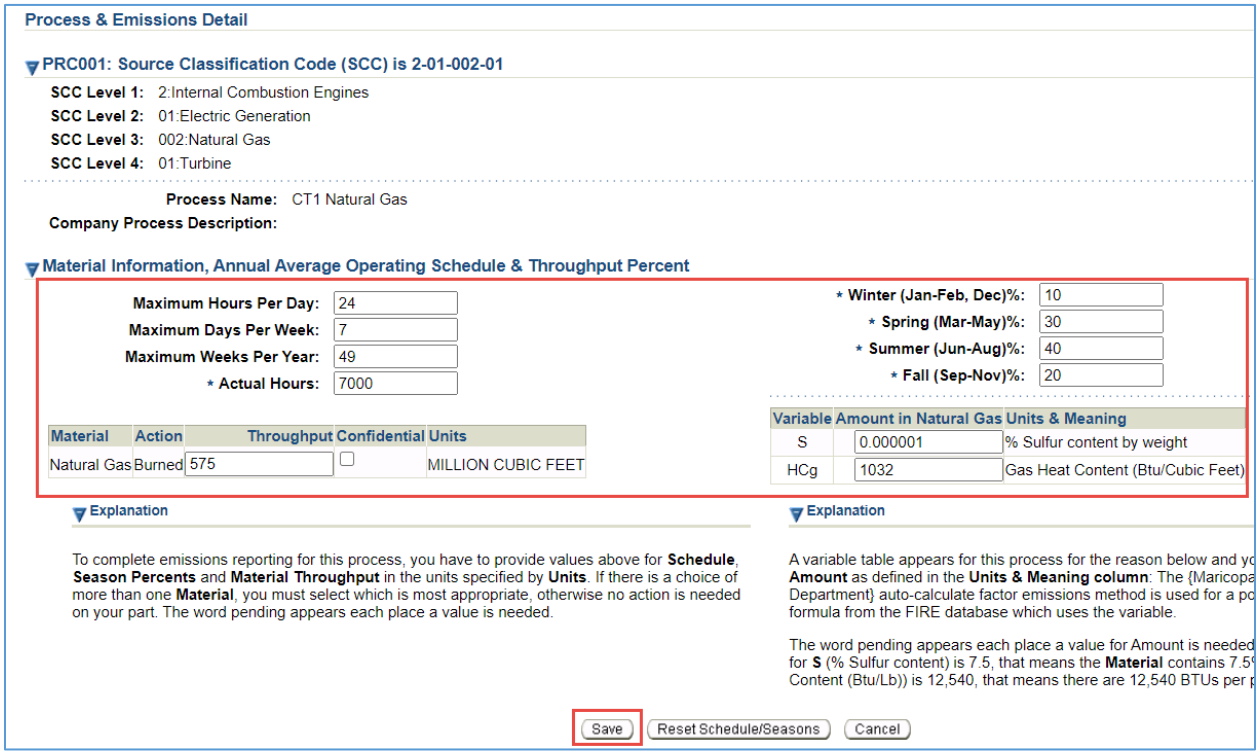
   Fuel oil: Convert from gallons (gal) to thousand gallons (Mgal).

   $$Mgal = gallons \div 1{,}000$$

4. Enter the **heat content** and the **sulfur content** of the fuel combusted in the variable field (based on analytical results if required by the permit). The AQD Online Portal will use the heat content to calculate emissions factors for hazardous air pollutants (HAPs) and the sulfur content to calculate the emissions factor for sulfur dioxide.

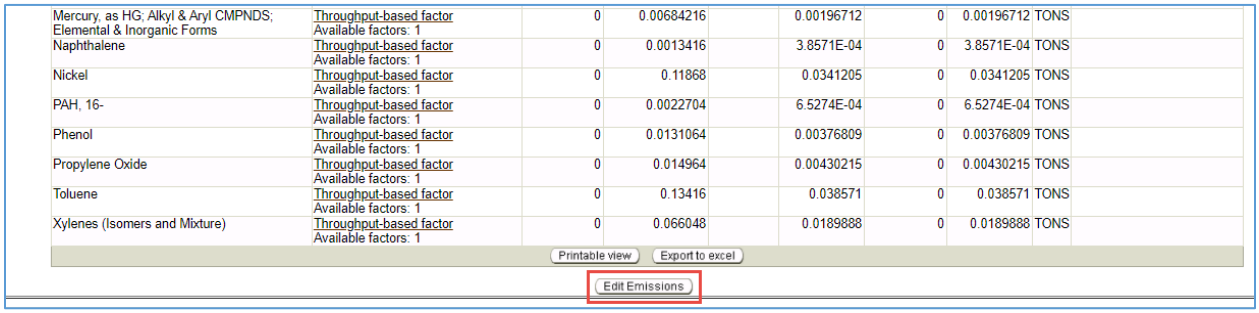
5. Enter the **percentage** of the fuel throughput that was combusted during each season.

6. Click **Save.**



Step 3

Click **Edit Emissions** at the bottom of the screen.



Reporting Criteria Air Pollutant Emissions

1. Select the **Method Used** to calculate emissions and enter **Uncontrolled Emissions Factors** and **Time-based Emissions Factors** for each pollutant:

    a. For pollutants that are monitored with a continuous emissions monitoring system (CEMS), select the method **Time-based factor – CEM**. To calculate the time-based emissions factor (EF), divide total emissions for the year (in pounds) by total operating hours for the year. Enter the calculated EF in the **Time-based factor (lbs/hour)** column.

    b. For pollutants that are stack tested, select the method **Time-based factor – Stack Test**. Enter the EF (lbs/hour) from the approved stack test report in the **Time-**

based factor (lbs/hour) column. If the approved stack test report only includes a throughput-based EF, convert to a time-based EF.

$$Time\text{-}based\ EF\ \left(\frac{lb}{hr}\right) = \frac{throughput\text{-}based\ EF\ (\frac{lb}{MMBtu})\ x\ throughput\ (MMBtu)}{annual\ hours}$$

c. For pollutants that are not stack tested or monitored with CEMS, select **Throughput-based factor** and use uncontrolled emissions factors from AP-42[1,2,3] converted to lb/MMcf using the following equation:

$$EF\ \left(\frac{lb}{MMcf}\right) = EF\ \left(\frac{lb}{MMBtu}\right) x\ heat\ content\ \left(\frac{Btu}{cf}\right)$$

2. Enter the **Hours Uncontrolled** for each pollutant. If emissions of a pollutant are not controlled, then hours uncontrolled should be equal to actual hours. If emissions of a pollutant where controlled continuously throughout the reporting year, enter zero (0) for hours uncontrolled.

Reporting Hazardous Air Pollutant and Greenhouse Gas Emissions
Emissions of hazardous air pollutants and greenhouse gases are calculated automatically using WebFire emissions factors. Leave the default throughput-based emissions factors in place, unless more specific emissions factors are known. For pollutants that are classified as a VOC and a HAP, the HAP emissions factor cannot be higher than the VOC emissions factor.

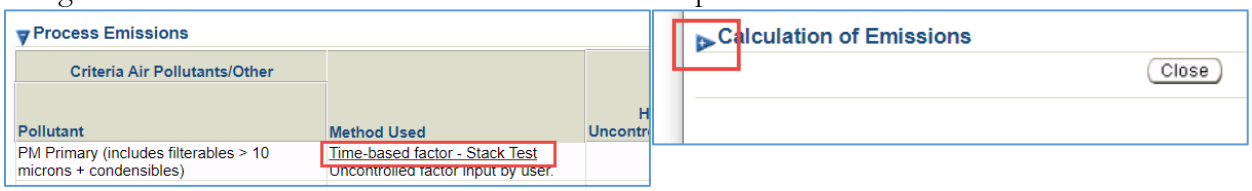
For emission units that are subject to 40 CFR 98 (Mandatory Greenhouse Gas Reporting), select the method **Emissions** and enter the total emissions reported under Part 98. For emission units that are not subject to 40 CFR 98, the default throughput-based emissions factors can be used.

Step 4

Click **Save** at the bottom of the screen. The AQD Online Portal will calculate emissions based on the operational information and the emissions factors provided.

Step 5

Verify that the results match emission records from the facility. If the results in the AQD Online Portal are not what you expected, click on the method **Time-based factor – Stack Test**. Click the triangle next to **Calculation of Emissions** to see the inputs that were used to calculate emissions.



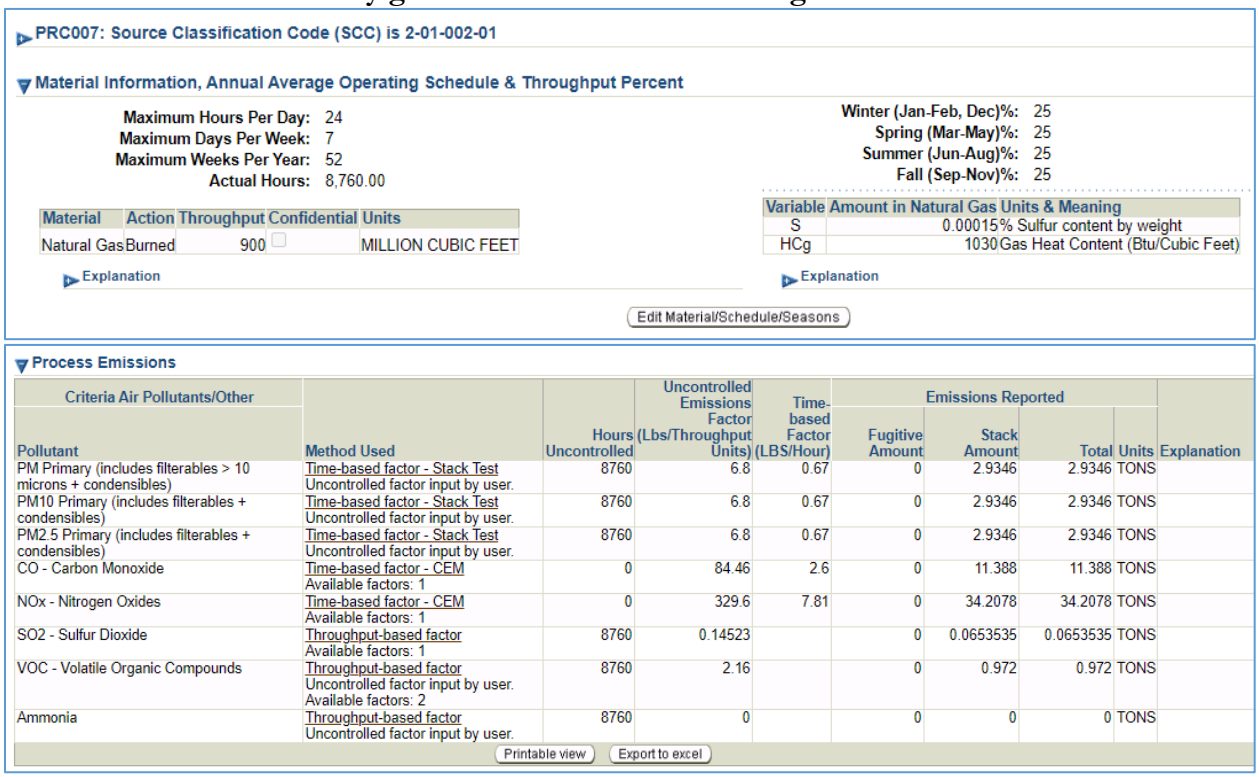
[1] Stationary Gas Turbines: https://www3.epa.gov/ttn/chief/ap42/ch03/final/c03s01.pdf
[2] Natural Gas Utility Boilers: https://www3.epa.gov/ttn/chief/ap42/ch01/final/c01s04.pdf
[3] Distillate Oil Utility Boilers: https://www3.epa.gov/ttn/chief/ap42/ch01/final/c01s03.pdf

Step 6

Refer to other process specific help sheets or the Emissions Inventory Instructions to report emissions from other types of processes at the facility. When emissions have been reported for each process, refer to Task 5 on page 26 of the Emissions Inventory Instructions to validate and submit the emissions inventory. The process specific help sheets and the Emissions Inventory Instructions are available at maricopa.gov/5628.

Example

Emissions from a stationary gas turbine fired with natural gas



PRC007: Source Classification Code (SCC) is 2-01-002-01

Material Information, Annual Average Operating Schedule & Throughput Percent

Maximum Hours Per Day: 24
Maximum Days Per Week: 7
Maximum Weeks Per Year: 52
Actual Hours: 8,760.00

Winter (Jan-Feb, Dec)%: 25
Spring (Mar-May)%: 25
Summer (Jun-Aug)%: 25
Fall (Sep-Nov)%: 25

Material	Action	Throughput	Confidential	Units
Natural Gas	Burned	900		MILLION CUBIC FEET

Variable	Amount in Natural Gas Units & Meaning
S	0.00015% Sulfur content by weight
HCg	1030 Gas Heat Content (Btu/Cubic Feet)

Explanation

Explanation

Edit Material/Schedule/Seasons

Process Emissions

Criteria Air Pollutants/Other Pollutant	Method Used	Hours Uncontrolled	Uncontrolled Emissions Factor (Lbs/Throughput Units)	Time-based Factor (LBS/Hour)	Emissions Reported Fugitive Amount	Stack Amount	Total	Units	Explanation
PM Primary (includes filterables > 10 microns + condensibles)	Time-based factor - Stack Test Uncontrolled factor input by user.	8760	6.8	0.67	0	2.9346	2.9346	TONS	
PM10 Primary (includes filterables + condensibles)	Time-based factor - Stack Test Uncontrolled factor input by user.	8760	6.8	0.67	0	2.9346	2.9346	TONS	
PM2.5 Primary (includes filterables + condensibles)	Time-based factor - Stack Test Uncontrolled factor input by user.	8760	6.8	0.67	0	2.9346	2.9346	TONS	
CO - Carbon Monoxide	Time-based factor - CEM Available factors: 1	0	84.46	2.6	0	11.388	11.388	TONS	
NOx - Nitrogen Oxides	Time-based factor - CEM Available factors: 1	0	329.6	7.81	0	34.2078	34.2078	TONS	
SO2 - Sulfur Dioxide	Throughput-based factor Available factors: 1	8760	0.14523		0	0.0653535	0.0653535	TONS	
VOC - Volatile Organic Compounds	Throughput-based factor Uncontrolled factor input by user. Available factors: 2	8760	2.16		0	0.972	0.972	TONS	
Ammonia	Throughput-based factor Uncontrolled factor input by user.	8760	0		0	0	0	TONS	

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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
Carbon Dioxide	Throughput-based factor Available factors: 1	8760	113,300.		0	50,985	50,985	TONS	
Methane	Throughput-based factor Available factors: 1	8760	8.858		0	3.9861	3.9861	TONS	
Acetaldehyde	Throughput-based factor Available factors: 1	8760	0.0412		0	0.01854	0.01854	TONS	
Acrolein	Throughput-based factor Available factors: 1	8760	0.006592		0	0.0029664	0.0029664	TONS	
Benz[A]Anthracene	Throughput-based factor Available factors: 1	8760	0.00309		0	0.0013905	0.0013905	TONS	
Benzene	Throughput-based factor Available factors: 1	8760	0.01236		0	0.005562	0.005562	TONS	
Butadiene, 1,3-	Throughput-based factor Available factors: 1	8760	2.2145E-04		0	9.96525E-05	9.96525E-05	TONS	
Cadmium	Throughput-based factor Available factors: 1	8760	0.0071379		0	0.00321205	0.00321205	TONS	
Chromium	Throughput-based factor Available factors: 1	8760	0.013699		0	0.00616455	0.00616455	TONS	
Ethyl Benzene	Throughput-based factor Available factors: 1	8760	0.03296		0	0.014832	0.014832	TONS	
Fluoranthene	Throughput-based factor Available factors: 1	8760	0.001236		0	5.562E-04	5.562E-04	TONS	
Formaldehyde	Throughput-based factor Available factors: 1	8760	0.7313		0	0.329085	0.329085	TONS	
MN - Manganese	Throughput-based factor Available factors: 1	8760	0.082606		0	0.0371727	0.0371727	TONS	
Mercury, as HG; Alkyl & Aryl CMPNDS; Elemental & Inorganic Forms	Throughput-based factor Available factors: 1	8760	0.0068289		0	0.003073	0.003073	TONS	
Naphthalene	Throughput-based factor Available factors: 1	8760	0.001339		0	6.0255E-04	6.0255E-04	TONS	
Nickel	Throughput-based factor Available factors: 1	8760	0.11845		0	0.0533025	0.0533025	TONS	
PAH, 16-	Throughput-based factor Available factors: 1	8760	0.002266		0	0.0010197	0.0010197	TONS	
Phenol	Throughput-based factor Available factors: 1	8760	0.013081		0	0.00588645	0.00588645	TONS	
Propylene Oxide	Throughput-based factor Available factors: 1	8760	0.014935		0	0.00672075	0.00672075	TONS	
Toluene	Throughput-based factor Available factors: 1	8760	0.1339		0	0.060255	0.060255	TONS	
Xylenes (Isomers and Mixture)	Throughput-based factor Available factors: 1	8760	0.06592		0	0.029664	0.029664	TONS	

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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