



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

Reporting Emissions from Electrical Generating Units (EGU)

Emissions Inventory Help Sheet

Maricopa County Air Quality Department

December 2020

What to Report

Facilities with electrical generating units (EGU) must report emissions of particulate matter (PM) primary, PM₁₀ 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. PM₁₀ 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. PM₁₀ 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.

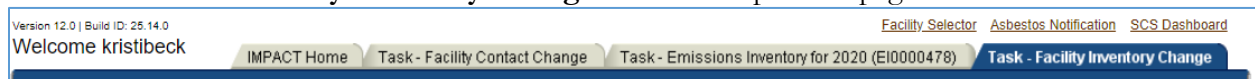
How to Report

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

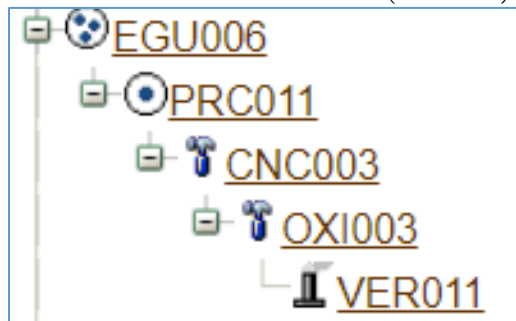
Each control device at the facility must be created as control equipment and associated with the emissions process it controls. If there are multiple controls on an emissions process, they must be associated with the emissions process so that the air flow in the facility inventory is the same as the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

Release points

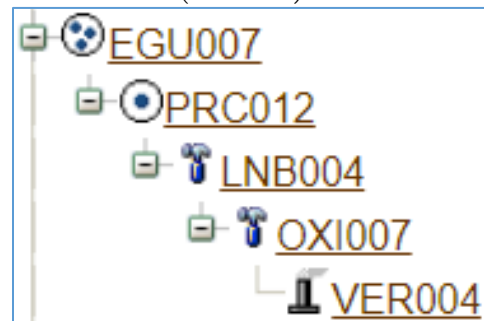
There should be one EGU emission unit for each utility boiler and each combustion turbine at the facility.

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-NO_x burners (LNB004) and is controlled by an oxidation catalyst (OXI007), which vents 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**.

Facility Information

Facility ID: F006332
 Facility Name: AQ Production Validation
 Facility Description: Record created for validation of production environment.
 Facility Class: Minor
 Facility Type: Other (Unknown)
 Associated Monitor Group ID:
 Operating Status: Operating **AFS:**
 Number of Employees:
 Department:

▶ Annual Administrative Fee

▶ Location

▶ NAICS

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.

Severity	EU ID	Message
ERROR		Control Equipment [PAF001]: Attribute Change Frequency - specify units is not set.

Task – Emissions Inventory for Reporting Year

Step 1

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

Version 12.0 | Build ID: 25.14.0 Facility_Selector Asbestos Notification SCS Dashboard

Welcome kristibeck IMPACT Home Task - Facility Contact Change **Task - Emissions Inventory for 2020 (EI0000478)** Task - Facility Inventory Change

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**.

Process & Emissions Detail

▶ PRC001: Source Classification Code (SCC) is 2-01-002-01

▼ Material Information, Annual Average Operating Schedule & Throughput Percent

Maximum Hours Per Day: 24	Winter (Jan-Feb, Dec)%: 25
Maximum Days Per Week: 7	Spring (Mar-May)%: 25
Maximum Weeks Per Year: 52	Summer (Jun-Aug)%: 25
Actual Hours:	Fall (Sep-Nov)%: 25

Material	Action	Throughput	Confidential	Units
Natural Gas Burned	pending	<input type="checkbox"/>		MILLION CUBIC FEET

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

Explanation

To complete emissions reporting for this process, you have to provide values above for **Schedule**, **Season Percents** and **Material Throughput** in the units specified by **Units**. If there is a choice of more than one **Material**, you must select which is most appropriate, otherwise no action is needed on your part. The word pending appears each place a value is needed.

A variable table appears for this process for the reason below and you must provide a value for each **Amount** as defined in the **Units & Meaning** column. The (Maricopa Department) auto-calculate factor emissions method is used for a percentage of the total emissions. The word pending appears each place a value for **Amount** is needed. For example, if the **S** (% Sulfur content) is 7.5, that means the **Material** contains 7.5% Sulfur. If the **HCg** (Gas Heat Content (Btu/Lb)) is 12,540, that means there are 12,540 BTUs per pound of gas.

[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).

$$MMcf = MMBtu \div \text{heat content}$$

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

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

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**.

Process & Emissions Detail

▼ PRC001: Source Classification Code (SCC) is 2-01-002-01

SCC Level 1: 2:Internal Combustion Engines
 SCC Level 2: 01:Electric Generation
 SCC Level 3: 002:Natural Gas
 SCC Level 4: 01:Turbine

Process Name: CT1 Natural Gas
 Company Process Description:

▼ Material Information, Annual Average Operating Schedule & Throughput Percent

Maximum Hours Per Day:	24	* Winter (Jan-Feb, Dec)%:	10
Maximum Days Per Week:	7	* Spring (Mar-May)%:	30
Maximum Weeks Per Year:	49	* Summer (Jun-Aug)%:	40
* Actual Hours:	7000	* Fall (Sep-Nov)%:	20

Material	Action	Throughput Confidential Units
Natural Gas Burned	<input type="checkbox"/>	575 MILLION CUBIC FEET

Variable Amount in Natural Gas Units & Meaning		
S	0.000001	% Sulfur content by weight
HCg	1032	Gas Heat Content (Btu/Cubic Feet)

▼ Explanation

To complete emissions reporting for this process, you have to provide values above for **Schedule, Season Percents** and **Material Throughput** in the units specified by **Units**. If there is a choice of more than one **Material**, you must select which is most appropriate, otherwise no action is needed on your part. The word pending appears each place a value is needed.

A variable table appears for this process for the reason below and you must provide a **Amount** as defined in the **Units & Meaning column**. The (Maricopa Department) auto-calculate factor emissions method is used for a percentage of the total emissions. The formula from the FIRE database which uses the variable.

The word pending appears each place a value for Amount is needed. For S (% Sulfur content) is 7.5, that means the **Material** contains 7.5% Sulfur. For HCg (Gas Heat Content (Btu/Lb)) is 12,540, that means there are 12,540 BTUs per pound of gas.

Save Reset Schedule/Seasons Cancel

Step 3

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

Mercury, as HG; Alkyl & Aryl CMPNDS; Elemental & Inorganic Forms	Throughput-based factor Available factors: 1	0	0.00684216	0.00196712	0	0.00196712 TONS
Naphthalene	Throughput-based factor Available factors: 1	0	0.0013416	3.8571E-04	0	3.8571E-04 TONS
Nickel	Throughput-based factor Available factors: 1	0	0.11868	0.0341205	0	0.0341205 TONS
PAH, 16-	Throughput-based factor Available factors: 1	0	0.0022704	6.5274E-04	0	6.5274E-04 TONS
Phenol	Throughput-based factor Available factors: 1	0	0.0131064	0.00376809	0	0.00376809 TONS
Propylene Oxide	Throughput-based factor Available factors: 1	0	0.014964	0.00430215	0	0.00430215 TONS
Toluene	Throughput-based factor Available factors: 1	0	0.13416	0.038571	0	0.038571 TONS
Xylenes (Isomers and Mixture)	Throughput-based factor Available factors: 1	0	0.066048	0.0189888	0	0.0189888 TONS

Printable view Export to excel

Edit Emissions

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.

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

- 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:

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

- 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 were 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.

The screenshot shows two parts of the AQD Online Portal interface. On the left is a table titled 'Process Emissions' with columns for 'Pollutant', 'Method Used', and 'Hours Uncontrolled'. The first row shows 'PM Primary (includes filterables > 10 microns + condensibles)' with the method 'Time-based factor - Stack Test' and a note 'Uncontrolled factor input by user.' On the right is a pop-up window titled 'Calculation of Emissions' with a 'Close' button. A red box highlights the play button icon in the top left corner of the pop-up window.

Process Emissions		
Criteria Air Pollutants/Other		
Pollutant	Method Used	Hours Uncontrolled
PM Primary (includes filterables > 10 microns + condensibles)	Time-based factor - Stack Test Uncontrolled factor input by user.	

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	Winter (Jan-Feb, Dec)%: 25
Maximum Days Per Week: 7	Spring (Mar-May)%: 25
Maximum Weeks Per Year: 52	Summer (Jun-Aug)%: 25
Actual Hours: 8,760.00	Fall (Sep-Nov)%: 25

Material	Action	Throughput	Confidential	Units
Natural Gas Burned		900	<input type="checkbox"/>	MILLION CUBIC FEET

▶ Explanation

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

▶ Explanation

[Edit Material/Schedule/Seasons](#)

▼ Process Emissions

Criteria Air Pollutants/Other	Method Used	Hours Uncontrolled	Uncontrolled Emissions Factor (Lbs/Throughput Units)	Time-based Factor (LBS/Hour)	Emissions Reported			Explanation
					Fugitive Amount	Stack Amount	Total Units	
Pollutant								
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	

[Printable view](#) [Export to excel](#)

Hazardous Air Pollutants/Greenhouse Gases/Other	Method Used	Hours Uncontrolled	Uncontrolled Emissions Factor (Lbs/Throughput Units)	Time-based Factor (LBS/Hour)	Emissions Reported			Units	Explanation
					Fugitive Amount	Stack Amount	Total		
Pollutant									
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	

Printable view Export to excel

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