

Instructions for Using Air Contaminant Discharge Permit Series AQ400 Forms

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Purpose

Emissions detail sheets are necessary for providing the basis for the Plant Site Emissions Limit (PSEL) and tracking changes in emissions at the facility. For non-greenhouse gas sources that existed in 1977 or 1978, the detail sheets need to show both the actual emissions in the baseline period (Form AQ401) and the projected emissions given the current configuration of the facility (Form AQ402). For greenhouse gas sources that existed or were permitted during 2000-2010, the detail sheets need to show both the actual emissions in the baseline period (Form AQ401) and the projected emissions given the current configuration of the facility (Form AQ402). The baseline period for greenhouse gases is one consecutive 12 calendar month period during 2000 – 2010. For sources that began operations after the baseline period, it is only necessary to show the projected emissions based on the current configuration of the facility.

AQ400 Forms

Below is a list of the forms to be used to show pollutant emissions. Form [AQ401](#) is required for non-greenhouse gas sources that existed prior to 1979 or for greenhouse gas sources that existed prior to 2011. Form [AQ402](#) must be included in all applications. Form [AQ403](#) is used for showing hazardous air pollutant emissions, if requested By DEQ. Form [AQ404](#) is used for identifying categorically insignificant activities at a facility.

Form Number	Description
AQ401	Plant Site Emissions Detail – Baseline Year
AQ402	Plant Site Emissions Detail – Current/Future Operations
AQ403	Plant Site Emissions Detail – Hazardous Air Pollutants
AQ404	Categorically Insignificant Activities

Form AQ404, Categorically Insignificant Activities: DEQ has listed a number of activities as “categorically insignificant,” meaning DEQ will not regulate them because their emissions are likely to be ‘insignificant.’ If these activities are present at the facility, the owner/operator does not need to estimate emissions from them, except as required by Cleaner Air Oregon. The owner or operator must fill out applicable application forms if a New Source Performance Standard (NSPS), National Emission Standard for Hazardous Air Pollutants (NESHAP) (i.e., emergency generators) or DEQ rules (i.e., gasoline dispensing) applies to that activity. This form asks for identification of activities at the facility that are “categorically insignificant” as defined in [OAR 340-200-0020](#). Read the instructions carefully, as the activities listed in the regulation are considered “categorically insignificant” only provided that they are not part of the facility's primary business or production activities.

For existing sources that had emissions during the baseline period, the applicant should carefully re-evaluate the baseline emission rate because the baseline emission rate will be changed only if a material mistake or an inaccurate statement has been made in establishing the production basis for the baseline emission rate. The baseline emission rate will also be recalculated if actual emissions are reset in accordance with the definition of actual emissions.

For sources that operated during the baseline period, the baseline emission rate is used to establish the netting basis. The netting basis is important because emission increases after the baseline period are compared to it to determine if the increases are greater than the significant emission rates, which would require additional analysis before the increases could be approved. In other words, changes at the facility can be approved on a faster track provided the plant site emissions stay within the netting basis plus the significant emission rate.

The permittee must obtain a Standard ACDP in order to maintain a netting basis for the source. For all other types of permits, the netting basis will be re-set to zero with the first permit action after July 1, 2001.

Instructions

There are three basic ways to determine emissions from a source:

1. Actual measured emissions using a Continuous Emissions Monitoring System (CEMS) (note, continuous predictive emissions monitors also fit in this category);
2. Material balance (primarily VOC sources and SO₂ from combustion devices); and
3. Calculated emissions based on emissions factors and production or process rates.
4. Of these methods, the emission factor approach is probably the most common. The detail sheets need to show emissions by device or activity. For sources located in the Medford-Ashland AQMA, it is also necessary to show the short term PM₁₀ emissions as well as the annual emissions in order to show the basis for the short term PM₁₀ PSEL in the permit.

Emission factors

In most cases, emissions are determined using emission factors and production or process rates. This is a simple means of calculating **normal** actual or projected emissions. Normal is underlined because emission factors do not account for emission variations due to such things as startups, shutdowns, operating load fluctuations, ambient conditions, fuel quality, etc. However, emission factors are a useful tool for establishing historical emissions and the only way to determine emissions when continuous emissions monitors and/or material balance information is not available.

Emission factors relate mass of emissions to a process or production unit level. For example, a particulate matter emission factor for rock crushers relates mass of particulate matter emitted to tons of rock crushed (lb PM/ton of rock crushed). Using this factor, one only needs to know the total amount of rock crushed in the baseline period to determine the baseline emission rate, or the projected amount of rock that will be crushed to calculate the projected emissions. When using this method, the detail sheet needs to identify the emission source, annual (and daily PM₁₀ in the Medford-Ashland AQMA) production levels, the emission factor, and the calculated emissions. The basis for the factor should also be provided either in the detail sheet or as a supplement to the detail sheet. Emission factors should be based on the best available information, which could be, but is not limited to the following:

- Actual source test data provided the equipment has not been modified;
- Source test data from similar type equipment;
- Industry factors based on studies of the processes;
- DEQ factors (use with caution)
- EPA AP-42 factors (use with caution as these are rated from A-E, depending on the confidence level); or
- Engineering estimates (this may include emission control factors)
- Combustion emission factors for greenhouse gases are in EPA's GHG *reporting* rules, **40 CFR Part 98 Subpart C**

An example detail sheet using emission factors is provided below:

Device	Pollutant	Short Term Production Level	Annual Production Level	Emission Factor	Reference	Short Term Emissions (lbs/day)	Annual Emissions (tons/yr)
Rock Crusher	PM	900 tons/day	300,000 tons	0.04 lb/ton	DEQ	36.0	6.0
	PM10	900 tons/day	300,000 tons	0.02 lb/ton	DEQ	18.0	3.0
	PM2.5	900 tons/day	300,000 tons	0.0012 lb/ton	DEQ	1.1	0.2
Generator	PM	90 gal/day	24,000 gal.	42.5 lb/1000 gal	AIRS	3.8	0.5
	PM10	90 gal/day	24,000 gal.	42.5 lb/1000 gal	AIRS	3.8	0.5
	PM2.5	90 gal/day	24,000 gal.	42.5 lb/1000 gal	AIRS	3.8	0.5
	CO	90 gal/day	24,000 gal.	130 lb/1000 gal	AIRS	11.7	1.6
	NOx	90 gal/day	24,000 gal.	604 lb/1000 gal	AIRS	54.4	7.2
	SO2	90 gal/day	24,000 gal.	39.7 lb/1000 gal	AIRS	3.6	0.5
	VOC	90 gal/day	24,000 gal.	49.3 lb/1000 gal	AIRS	4.4	0.6
	GHG	90 gal/day	24,000 gal.	SEE the greenhouse gas calculator at http://www.deq.state.or.us/aq/permit/acdp/simple.htm			

It is not always necessary to show the emissions detail for each and every emissions source at a facility. If there are numerous devices with the same emissions factor, it is possible to combine them in the detail sheet. For example, a facility may have 12 cyclones for which the same emission factor is used to calculate the emissions. The detail sheet could just have a line item for Cyclones and not address each one of the cyclones. The same could be true for multiple boilers, coating lines (see below), or any other device or process that uses the same emission factor and production or process data to calculate the emissions. When there are multiple devices or activities at a facility, it is sometimes better to organize the detail sheet by pollutant rather than by device so that it is easier to show total emissions by pollutant.

Material balance

Sometimes emissions can be determined by a material balance calculation. This means that the mass of pollutant emitted is equal to the mass of pollutant used in the process. One example of this would be solvent cleaning. If the mass of emissions does not equal the mass used in the process, then a combination of material balance and emission factors or control factors will probably need to be used to determine the emissions. An example would be styrene emissions from fiberglass processes. Only a portion of the VOC is emitted because much of it goes into the product. Another example would be a coating line that uses a thermal oxidizer to control the VOC emissions. Material balance may be used for determining the amount of VOC going to the thermal oxidizer, but the emissions are determined by applying a control factor for the thermal oxidizer. In either case, the detail sheets should provide the basis for the baseline emission rate and PSEL.

Below is one example:

Process	*VOC used in process (lb/day)	*VOC used in process (ton/yr)	VOC emission factor	1 – VOC control factor	VOC (lb/day)	VOC (ton/yr)
Coating line 1	1000	120	1.0	1.0	1000	120
Coating line 2	1000	120	1.0	0.1	100	12
Fiberglass 1	1000	120	0.35	1.0	350	42
Fiberglass 2	1000	120	0.35	0.1	35	4.2

*VOC used in the process is determined using material safety data sheets and assuming that all VOC is emitted to the atmosphere. The material balance equation depends on the type of product, but the following is a common approach:

$$\text{VOC} = M \times d \times \% \text{VOC} / 100$$

where, VOC = amount of VOC used in the process (lbs);

M = gallons of VOC containing material used (gallons); d = density of VOC containing material (lb/gallon); %VOC = VOC content of the material as a percent by weight.

For showing the baseline emission rate, the detail sheet will include actual data from the baseline period. However, for proposed PSELs, it may not be necessary to use a detail sheet to show the basis of the PSEL when using a material balance approach. If you don't use a detail sheet, the formulas for calculating the emissions should be clearly stated; especially when there is a mix of controlled and uncontrolled processes.

Continuous monitoring data

In rare cases, there may be a continuous emissions monitoring device on an emissions unit so that the PSEL can be determined from actual emissions data. This would be extremely rare because there were not very many CEMS in place during the baseline period and new sources cannot have CEMS data until they begin operations. However, if there is CEMS data, the detail sheet does not need to provide any information about production or emission factors unless there is some other need for the information. Below is an example detail sheet using CEMS data.

Device	Pollutant	Production (1000 lb of steam/day)	Production (1000 lb of steam/yr)	Emission Factor (lb/1000 lb of steam)	Reference	Short Term Emissions (lbs/day)	Annual Emissions (tons/yr)
Boiler A	PM/PM ₁₀	7200	2,500,000	0.04 lb/1000 lb steam	ST data	288	50
	CO	NA	NA	NA	CEMS	14,200	2500
	NO _x	NA	NA	NA	CEMS	2,232	388
	SO ₂	7200	2,500,000	0.014lb/1000 lb steam	DEQ	101	18
	VOC	7200	2,500,000	0.13 lb/1000 lb steam	ST data	936	163

*NA means not applicable.

Although detail sheets are useful tools for summarizing the emissions information about a facility, they are not the only way to present the information. For sources that have only one type of pollutant emissions and those emissions are determined by a material balance, it may be simpler to describe the emissions in a narrative type format and provide equations for calculating the emissions. However, there should be some basis to the emissions other than a calculation procedure. In most cases, the basis will be the baseline emission rate, but for newer sources, a typical operating year may be used to show the emissions by individual devices or processes.