

THE AIR DVD: *Chapter 2 - Permitting Basics*

To keep our air clean and comply with federal regulations, the NDEQ air division issues permits to businesses that emit air pollution.

There are some basic terms we use.

We permit sources... A source is any property or person contributing to air pollution. A facility can be a combination of sources or just one source. We often use source and facility interchangeably.

We only permit stationary sources... Stationary sources are buildings, structures, facilities or installations that are fixed at a site. Stationary sources can be portable, like an asphalt plant.

Sources are made up of emission units...An emission unit is any part or activity of a stationary source that emits or would have the potential to emit any regulated air pollutant.

An emission unit may be a boiler, a grain receiving pit, a haul road, or a dryer.

An emissions point is where emissions are released into the atmosphere. An emission point may be a stack, a wall vent, or a window.

You will need to identify all of the air emissions units and points at your facility in your permit application

We also take into account fugitive emissions...These air emissions don't exhaust through a building structure, like dust blowing from coal piles or volatile organic compounds leaking from outdoor valves

There are two types of sources we issue permits to, major and minor.

Generally, major sources emit higher levels of air pollutants and are subject to both state and federal permitting rules.

Minor sources emit lower levels of air pollutants and are typically only subject to state permitting rules.

Many facilities use air pollution control equipment to control the amount of emissions released into the atmosphere.

Air pollution controls either destroy or remove air contaminants from the exhaust stream before they are released into the atmosphere. Common control devices include baghouses, cyclones, wet scrubbers and thermal oxidizers.

The EPA has a great training tool with information about air pollution control devices on their website. www.epa.gov/ttn/atw/utrain.html

To determine if you need a permit you'll calculate your Potential-to-Emit or PTE. PTE is the maximum quantity of air pollutants a source could emit in a year given its physical and operational design.

You'll calculate each pollutant separately with the assumption that your source operates continuously for one year, 24 hours a day for 365 days, without control devices

Your PTE can include reductions for control equipment or other process limitations if they are included in a federally enforceable permit or applicable federal regulation.

For instance, if you have an existing air quality construction permit that limits the amount of material you can process per hour, you can take that operating restriction into consideration.

You can also take into consideration certain process limitations or bottlenecks. A bottleneck is an activity that restricts the capacity of other operations.

For instance, if you have a conveyor leg that limits the amount of grain that can be dried, the leg would be considered a bottleneck even though the grain dryer may be able to process more grain per hour.

The NDEQ Air Quality Division has developed several potential emission calculation spreadsheets to help you understand how to calculate your emissions. They can be found on the agency website under Air Quality Publications.

Once you have calculated your PTE, compare your PTE with the appropriate permit thresholds to determine if you need a permit. You can find the thresholds on our website and later in this chapter of the DVD.

You will also have to calculate your Actual emissions, which are emissions produced by a facility based on actual operating hours and conditions.

Your actual emissions will be used to determine if you are subject to the operating permit program and demonstrate your compliance with emissions limits. They are also reported in your emissions inventory.

There are several ways to calculate your potential and actual emissions. Choose the method that will provide the most representative emissions for your facility.

The most representative emission data will come from your own stack testing or continuous emission monitors. If you this data for your facility, it should be used in place of emission factors.

Another way to determine your emissions is to use mass balance calculations. This method compares the number of materials that enter a process to the amount of materials that leave.

Your purchasing, production, and waste records may help you with your calculation.

Let's calculate emissions for a surface coating facility using the mass balance method, based on actual material usage data. In this case, the facility uses the highest amount of material used in the previous five years along with the actual hours of operation.

To calculate volatile organic compound and hazardous air pollutant emissions from evaporative loss products, you'll need the monthly usage of the product in gallons. You will also need the weight percent or pounds per gallon of each VOC and HAP in the product and the density or specific gravity of the product.

If a range is given for the amount of VOC or HAP in a product, you must use the highest value in your calculation.

This information can be found in the Material Safety Data Sheet (MSDS), Certified Product Data Sheet (CPDS), lab data, or other similar environmental data.

You will multiply the gallons of coating used in the year (200 gallons) by the density of the coating, (10 pounds per gallon), times the weight percent of the HAP (4%). This will give you the actual pounds of HAP emitted in a year, (80 lbs)

You can also use mass balance to calculate your potential emissions by taking the actual pounds of HAP emitted (80 lbs) divided by the hours your facility operated during that year (2,340 hours = .034 lbs HAP/hr).

You will multiply that number by the total number of hours in a year (8760). This will give you the potential pounds of HAP emissions in a year (299.49 lbs/year). To get to tons, you will divide that number by 2000 pounds per ton (= .15 tons/year).

Facilities that don't have the hours of operation or actual product used can calculate emissions other ways. For instance, they could use the maximum spray gun capacity or the amount of coating used per product. If you aren't sure which method is best, contact the Air Quality Division.

If you don't have data from your source you can calculate emissions using emission factors. An emission factor is an average emission value derived from industry data.

You will need to know your process capacity or design rating to use an emission factor.

Here is an example of an actual emissions calculation for nitrogen oxides using an emission factor from EPA's AP42 Document.

The emission unit is a 50 million Btu/hour natural gas fired boiler that combusted 40 million standard cubic feet of natural gas in a period of 12 consecutive months.

The NO_x emission factor from AP-42 is 100 pounds of NO_x emitted per million cubic foot of natural gas burned.

To get the amount of NO_x emitted in a year, multiply the amount of natural gas combusted by the NO_x emission factor. ($40 \times 10^6 \times 100 \text{ lb}/10^6 \text{ scf} = 4,000 \text{ lbs}$) To convert pounds into tons divide by 2,000.

To calculate potential emissions for the same unit you first determine the maximum fuel use. Just divide the maximum fuel rate by the heating value of natural gas. ($50 \text{ million btu/hour} / 1,020 \text{ btu/cubic ft.} = 49,020 \text{ cubic ft/hour}$)

Next, calculate the amount of natural gas that can be burned in a year by multiplying the maximum allowable operating hours in a year by the maximum hourly amount of fuel use. ($8,760 \text{ hrs} \times 49,020 \text{ scf/hour}$)

= 429.41 MM scf/year). The maximum allowable hours assumes the process runs 24 hours a day, 365 days a year.

Now, multiply the amount of natural gas burned in a year by the NO_x emission factor. This gives you the pounds of NO_x emitted in a year. (429.41 MM scf/year x 100 lbs/NO_x = 42,941 lb NO_x/yr). To get tons divide by 2,000. (21.47 tons/yr)

Emission factors for pollutants can be found in EPA publications such as AP-42 or WebFire, both of which can be found on EPA's website. These factors are only intended for use when a facility lacks other emission data. www.epa.gov/ttn/chief/efpac

You can use emission limits from an air permit you already have or from a federal regulation you are subject to, like the New Source Performance Standards to calculate your potential emissions.

To do this, you would just use the allowable emission limit in place of your emission factor.