

Air 101 – Permitting Basics

Air Quality 101 Workshop
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Objectives

- Difference between “source” and “facility”
- Types of sources
- Emission Units vs. Emission Points
- Major vs. Minor Status
- Potential and Actual Emissions
- How to Calculate Emissions
- Permitting Process



What is a Source?

- **SOURCE** - any property, real or personal, or person contributing to air pollution (Title 129, Chapter 1).
- VERY Broad Definition
- Paraphrased - the collection of all units, processes, operations, and/or activities that contribute to air pollution located contiguous or adjacent to one another.
- A “source” can be a single emissions unit or a large factory that produces many products.
- Different programs under the Clean Air Act define “source” differently.

What is a Facility?

- “Facility” is defined in Chapter 1 as “Building, structure, facility, or installation”
- Occasionally “Facility” and “Source” may be used interchangeably
- The Department typically issues a specific Facility ID# to a specific location
- Paraphrased– the collection of all units, processes, operations, and/or activities that contribute to air pollution located on the same piece of land.



How are facilities and sources related?

- Complex analysis, many ways to look at it depending on the program (NSR, NSPS, NESHAP, etc) you are evaluating
- Depending on the program:
 - A facility can be composed of numerous sources.
 - A source can be composed of numerous facilities.
- Depending on the program and/or regulation, additional information may be needed to determine what constitutes the “source” including:
 - SIC Code
 - Ownership or Control
 - Type and quantity of Emissions

Types of Sources

- Stationary - any building, structure, facility, or installation that are at a fixed site
 - “Portable” can be considered Stationary
- Mobile - a motor vehicle, nonroad engine, or nonroad vehicle

Only Stationary Sources need to obtain Permits from NDEQ Air Division.



Emissions Unit

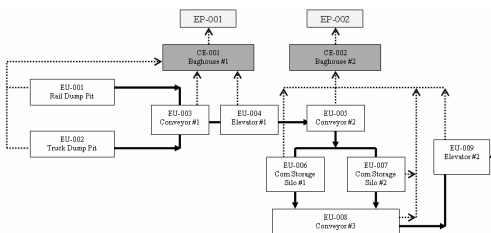
- Emissions Unit - any part or activity of a stationary source that emits or would have the potential to emit any regulated air pollutant (Title 129, Chapter 1)
- Any piece of equipment or any process (group of units) that emits pollutants into the air
- Examples of an Emissions Unit:
 - Boiler
 - Engine/Generator
 - Vent
 - Cooling Tower
 - Haul Road Traffic
 - Grain Receiving (each receiving pit, conveyor, elevator leg, etc.)

Emissions Point

- An Emissions Point is where emissions are actually, physically released into the atmosphere.
- This may be emissions from one or more emissions units.
- Examples of an Emissions Point:
 - Stack
 - Wall Vent
 - Building Ventilation Exhaust
 - Uncaptured Emissions (emissions not captured by a control device)
 - Fugitive Emissions (Equipment Leaks, Haul Roads)

Process Flow Diagram

- Easiest way to visualize how emission units and emission points are related.
- Required to be submitted with all permitting applications



Major vs. Minor

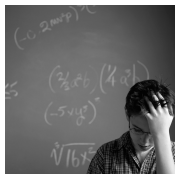
- Major or Minor status will dictate what rules or requirements are applicable to your source.
- Different applicability criteria for the construction permit program than for the operating permit program.
- In general, major sources are subject to rules and regulations established by the Federal Government
- In general, minor sources are subject to state requirements.
- Emissions from the source are used to determine major or minor status.

Emissions – PTE vs. Actual

- *Potential to Emit* (PTE) is the maximum quantity of air pollutant(s) an emissions unit or source can emit in a year given its physical and operational design. Any physical or operational limitation on the capacity of the source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is federally enforceable.
- *Actual emissions* are emissions produced by a facility, based on actual operating times and actual operating conditions.

Calculating Emissions

- Numerous ways to calculate emissions from an emissions unit or source
- Same methodologies can be used to calculate PTE or actual emissions
- Should always use the most representative and accurate method for each emission point.



Calc. Method – Emission Factors

- Emission factor - an average emission value from industry data that relates an activity/process to the quantity of a pollutant released into the atmosphere.
- Typically expressed as the weight of pollutant released per volume, weight, or length of time of the activity.
- Emission factors can be found in EPA publications such as AP-42 or WebFire (www.epa.gov/ttn/chieff)
- Use data specific to your operations (e.g. from stack testing) if available and if the test results were deemed to be valid by the Department.

Calc. Method – Emission Factors

Calculating PTE using Emission Factors from AP-42
500 hp Emergency Generator that uses #2 Diesel Fuel

Maximum Allowable Operating Hours = 8,760 hrs / yr

NO_x Emission Factor from AP-42 = 0.031 lb/hp-hr

(AP-42, Chapter 3.3, Table 3.3-1)

500 hp x 0.031 lb/hp-hr = 15.5 lb NO_x / hr

15.5 lb NO_x / hr x 8,760 hr/yr = 135,780 lbs NO_x / yr

135,780 lbs NO_x / yr / 2,000 lbs/ton = 67.89 tons NO_x / yr

PTE of NO_x from the 500 HP Generator is 67.89 tons / yr

Calc. Method – Emission Factors

Calculating 2007 Actual Emissions using AP-42
500 hp Emergency Generator that uses #2 Diesel Fuel

2007 Actual Operating Hours = 142 hrs in 2007

NO_x Emission Factor from AP-42 = 0.031 lb/hp-hr

(AP-42, Chapter 3.3, Table 3.3-1)

500 hp x 0.031 lb/hp-hr = 15.5 lb NO_x / hr

15.5 lb NO_x / hr x 142 hrs in 2007 = 2,201 lbs NO_x / yr

2,201 lbs NO_x / yr / 2,000 lbs/ton = 1.101 tons NO_x / yr

Actual Emissions in 2007 of NO_x from the 500 HP Generator was 1.101 tons

Calc. Method – Mass Balance

- The idea that “what goes in, must come out”
- Materials entering a process equal materials leaving, either through the product, recycled material, air emissions, wastewater, or solid or hazardous waste
- Must be able to accurately define these quantities
 - the amount of raw materials fed to production
 - the amount used in the product
 - the amount lost to the non-air waste stream
- Methodology useful when calculating emissions from surface coating facilities.



Calc. Method – Mass Balance

Calculating PTE using Mass Balance Approach

Maximum Units able to be Painted = 5 units per hr
It takes 10 gallons of paint to coat each unit.

The paint contains 1.5 lbs of VOC / gal.

Assumption: All VOC contained in Paint is Emitted

$$5 \text{ units/hr} \times 10 \text{ gal/unit} = 50 \text{ gal/hr}$$

$$50 \text{ gal/hr} \times 8,760 \text{ hr/yr} = 438,000 \text{ gal/yr}$$

$$438,000 \text{ gal/yr} \times 1.5 \text{ lbs VOC / gal} = 657,000 \text{ lbs VOC / yr}$$

$$657,000 \text{ lbs VOC / yr} / 2,000 \text{ lbs/ton} = 328.5 \text{ tons VOC / yr}$$

PTE of VOC from painting operations is 328.5 tons / yr

Calc. Method – Mass Balance

Calculating 2007 Actual Emissions from Painting

Paint Used in 2007 = 123,075 gallons

The paint contains 1.5 lbs of VOC / gal.

Assumption: All VOC contained in Paint is Emitted

$$123,075 \text{ gallons} \times 1.5 \text{ lbs VOC / gal} = 184,612.5 \text{ lbs VOC}$$

$$184,612.5 \text{ lbs VOC} / 2,000 \text{ lbs/ton} = 92.31 \text{ tons VOC}$$

Actual Emissions in 2007 of VOC from the painting operations was 92.31 tons

Permitting Process

- Administrative Review
- Technical Review
- Draft Permitting Documents
 - Permit, Fact Sheet, Calculations, Review Analyses
- Source Review
- Public Notice
- Respond to Comments Received and/or Conduct Public Hearing
- Issuance of Permit

Any Questions?

Thank You!
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