

Note: These are simplified procedures for typical facilities.

If an air permit is required at your site, if your emissions estimates require assistance from an engineer, or if the potential emissions at your site exceed the 80% limits in the “Overview” table, the Small Business and Local Government Assistance staff (SBLGA) will put you in contact with a TCEQ engineer for further guidance.

Example Emissions Estimate - Volatiles

- Volatile Organic Compounds (VOC)

- Hazardous Air Pollutants (HAP)

Many facilities create volatile pollution, both VOC and HAP. Both are estimated the same way. To see if you should detail your emissions you will first make a broad, “first cut,” estimate using very conservative estimating factors. If your estimate is larger than the 20 TPY/8 TPY VOC/HAP values seen in the “80% of Limit” column in the “Overview” table you will proceed with a more detailed estimate. When you complete your estimate you will return to “What will I do with these emissions estimates?” in the [“Overview.”](#)

Illustration - “first cut” estimate of actual emissions

We will examine “Facility A” over a busy, “worst case” year - the highest use rates of current materials on record. Start by assuming a very conservative volatile content of 8.0 lb/gal, or 50% if a material is purchased by the pound.

1. Studying its purchase records, Facility A determined it used five different materials during the year including ink, and wall and trim paint for a small self-help painting project.
2. A “first cut” estimate of Facility A’s total emissions was made by multiplying either 8.0 lb/gal or 50% VOC content (or the actual HAP amounts in each material) times the amount of each material used.
3. Facility A then proceeded to “Example Estimate - Potential Emissions” below.

Note: Actual VOC and HAP content may be found by studying the Material Safety Data Sheets (MSDSs) and product labels for each material.

Following are Facility A’s basic emissions estimates (Actual volatile contents).

Facility A used “worst case” material use rates - the highest use of current materials on record - to identify the materials and quantities used in their emissions estimate.

- Note:
1. HAP amounts shown are not actual. Representative amounts are identified to clarify procedure and understanding.
 2. Actual VOC and HAP content may be found by studying the Material Safety Data Sheets (MSDSs) and product labels for each material.

Chemical 1 - Wall Paint (Painted the walls and trim in employee break room.)

VOC per gallon (water based wall paint, SW Classic 99): 1.19 pounds

HAP per gallon (small amount used in paint formula): 0.02 pounds

Amount used: 12 gallons during the year

Gallons used per year times pounds of VOC/HAP per gallon:

$12 \text{ gal/yr} \times 1.19 \text{ lbs of VOC/gal} = 14.28 \text{ lbs VOC/yr}$

$12 \text{ gal/yr} \times 0.02 \text{ lbs of HAP/gal} = 0.24 \text{ lbs HAP/yr}$

Chemical 2 - Trim Paint (Painted trim and base boards in employee break room.)

VOC per gallon (oil based trim paint, SW Promar 200): 3.69 pounds

HAP per gallon (small amount used in paint formula): 0.03 pounds

Amount used: 2 gallons during the year

Gallons used per year times pounds of VOC/HAP per gallon:

$$2 \text{ gal/yr} \times 3.69 \text{ lbs of VOC/gal} = 7.38 \text{ lbs VOC/yr}$$

$$2 \text{ gal/yr} \times 0.03 \text{ lbs of HAP/gal} = 0.06 \text{ lbs HAP/yr}$$

Chemical 3 - Clean-up Solvent (Brushes, equipment and floor stains, break room project; general cleaning throughout the year.)

VOC per gallon (toluene, 100% VOC): 7.22 pounds

HAP per gallon (small amount used in manufacturer's formula - in this example the HAP is also a VOC): 0.05 pounds

Amount used: 9 gallons during the year

Gallons used per year times pounds of VOC/HAP per gallon:

$$9 \text{ gal/yr} \times 7.22 \text{ lbs of VOC/gal} = 64.98 \text{ lbs VOC/yr}$$

$$9 \text{ gal/yr} \times 0.05 \text{ lbs of HAP/gal} = 0.45 \text{ lbs HAP/yr}$$

Chemical 4 - Silicone Lube

VOC content: 28%

Amount used: 8 pounds per year

Yearly amount times VOC percentage:

$$8 \text{ lbs per yr} \times 28 \text{ percent} = 2.24 \text{ lbs VOC/yr}$$

Chemical 5 - Isopropyl Alcohol

VOC per gallon (100% VOC): 6.51 pounds

Amount used: 26 gallons per year

Gallons used per year times pounds of VOC per gallon:

$$26 \text{ gal/yr} \times 6.51 \text{ lbs of VOC/gal} = 169.26 \text{ lbs VOC/yr}$$

Ink

VOC per pound of ink: 5.0%

Amount used: 2,192 pounds/year minus 100 pounds documented waste equals 2,092 pounds/yr

$$2,092 \text{ lb/yr} \times 0.05 = 104.6 \text{ lb VOC/yr}$$

Note: Ink waste documented at 5% VOC - same as the raw ink.

Total Annual VOC Emissions (Actual)

Chemical 1 + Chemical 2 + Chemical 3 + Chemical 4 + Chemical 5 + Ink =

$$14.28 + 7.38 + 64.98 + 2.24 + 169.26 + 104.6 = 362.74 \text{ lb VOC/yr}$$

Total Annual HAP Emissions (Actual)

Chemical 1 + Chemical 2 + Chemical 3 =

$$0.24 + 0.06 + 0.45 = 0.75 \text{ lb HAP/yr}$$

Converting Actual Emissions to Tons per Year

To convert pounds per year to tons per year (TPY) divide by 2,000.

Example: $(362.74 \text{ lbs VOC/yr}) \div (2,000 \text{ lb/ton}) = 0.18 \text{ TPY of VOC (rounded)}$

$$(0.75 \text{ lbs HAP/yr}) \div (2,000 \text{ lb/ton}) = 0.00038 \text{ TPY of HAP (rounded)}$$

Example Estimate - Potential Emissions

You have now estimated your “worst case,” *actual* annual emissions. The next step is to estimate your *potential* emissions (PTE) - how much higher your emissions would have been if you had operated at maximum design capacity - 24 hours a day, 365 days per year. To estimate your potential annual emissions it is easiest to first determine “worst case” hourly emissions and then multiply by 8,760 hrs - the maximum number of hours in a year:

$$(24 \text{ hrs/day} \times 365 \text{ days/yr} = 8,760 \text{ hrs/yr})$$

Follow the sequence below:

1. Look at your typical weekly schedule over the last year. Most facilities operate 8 hours per day, 5 days per week, 50 weeks a year (two week shutdown for holidays). Unless you operated differently for significant periods (longer days; more days per week; more weeks) this approach (how many hours, how many days, how many weeks) is sufficient.
2. Start with your “worst case” *actual* annual emissions. To determine weekly emissions, divide these annual emissions by the number of weeks operated.
3. Divide weekly emissions by the number of days your facility operated each week to determine your daily emissions.
4. Now divide your daily emissions by hours operated each day to arrive at “worst case” hourly emissions.
5. Finally, multiply your “worst case” maximum hourly emissions by 8,760 hours (the maximum number of hours in a year) to find maximum potential annual emissions (PTE).

Illustration - Potential Emissions

An illustration is helpful to demonstrate this sequence:

If your estimated *actual* emissions for the past twelve months - based on “worst case” material use rates - the highest use of current materials on record - are 2,000 lb (1 ton) and you operated for 50 weeks during that period then:

- a. Weekly emissions are found by dividing these “worst case” annual emissions by weeks in operation.

Annual emissions divided by weeks in operation:

$$2,000 \text{ lb} \div 50 \text{ wks} = 40 \text{ lb/wk}$$

- b. Daily emissions are found by dividing weekly emissions by days operated each week.

Weekly emissions divided by days operated each week:

$$40 \text{ lb/wk} \div 5 \text{ days/wk} = 8 \text{ lb/day}$$

- c. Divide daily emissions by daily hours of operation to find actual, “worst case” hourly emissions.

Daily emissions divided by daily hours of operation:

$$8 \text{ lb/day} \div 8 \text{ hrs/day} = 1 \text{ lb/hour (‘‘worst case’’ maximum hourly emissions)}$$

- d. Finally, maximum annual potential emissions (PTE) are obtained by multiplying “worst case” maximum hourly emissions by 8,760 hours (maximum number of hours per year).

$$1 \text{ lb/hr} \times 8,760 \text{ hr/yr} = 8,760 \text{ lb/yr}$$

- e. To convert pounds per year to tons per year (TPY), divide by 2,000 lb per ton.

$$8,760 \text{ lbs/yr} \div 2,000 \text{ lbs/ton} = 4.38 \text{ TPY}$$

Your *potential to emit (PTE)* in this example is 4.38 tons per year (TPY). Follow this same sequence for each material that contains hazardous air pollutants to determine your *potential to emit for HAPs*.

How Do I Use These Results?

Now go to “What do I do with these emissions estimates?” in the [“Overview.”](#)