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DISCLAIMER

The purpose of this document is to help small businesses understand and implement the air emissions inventory process. Sections of this document summarize air pollution regulations governing small businesses. State and federal regulations take precedence over this document.

CHAPTER 1

INTRODUCTION

Environmental laws have a significant effect on all businesses. Small businesses in particular face challenges in complying with federal and state regulatory requirements. They may not be able to employ environmental staff to identify, interpret and implement applicable regulations. The Commonwealth of Pennsylvania has established the AIRHELP Program to help small businesses understand and comply with air pollution control requirements.

This manual is one in a series of guides offered through Pennsylvania's AIRHELP Program. Although it is aimed at small businesses, other businesses may benefit from it as well. This manual addresses why and how your business should prepare an air emissions inventory and responds to such commonly asked questions as:

- **Why should air emissions be of concern to my business?**
- **How can I estimate my facility's air emissions?**
- **How do I use my air emissions inventory data to comply with air regulations?**
- **Where can I go for free information and assistance?**

This manual is intended as a handy tool and is organized as shown on the following page to help you find the information you need.

HOW TO USE THIS GUIDE	
Go to Chapter	**To obtain information on**
1 (this chapter)	➢ **Why air pollution is a concern** ➢ **What agencies are implementing air regulations in Pennsylvania** ➢ **How to use this manual**
2	➢ **Why and how to conduct an air emissions inventory to meet regulatory requirements and to assess pollution prevention opportunities**
3	➢ **How to estimate actual air emissions** ➢ **Examples of estimation calculations and methods** ➢ **Advantages and disadvantages of each estimation method**
4	➢ **How to calculate potential emissions based on actual emissions and compile your air emissions inventory data**
5	➢ **How to determine your regulatory status based on your air emissions and comply with applicable air regulations**
6	➢ **Additional sources of technical and regulatory information**
Appendix A	➢ **Air pollutants currently regulated**
Appendix B	➢ **Emission factors contained in EPA publication AP-42**

Why is Air Quality a Concern?

The U.S. Environmental Protection Agency (EPA) monitors our nation's air to track levels of regulated air pollutants, including the following:

- **Volatile organic compounds (VOC)**
- **Nitrogen dioxide (NO_2)**
- **Sulfur dioxide (SO_2)**
- **Oxides of nitrogen and sulfur (NOx and SOx)**
- **Carbon monoxide (CO)**
- **Lead (Pb)**
- **Particulate matter (PM)**

Air pollution concentrations in many areas of the U.S. are still above the national air quality standards set by EPA to protect human health and the environment. In fact, ground-level ozone levels are still increasing in some areas. Ozone is formed from VOCs and NOx, which react in the presence of heat and sunlight, and is known to harm the human respiratory system. Other regulated pollutants such as lead can cause nervous system damage. NOx and SOx, which result from using fossil fuels for power, contribute to acid rain and associated problems (such as forest and ecosystem destruction) (Ref. 7).

In addition to these six air pollutants, there are hazardous air pollutants (HAPs). HAPs are compounds and classes of compounds determined by EPA to be particularly toxic to human health.

According to EPA, 164 million Americans live in areas with poor air quality. Each year, poor air quality contributes to 120,000 deaths and costs an estimated 40 billion dollars in health care and lost productivity. Poor air quality can negatively impact quality of life, property values, agriculture, and recreation and tourism. Businesses tend to locate in states with better air quality; therefore, poor air quality also hurts a state's business competitiveness (Ref. 6).

Because of these continuing problems, additional regulations are being implemented to improve air quality in the U.S. Some of these new regulations impact small businesses like yours.

Who Implements Air Quality Regulations in Pennsylvania?

Air quality concerns vary from place to place based on factors such as local industries, population density, public transportation use and atmospheric conditions. Therefore, state, city, and county governments are responsible for implementing most air regulations.

In Allegheny and Philadelphia counties, the environmental regulatory agency for air pollution is the county health department. The Pennsylvania Department of Environmental Protection (DEP) implements air quality regulations through six regional offices. DEP's central office assists with air program development, administration and training. Chapter 6 includes phone numbers and addresses for these agencies.

The Commonwealth of Pennsylvania has established the AIRHELP Program to help small businesses understand and comply with air pollution control regulations. The Pennsylvania AIRHELP Hotline (1-800-PA-AIRHELP) can answer your questions and provide regulations and guidance manuals to assist you. More information on

this service is included in Chapter 6.

Who is Impacted by These Regulations?

Current air regulations include requirements that apply to many small businesses. Examples of some of the small businesses that might have to meet air regulations are listed below.

Industry Category	Number*	Air Emissions
Printing and publishing	4,700	VOCs and HAPs from solvent-based inks and cleaning solutions (heat-set ink processes are of particular concern)
Top and body repair and paint shops	4,400	VOCs and HAPs from spray painting and parts washing solutions; PM from polishing and buffing parts
Fabricated metal products and industrial machinery and equipment	5,300	VOCs and HAPs from solvent-based cleaners, lubricants, and coatings; HAPs, such as chromium, associated with electroplating processes; and PM from machining operations
Retail bakeries	1,500	VOCs from fermentation and equipment cleaning; PM from dry goods processing
Gasoline service stations	3,500	VOCs from vehicle and tank refueling
Laundries and dry cleaners	4,000	HAPs associated with dry cleaning solutions
Air conditioning and refrigeration services	7,300	Ozone-depleting substances from refrigerants
Automotive repair shops (not painting)	13,000	VOCs and HAPs from paints and cleaning solvents Ozone-depleting substances from refrigerants

***Estimated number of small Pennsylvania businesses** **Source: Ref. 2 and 3**

The effect of air quality regulations on your business depends on (1) where your business is located, (2) the types of pollutants you emit and (3) the amount of pollutants you do or could emit. This manual primarily focuses on how to estimate emissions, however, Chapter 5 provides some information on the air quality regulations.

The remainder of this chapter presents some commonly asked questions regarding air quality regulations and their effects on small businesses.

Commonly Asked Questions

Q: **I have operated my small business for more than 20 years and was never impacted by air regulations. Are small businesses like mine a new target of air quality regulations?**

A: **There are still many areas in Pennsylvania and the U.S. where the air quality does not meet federal standards. Large sources of air pollution have already been regulated for a number of years. Therefore, air regulations now address smaller emission sources. Previously, most air quality requirements affected only medium- to large-size businesses, but now even small businesses are being asked to help achieve air quality goals. AIRHELP has found that some businesses with only 10 to 15 employees have exceeded the emission thresholds for major sources and have been impacted by the air regulations.**

Q: **I'm pretty sure that I have no high-volume or hazardous emission sources. Do I still have to complete an air emissions inventory?**

A: **Yes. Completing an air emissions inventory is the only way to document your emission sources and accurately determine your regulatory status. Also, you can identify any sources requiring emission reductions using control technologies or pollution prevention techniques. This guide walks you through the inventory process to ensure all components are accurately and efficiently completed.**

Q: **I've heard that I have to estimate my air emissions based on a production scenario that assumes I am operating around-the-clock, 365 days per year, and at 100 percent of my design capacity (potential to emit). Why should I be regulated based on this data, if I know that I'll never operate at this level?**

A: **Your actual emissions are based on your routine, facility-specific operating scenarios. Potential emissions address the maximum operating scenario you describe, including control devices. Some regulatory requirements are based on potential emissions because your business may continue to grow and have more air emissions, approaching the maximum. However, your potential to emit can be adjusted if you can demonstrate to DEP that this scenario is impossible for your facility. Options for adjusting your potential to emit are included in Chapter 4.**

Commonly Asked Questions (Continued)

Q: What major air compliance deadlines should I know about?

A: Annual emission statements for the previous calendar year, if required for your business, are due March 1 of each year. July 15, 1994, was the deadline to propose a Reasonably Available Control Technology (RACT) for your business, if you are a major source of NOx or VOC. For major sources, applications for Title V and synthetic minor permits were due November 1995. For sources built before July 1972, permit applications are due by November 1996. If you missed one of these deadlines, contact the appropriate agency (see Page 3) to set up a schedule for submitting the required information.

Q: If I have missed a deadline or have not been complying with an air regulation, will I have to pay a fine?

A: DEP has a voluntary compliance audit policy. A company that conducts an environmental compliance audit, takes action to promptly correct any violations that are discovered and discloses them to DEP would not be assessed a civil penalty.

Q: Is financial assistance available to small businesses to help me comply with air quality regulations?

A: The Pennsylvania Department of Community and Economic Development administers a low interest loan program to help small businesses comply with air quality regulations. For more information about the loan program, call 717-772-2889. In addition, the AIRHELP Program has prepared a brochure entitled *Financing Air Pollution Control Equipment*. It is available by calling the AIRHELP Hotline (1-800-PA-AIRHELP).

Q: What other resources are available to help me comply with the Clean Air Act (CAA)?

A: There are hotlines, electronic bulletin boards, state and federal contacts and trade associations. Chapter 6 provides a list of the resources that can help you.

CHAPTER 2

THE AIR EMISSIONS INVENTORY

The U.S. Environmental Protection Agency (EPA) defines an emissions inventory as "a listing, by source, of the amount of air pollutants discharged into the atmosphere of a community." Essentially, an air emissions inventory is a list of all air pollution sources and the types and amounts of pollutants emitted by each source. Any business with potential air pollution sources should perform an emissions inventory. In addition, state regulations may require you to conduct an emission inventory (Ref. 6).

This chapter will help you prepare for the emissions inventory and collect the information you need to calculate your air emissions. Chapters 3 and 4 explain how to calculate your actual and potential air emissions.

Purpose

An emissions inventory will help you calculate your actual and potential air emissions. The information about emissions will help you determine which air regulations apply to your business. Should the regulations apply, the information from the inventory will help you meet some of the requirements, such as permit applications, annual emissions statements and recordkeeping.

There are some air pollutants that are regulated but if you use them you do not need to estimate their emissions. These pollutants include ozone-depleting substances and toxic and flammable substances. An emissions inventory will help you determine if you use these substances and if the regulations apply to you. All of the regulated air pollutants are listed in Appendix A.

After you conduct an inventory, you may find that the air quality regulations do not apply to you at this time. However, if your operations change in the future, you will have the information available to determine your new regulatory status.

An inventory helps you understand what you are doing, what chemicals you use and what wastes you produce. Therefore, your emissions inventory also may identify pollution prevention options for your business. The idea behind pollution prevention is that "an ounce of prevention is worth a pound of cure." In other words, the less pollution

you generate, the less you will have to recycle, treat or dispose. Pollution prevention provides your company with many advantages:

- **Reduced waste disposal costs**
- **Reduced costs for energy, water, and raw materials**
- **Reduced operating costs**
- **Increased income from wastes that can be sold**
- **Fewer waste disposal problems**
- **Reduced risk of criminal and civil liability**
- **Protection of employees, the public, and the environment**
- **Improvement of employee morale and participation**
- **Enhancement of your company image**

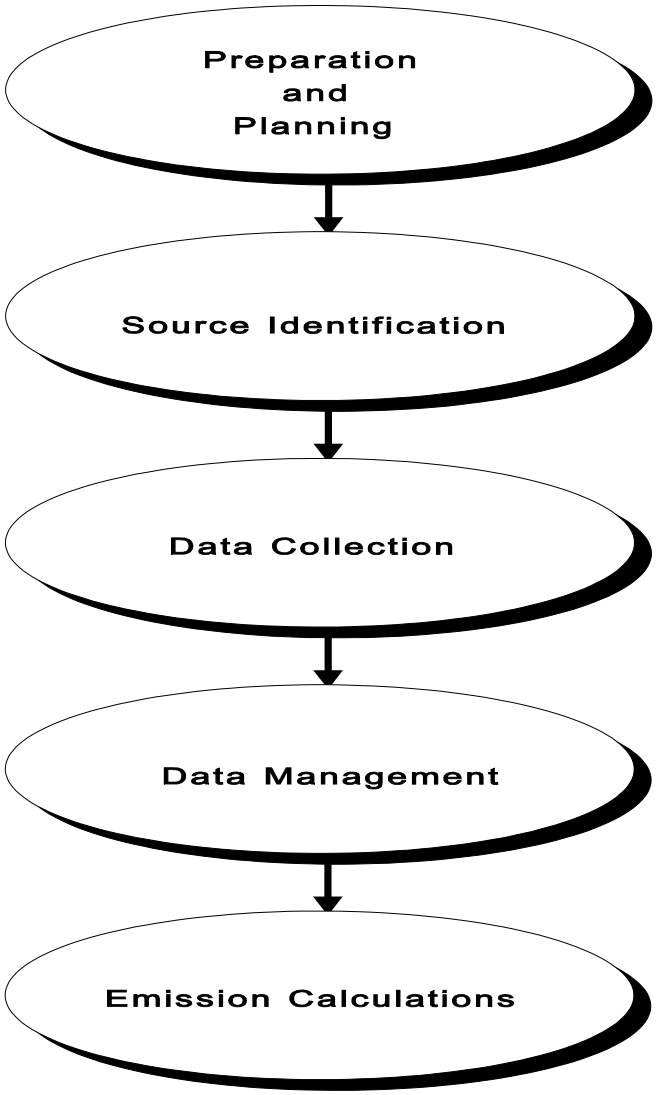
Pollution prevention may include the following changes in small business operations:

- **Equipment or technology changes**
- **Changes in processes or procedures**
- **Reformulation or redesign of products**
- **Substitution of raw materials**
- **Improvements in housekeeping and maintenance**
- **Staff training**
- **Improvements in inventory control**

During the emissions inventory, you will collect a wide variety of information about your facility's operations and processes. You may also be able to identify pollution prevention opportunities. For example, the person operating the parts cleaner may tell you about an aqueous cleaner and provide a safer workplace that degreases just as well as the chlorinated solvent you are currently using. Substitution of the less toxic aqueous cleaner would eliminate VOC emissions from the parts cleaner and provide a safer workplace. In addition, involving your employees in the process may improve morale as employees see that their participation makes a difference.

Steps In a Successful Emissions Inventory

The following flowchart shows the steps you need to take to conduct a successful emissions inventory.



Preparation and Planning

Preparation and planning is the first step in the emissions inventory. The key to this step is excellent communication between all people working on the emissions inventory. If everyone involved is well informed and communicates frequently from the beginning, the emissions inventory process will probably go more smoothly.

The support of management and facility personnel is critical to the success of the emissions inventory. Management's commitment to the inventory process will ensure resources and funding are allocated and may improve commitment from facility personnel. All facility personnel should be informed of the emissions inventory and its purpose. Personnel at all levels may have relevant information for the emissions inventory (Ref. 7). The preparation and planning step has two objectives:

- **Determining the scope of the emissions inventory**
- **Collecting preliminary data**

In determining the scope of the emissions inventory, you should answer the following two questions:

- **Will the whole facility or part of the facility be inventoried?**
- **What air pollutants will be estimated?**

Areas of the facility that have no air emissions, such as offices and break areas, can probably be omitted from the emissions inventory. Likewise, it is helpful to identify the regulated air pollutants that your facility generates. For example, if you know that your facility does not produce sulfur dioxide or lead air emissions, these air pollutants can be omitted from the emissions inventory (Ref. 4).

You should collect the following preliminary data:

- **A facility map**
- **A general description of facility processes and wastes**
- **Copies of previous reports on air emissions and permits**
- **A preliminary list of sources**
- **Any other information about air emissions from your facility**

Source Identification

The next step in the emissions inventory process is source identification. Each emissions source and vent must be identified and its emissions quantified. It is very important to identify every source. If you do not, you may not comply with some regulations and may be subject to enforcement action from a regulatory agency.

Use the following three steps to identify sources:

- **Review any available information, including existing air emission permits, Superfund Amendments and Reauthorization Act (SARA) 313 inventory information, material safety data sheets (MSDS), fuel data, solvent disposal records, purchasing records, stack test results, facility drawings, and process flow diagrams.**
- **Conduct a thorough facility walk-through to visually verify each emission source. Be sure to keep track of all source locations.**
- **Develop and distribute a questionnaire asking facility personnel to list all facility operations they work on and any associated air emissions.**

Be careful not to overlook any possible sources. For example, many people forget about spray cans, cleaning operations and natural-gas-fired space heaters. As you walk around your facility, ask yourself what raw materials are used for each piece of equipment and whether the equipment might produce air emissions.

Data Collection

After you identify and record the locations of all possible air emissions sources, you can collect the information needed to determine your actual and potential emissions. The following table lists the three categories of data you should collect.

Data Collection Needs for Your Emissions Inventory	
Operating Data	**Fuel and raw material type and properties** **Fuel and raw material consumption** **Operating schedules** **Annual and highest possible throughput rate** **Peak ozone season monthly production rate**
Control Equipment Data	**Current air emission control equipment** **Control equipment efficiency for all pollutants** **Maintenance records and requirements**
Process Roof Vent Data	**Listing of process roof vents** **Location, vent height, shape, opening size, exhaust flow rate, and temperature information of process roof vents** **Identification of the sources connected to each roof vent**

Data Management

Poor data management can make your emissions inventory chaotic and possibly useless. Data should be tracked and organized during collection using worksheets or a database system suitable for organizing the data into a workable format. It is important to keep thorough and organized records of all data gathered during the inventory process. If you select a database, keep in mind the end use of the data and the amount and complexity of data collected. Software is available that automates not only data collection and organization, but also calculation, recordkeeping and reporting functions in formats compatible with regulatory agency standards (Ref. 1).

Organized data in a useful format is an important part of a successful emissions inventory. It enables you to fulfill legal obligations for accuracy and completeness, meet deadlines for permit application submissions and avoid delays in permitting caused by submission of insufficient information.

Emission Calculations

You will use data collected during the emissions inventory to determine the amount of emissions from your facility. For each pollutant you emit, you must determine both actual and potential emissions. Actual emissions are the quantity of pollutant emitted during routine operations. Potential emissions are the quantity of pollutants that would be omitted if your facility operated every day, 24 hours a day, 365 days a year, at the maximum design capacity of all equipment.

Your emissions estimate must include all emission sources at your facility, not just those from your primary operation. For example, a printing business should estimate VOC emissions from its primary operation of printing. If the business also does binding or laminating, any VOCs emitted from those operations should also be determined (Ref. 1).

Once you have estimated your emissions for all your sources of the same pollutant, you then add up these estimates to get the total emissions of the pollutant. This number is then used to determine what air quality regulations apply to your business. Chapter 3 discusses how to calculate your actual emissions. Chapter 4 discusses how to calculate your potential emissions. Chapter 5 discusses how to calculate your total emissions and what air emission regulations may apply to you.

Helpful Hints

The following figure presents some helpful hints for conducting a successful emissions inventory.

FIGURE 1

HELPFUL HINTS FOR CONDUCTING AN EMISSIONS INVENTORY

Know your objectives

Get people involved

Document everything

Collect accurate data

Communicate frequently

Update facility drawings during the emission inventory

CHAPTER 3

CALCULATING ACTUAL AIR EMISSIONS

Actual emissions are the quantity of pollutants released from routine operations per year. This chapter discusses three methods for estimating your actual air emissions:

- **Direct measurements**
- **Material balances**
- **Emission factors**

These methods are listed below in the order of their relative accuracy. You should use the most accurate method that is reasonable for you. For most small businesses, direct measurement of emissions is unnecessary; material balances and emission factors are reasonable and appropriate methods.

Estimating emissions using direct measurements	**most accurate**
Estimating emissions using material balances	⇓
Estimating emissions using emission factors	**least accurate**

Appendix A discusses the types of pollutants that could require emissions estimates. Because volatile organic compounds (VOCs) are a common emission for many small businesses, the discussion and examples in this chapter focus on VOCs. However, the principles and methods presented can be applied to other pollutants as well. You will need to estimate actual emissions for each air pollutant you emit. In addition, you need to estimate actual emissions for all sources, not just those for major operations. Some VOCs are also hazardous air pollutants (HAPs). Your actual emissions of HAPs must be estimated separately. If a VOC is also a HAP, its actual emissions must be estimated as a VOC and also as a HAP (Ref. 1 and 5).

Direct Measurements

If conducted properly, direct measurements provide the most accurate emissions estimate. This method involves measuring the concentrations of the pollutants and the gas flow rate of the exhaust from a source. These measurements can typically only be taken from sources that have a stack or exhaust vent.

You can use two types of direct measurements to estimate emissions: (1) source testing and (2) continuous emissions monitoring. Source testing involves collecting individual samples of exhaust over a short period of time and measuring the amount of pollutants in the sample. To provide the best estimate of typical long-term operations, you should perform the test under normal operating conditions (Ref. 1). Once you have data on the pounds per hour of pollutant emitted under normal operations, actual emissions can be calculated by multiplying the pounds per hour by the number of hours you operate per year.

Continuous emissions monitoring uses a computerized system to continuously measure the pollutants in the exhaust, which allows you to obtain data for average conditions over a longer period of time. Continuous emissions monitoring is not usually done for VOCs because the equipment is costly and not readily available for this pollutant. The emissions data from the monitor can be totaled for the entire year to determine actual annual emissions.

Direct measurements involve specialized testing that must be done in accordance with regulations and approved EPA and Pennsylvania Department of Environmental Protection (DEP) procedures. Like most small businesses, you probably don't have the experienced personnel or equipment to perform direct measurements yourself. Therefore, to use this method, you most likely will need to hire a private firm that specializes in conducting direct measurements.

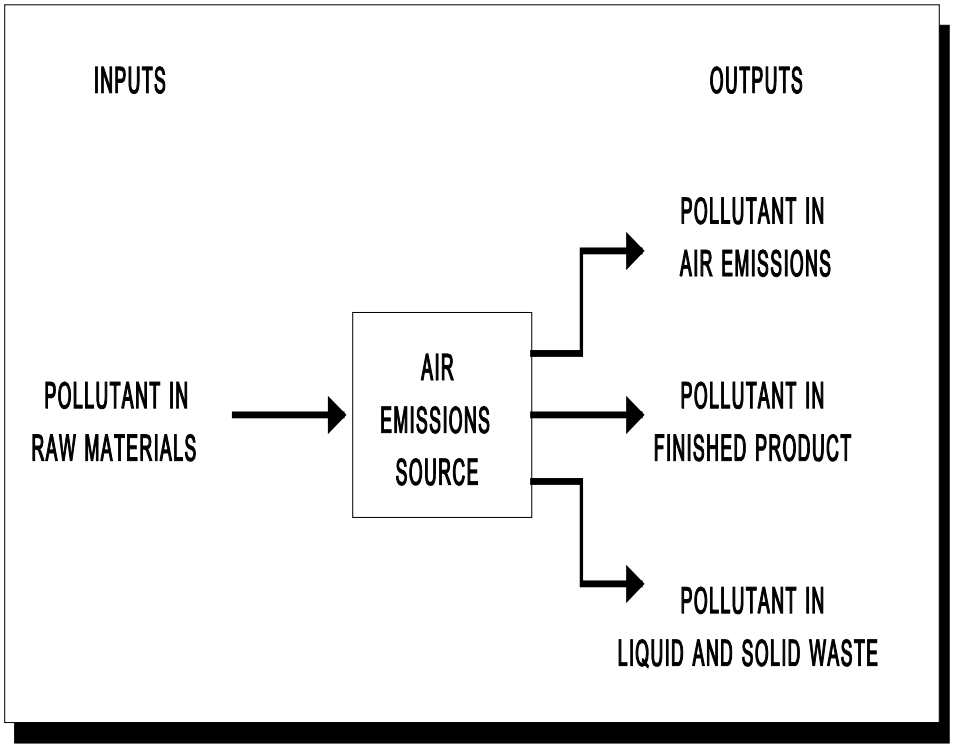
Material Balance

A material balance is a method of estimating emissions by accounting for, or "balancing," all of the material that goes into and comes out of an operation. If you know the amount of a pollutant that you put into an operation, and you can measure or make reasonable assumptions about the amount that comes out of the operation, then you can estimate your emissions using the material balance method. Material balances are mostly used to estimate air emissions of VOCs and sometimes particulate matter. Material balance is never used to estimate air emissions of SO_2, NOx, or CO (Ref. 1).

The best way to begin a material balance is to sketch a material balance diagram. This will help you account for all the process inputs and outputs. A general material balance diagram is shown below in Figure 2:

FIGURE 2

GENERAL MATERIAL BALANCE DIAGRAM



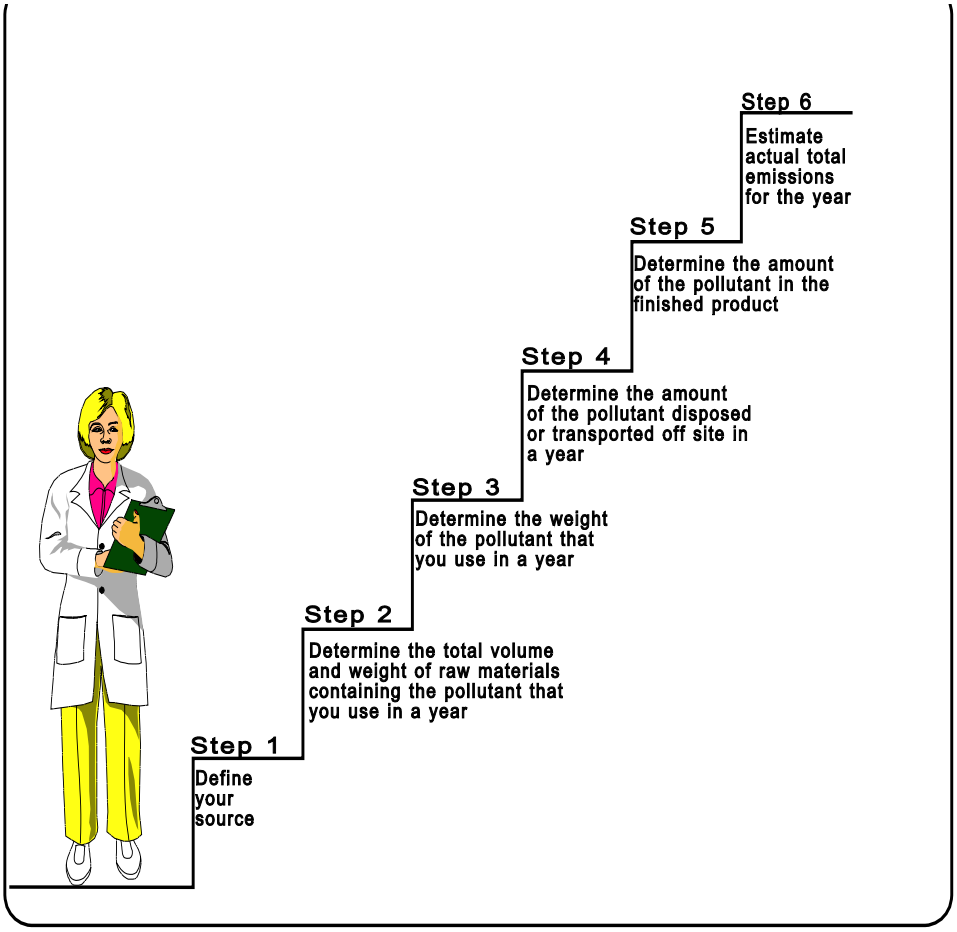
Based on this diagram, you can use the following equation to estimate your emissions:

$$\text{Actual emissions} = \text{amount of pollutant in raw materials} - \text{amount of pollutant in liquid and solid waste} - \text{amount of pollutant in finished product}$$

To use this equation, you need to perform six steps:

FIGURE 3

THE SIX STEPS OF A MATERIAL BALANCE



STEP 1 **Define your source. The first step is to define your source. If you have conducted an emissions inventory, you will already have a list of your air emission sources. Your source may be a single step or piece of equipment, or it may be a process involving several steps or pieces of equipment. When defining your source, it may be helpful to imagine a box around that source and then identify all of the ways that the pollutant goes into and comes out of that box.**

STEP 2 **Determine the total volume and weight of raw materials containing the pollutant that you use in a year. If you maintain records of the amount of raw material that you use, this step will be simple. If you don't, you can estimate the amount of raw materials by subtracting the amount of unused raw material from the amount of raw material you purchased in a year. Your invoices and inventory records should provide the information you need. If you only have information on the volume (in gallons) of the raw material, you need to convert the volume to the weight (in pounds) of the raw material. You can make this conversion using the density (in pounds per gallon) of the raw material and the following equation:**

weight = density x volume
(weight in pounds = pounds per gal x number of gallons)

You should be able to find out the density of the material from Material Safety Data Sheets (MSDS) sheets or from your raw material supplier.

STEP 3 **Determine the weight of the pollutant used in a year. Since the pollutant is only a portion of the raw material, you need to convert the weight of the raw materials used to the weight of pollutant used. You can make this conversion using the weight percent of the pollutant in the raw material. For example, if the weight percent of VOCs in a printing ink is 35 percent, there are 35 pounds of VOCs in every 100 pounds of ink. This is equal to 0.35 pound of VOCs per pound of ink. You should be able to obtain the weight percent of pollutants in your raw material from MSDS sheets or from your raw material supplier.**

STEP 4 **Determine the weight of the pollutant in liquid or solid waste that is disposed of, recycled, or transported off site in a year. Once you know the weight of pollutant used in a year, you need to account for the portion of the pollutant that is disposed, recycled, or transported off site. You need to consider both liquid and solid forms. Your waste manifests and other records should have this information. For example, in solvent degreasing operations, some portion of the solvent becomes spent and is recycled or transported off**

site. Some operations may not generate a significant amount of liquid or solid waste containing the pollutant; you can assume that step in the equation is zero. For example, when blending new materials together to make a product, all of the raw materials maybe used in the product and there is no left over or waste material for disposal.

STEP 5 **Determine the weight of the pollutant in the finished product. You may also need to account for a portion of the pollutants in the finished product. For example, during most printing operations, a portion of the solvents (VOCs) in printing ink is retained on the paper. For most other operations, such as solvent degreasing or automobile surface coating, you can usually assume that no VOCs are retained by the cleaned part or the coated part.**

STEP 6 **Estimate total actual emissions for the year. When you reach this step, you should have all the information you need to estimate your emissions using the material balance equation. Your operation may involve the use of different raw materials containing the same pollutant. For example, a printing opera-tion may use different inks containing VOCs or the same HAPs. In this case, you need to add the emissions from all raw materials used at a single source to obtain the total emissions of a pollutant from that source. Finally, you should divide the weight by 2,000 to convert the weight from pounds to tons.**

The two sections that follow present examples of the material balance method.

EXAMPLE 1 - AUTO BODY SHOP

You own a body shop and paint cars and car parts in several spray booths. Based on your invoices from last year, you purchased 350 gallons of Prime Coat X. Your inventory records indicate that 50 gallons of that primer remain in storage. Manifests show that you disposed of 8 gallons of waste primer last year. The manufacturer of Prime Coat X told you that the density of the coating is 9.4 pounds per gallon and that the coating is 26 percent VOCs by weight and 74 percent solids by weight. You can estimate your actual VOC emissions as follows:

STEP 1 **The source is all of the spray booths.**

STEP 2 **Volume of raw material used per year**
= 350 gallons purchased - 50 gallons in stock
= 300 gallons of primer used per year

Weight of raw material used per year
= 300 gallons of primer per year x 9.4 pounds per gallon

= 2,820 pounds of primer per year

STEP 3 **Weight of VOCs used per year**
= 2,820 pounds of primer per year x 0.26 pound of VOCs per pound of primer
= 733 pounds of VOCs per year

STEP 4 **Weight of VOCs disposed of or transported off site per year**
= 8 gallons of primer disposed x 9.4 pounds per gallon x 0.26 pound of VOCs per pound primer
= 19.6 pounds of VOCs per year as waste

STEP 5 **Weight of VOCs in finished product**
= 0 pounds of VOCs per year
(For automobile surface coating operations, you can assume that no VOCs are retained on the coated automobiles.)

STEP 6 **Total VOCs emitted per year**
= (733 - 19.6 - 0) pounds of VOCs per year
= 713.4 pounds of VOCs per year ÷ 2,000 pounds per ton
= 0.36 tons of VOCs per year

EXAMPLE 2 - PRINTING SHOP

You own a printing shop. Your records indicate that you used 562 gallons of a single, non-heatset ink last year. According to AP-42, for conventional non-heatset inks, about 95 percent of the VOCs is retained by the paper (Ref. 6). The MSDS indicates that the density of the ink is 8.4 pounds per gallon and the VOC content is 24 percent by weight. The MSDS also indicates that the ink is 2 percent toluene (which is a HAP) by weight. During change-out of inks from your presses, you disposed of 12 gallons of leftover ink last year. You can estimate your actual VOC emissions as follows:

STEP 1 **The source is the non-heatset ink printing process.**

STEP 2 **Volume of raw material used per year**
= 562 gallons of ink per year

Weight of raw material used per year
= 562 gallons of ink per year x 8.4 pounds per gallon
= 4,721 pounds of ink per year

STEP 3 **Weight of VOCs used per year**
= 4,721 pounds of ink per year x 0.24 pound of VOCs per pound of ink
= 1,133 pounds of VOCs per year

STEP 4 **Weight of VOCs disposed of or transported off site per year**
= 12 gallons per year x 8.4 pounds per gallon x
0.24 pound of VOCs per pound of ink
= 24 pounds of VOCs per year

STEP 5 **Weight of VOCs in finished product**
= 1,133 pounds of VOCs per year x
0.95 pound of VOCs retained per pound of VOCs used
= 1,076 pounds of VOCs per year

STEP 6 **Total VOCs emitted per year**
= 1,133 - 24 - 1,076 pounds of VOCs per year
= 33 pounds of VOCs per year
= 33 ÷ 2,000 pounds per ton
= 0.02 ton VOC per year

Some VOCs are also HAPs. HAPs need to be estimated separately from VOCs. Because one of the VOCs used in the ink (toluene) is a HAP, you also must estimate actual HAP emissions. This can also be done using a material balance as follows:

STEP 1 **Again, the source is the printing process.**

STEP 2 **Weight of raw material used per year**
= 4,721 pounds of ink per year

STEP 3 **Weight of HAP used per year**
= 4,721 pounds of ink per year x
0.02 pound of HAP per pound of ink
= 94 pounds of HAPs per year

STEP 4 **Weight of HAP disposed of or transported off site per year**
= 12 gallons of ink per year x 8.4 pounds per gallon x
0.02 pound of HAP per pound of ink
= 2 pounds of HAPs per year

STEP 5 **Weight of HAP in finished product**
= 94 pounds of HAP used per year x
0.95 pounds of HAP retained per pound of HAP used
= 89 pounds of HAPs per year

STEP 6 **Total HAP emitted per year**
= 94 - 2 - 89 pounds of HAPs per year
= 3 pounds of HAPs per year

A printing operation may have other VOC and HAP sources, such as fountain solutions, cleaning solutions, glues, coatings, and paints. These also can be estimated using the material balance method.

Emission Factors

If you do not have data or resources available to estimate actual emissions using source testing or material balances, check with your equipment vendor or your trade association for emissions information. If these resources cannot provide you with the information you need, you may be able to use emission factors. Emission factors are based on air pollution and emission studies performed by the U.S. Environmental Protection Agency (EPA). The main source of emission factors is an EPA document titled the *"Compilation of Air Pollutant Emission Factors"* commonly referred to as AP-42 (Ref. 6). There are several ways you can access AP-42:

- **AIRHELP - the Pennsylvania small business assistance program (1-800-PA-AIRHELP)**
- **Government Printing Office - ask for document No. 055-000-00500-1 (202-512-1800)**
- **Info CHIEF - an EPA helpline (919-541-5285)**
- **Fax CHIEF - a system to fax sections at your request (919-541-0548)**
- **CHIEF - a computer bulletin board system (919-541-5742)**

See Chapter 6 for additional information about these resources or call the AIRHELP Hotline (1-800-PA-AIRHELP).

Emission factors relate the amount of a pollutant emitted to the activity causing the emission. Emission factors are usually expressed as the *weight of the pollutant emitted* divided by a standard measure of the *activity emitting the pollutant*. For example, the emission factor for a dry cleaner using one distillation unit to reclaim its solvent is 1.6 pounds of perchloroethylene (weight of pollutant emitted) per 100 pounds of clothing washed (activity emitting the pollutant). Therefore, all you need to know to estimate emissions is the number of distillation units you have and the pounds of clothing you wash per year (Ref. 6).

To use emission factors, simply multiply the *emission factor* by the *amount per year of the activity emitting the pollutant* (provided by you based on your operations). The following equation summarizes the emission factor approach to estimating emissions:

$$\text{Actual emissions} \left(\text{weight of pollutant/year}\right) = \left(\frac{\text{Emission Factor}}{\text{weight of pollutant}}{\text{standard measure}}\right) \text{x} \quad \begin{matrix}\text{Amount per year of the a}\\ \text{emitting the pollutan}\\ \text{(number of standard measu}\end{matrix}$$

You must provide the *amount per year of the activity emitting the pollutant* in the correct standard measure. The correct standard measure is provided by the denominator of the emission factor. For example, the denominator in an emission factor of 1.6 pounds per 100 pounds of clothing is 100 pounds. If a dry cleaner cleaned 81,000 pounds of clothes, the emission factor should be multipled by 810.

Table 1 lists examples of sources commonly found at small businesses and the standard measures of the activity emitting the pollutant. Emission factors for the source categories in the first column are provided in AP-42, and the corresponding standard measures are found in the denominator of the emission factor.

TABLE 1
EXAMPLES OF ACTIVITIES IN AP-42

Common VOC Emission Source Categories	Standard Measure of Activity Emitting Pollutant

Solvent degreasing	**Number of cold cleaner units in operation**
Automobile and light duty truck surface coating	**Number of automobiles painted**
General industrial surface coating	**Gallons of coating applied**
Dry cleaning	**Hundred pounds of clothes cleaned**
Transportation and marketing of petroleum liquids (which includes gasoline service stations)	**Gallons of gasoline transferred to underground storage tanks**
Gasoline and diesel industrial engines	**Horsepower-hours of power output *or* Btu's of fuel input**
Flat wood interior panel coating	**Square feet of panel coated**
Asphalt paving operations	**Weight of cutback asphalt applied**

When using AP-42, refer to the section that *most* applies to your operations. For example, AP-42 includes a section on surface coating, which is divided into nonindustrial and industrial surface coating. Industrial surface coating is further divided into general industrial surface coating and 13 other, more specific types, of industrial surface coatings. You should first check the more specific subsections for applicable emission factors before referring to more general sections. Appendix B provides the table of contents of AP-42 so that you can check to see if your operation has an EPA emission factor.

The three examples that follow show you how to use emission factors to estimate your emissions.

EXAMPLE 1 - DRY CLEANING

You operate a dry cleaning shop that uses a distillation unit. The cleaner is perchloroethylene, which is a VOC. You wash 55,000 pounds of clothing per year. The emission factor in AP-42 for dry cleaning with a distillation unit is 1.6 pounds per 100 pounds of clothes. You would estimate your actual VOC emissions as follows:

Actual VOC emissions **= 1.6 pounds of VOC x 55,000 pounds of clothes ÷100 pounds**

= 880 pounds of VOCs per year
= 880 ÷ 2,000 pounds per ton
= <u>0.44 tons of VOCs per year</u>

EXAMPLE 2 - AUTO REFINISHING

You have an automobile refinishing business that refinishes 500 automobiles per year. For each automobile, you apply a prime coat using solvent-borne spray and a topcoat of enamel. It would be more accurate to use a material balance to calculate your air emissions in this example. However, you do not have the necessary data and will need to calculate your air emissions using emission factors. The AP-42 section titled "Automobile and Light Duty Truck Surface Coating Operations," is intended for production of new vehicles. However, because you do not have other data, the following AP-42 emission factors may be used to estimate emissions:

Prime coat - solvent borne spray:	**14.54 pounds of VOCs per automobile**
Topcoat - enamel:	**15.58 pounds of VOCs per automobile**

You would estimate your actual emissions of VOCs as follows:

Actual VOC emissions **= (14.54 + 15.58) pounds of VOC per automobile x 500 automobiles per year**
= 15,060 pounds of VOCs per year ÷ 2,000 pounds per ton
= <u>7.53 tons of VOCs per year</u>

EXAMPLE 3 - INTERNAL COMBUSTION ENGINE

Your manufacturing operation uses a 300 horsepower (hp) diesel internal combustion engine. From purchase records, you determine that 5,000 gallons of diesel fuel was consumed last year. Your supplier provides the information that the heat content for diesel fuel is 139,150 Btu's per gallon.

The engine emits many pollutants. NOx is emitted in the highest quantity and therefore will be used in the example. You would estimate emissions of all pollutants. The emission factor in AP-42 for NOx is:

4.41 pounds of NOx per million Btu's of heat input from the fuel

You would estimate NOx emissions as follows:

***Actual NOx emissions:* = 5,000 gallons per year x 139,150 Btu per gallon x 4.41 pounds of NOx per million Btu**
= 696 million Btu per year x 4.41 lb NOx per million Btu
= 3,069 pounds NOx per year ÷ 2,000 pounds per ton
= 1.5 tons of NOx per year

EXAMPLE 4 - BOILER

You operate a boiler to provide heat for your manufacturing process. From invoices, you determine that 7,500 gallons of No. 2 fuel oil were burned in the boiler last year. Your supplier informs you that the oil contains 0.3 percent sulfur by weight.

The boiler emits many pollutants. SO_2 is emitted in the largest quantity and therefore will be used in the example. However, you should perform similar calculations for all pollutants. The emission factor in AP-42 for SO_2 from an

$$\frac{142 \text{ pounds of } SO_2}{1{,}000 \text{ gallons of oil}} \times S$$

industrial boiler firing No. 2 fuel oil is:
Where "S" = the weight percent of sulfur in the oil.

You would estimate the SO_2 emissions as follows:

***Actual SO_2 emissions:* = $\frac{\text{142 pounds of } SO_2}{\text{1,000 gallons of oil}}$ x 7,500 gallons of oil per year x 0.3%**

sulfur

= 319.5 pounds of SO_2 per year ÷ 2,000 pounds per ton
= 0.16 tons of SO_2 per year

Advantages and Disadvantages

Table 2 summarizes the advantages and disadvantages of the three methods presented in this chapter for estimating actual emissions.

TABLE 2

COMPARISON OF METHODS FOR ESTIMATING EMISSIONS

Method	Advantages	Disadvantages
Direct Measurements	Provides most accurate estimate	Requires skilled personnel and special equipment Expensive Applies only to operating sources with exhaust vents or stacks Usually a one-time "snap shot" of on-going process
Material Balance	Averages out short-term fluctuations to provide a good long-term estimate Most well-run businesses have the information available	Accuracy is reduced for estimates over shorter time intervals Requires quantifying inputs and outputs Requires knowledge of the amount of pollutants in inputs and outputs
Emission Factors	Usually can be done quickly Many emission factors readily available	Provides least accurate estimate; usually overestimates Emission factors are not available for all pollutants and all sources

Effects of Air Pollution Control Devices

Pollution control devices prevent most, if not all, emissions from entering the atmosphere. Typical pollution control devices include thermal incinerators, condensers, and absorbers. If you have a control device on your emissions source, you should correct your uncontrolled emissio ns estimate to account for the efficiency of the control device. You can make this adjustment using the following equation:

$$\underset{(tons/yr)}{Emissions} = \underset{(tons/yr)}{Uncontrolled\ Emissions} \times \underset{of\ control\ device}{(1 - overall\ efficiency)}$$

The overall efficiency is the product of three factors: the control time, the capture efficiency, and the control efficiency. You can calculate the overall efficiency as follows:

$$\underset{efficiency}{overall} = \underset{time}{control} \times \underset{efficiency}{capture} \times \underset{efficiency}{control\ device}$$

Control Time

Control time accounts for how much time the control device is in use when emissions are generated. For example, if your emissions source operates 50 hours per week, but your control device is not in use 5 of those hours to allow for cleaning and servicing, then your control time is 45 hours/50 hours, which is equivalent to 90 percent, or 0.90.

Capture Efficiency

The capture efficiency is the relative amount of the pollutant that the control device captures. One hundred percent of the pollutants may not pass through the control device because part of the emission stream may be diverted from the control device. For example, spray painting in an open area of a shop will result in some of the air emissions escaping the control device. If 10 pounds of VOCs are released while spray painting a part and 7.5 pounds of the VOCs enter the control device, the capture efficiency is 75 percent, or 0.75. An accurate value for capture efficiency is difficult to

determine without elaborate testing. To see if capture efficiency is less than 100 percent, check the design drawings and specifications of your control device or ask the manufacturer of the control device (Ref. 1).

Control Efficiency

The control efficiency of a device is the relative amount of pollutants removed from the emissions that enter the control device in the inlet stream. If your control device has been tested for its actual control efficiency, use this actual control efficiency in your calculations. Otherwise, you can obtain an acceptable approximation of the control efficiency from the manufacturer of the control device. You should use the control efficiency provided by the manufacturer only if you have operated the control device consistently according to the manu-facturer's instructions. If you haven't, you may need to contact the manufacturer or hire a consultant to determine the device's actual control efficiency.

EXAMPLE 4 - WOOD FURNITURE FACILITY

You operate a wood furniture manufacturing facility. Using a material balance, you estimate that your uncontrolled VOC emissions are 11.5 tons/year. There is an incinerator controlling VOC emissions from the spray and flashoff areas, both of which are in totally enclosed booths and the door is kept closed during spraying. The pieces are air-dried, but the drying area is too large to be vented to the incinerator. The incinerator is always operated when the spray booth is in use. The manufacturer has provided documentation that the incinerator has a control efficiency of 98%, and you have maintained the incinerator according to manufacturer's specifications. There is no section in AP-42 for wood furniture manufacturing. However, the section on metal furniture coating estimates that 40 percent of the VOCs evaporate in the spray booth, 30 percent in the flashoff area, and 30 percent in the drying area.

***Control time*= 100% (control device is always used)**

***Capture efficiency* = 30% + 40% = 70% (only emissions from spray booth and flashoff areas are controlled and they are in a total enclosure, so all emissions are captured)**

***Control device efficiency* = 98%**

***Overall efficiency of control device*= 100% x 70% x 98%**
= 68.6%
= 0.686

***Controlled VOC by control device* = 11.5 tons per year x 0.686**

= 7.9 tons per year

Actual VOC Emissions **= Uncontrolled VOCs - controlled VOCs**
= 11.5 tons per year - 7.9 tons per year
= <u>3.6 tons VOCs per year</u>

CHAPTER 4

CALCULATING "POTENTIAL TO EMIT"

"Potential to emit" is the emission rate associated with the maximum unrestricted operation of the emission source for 8,760 hours per year. Maximum unrestricted operation is defined as operating your source at its full capacity or maximum design rate. The effect of a control device can be considered. Calculating your potential to emit is necessary to determine if you are a major source (see Chapter 5). You will need to know your potential to emit because it will determine whether some of the air regulations apply to your facility. This section explains how to calculate your potential to emit.

There are two methods you can use to calculate your potential emissions:

- **Determine your maximum hourly rate and multiply this rate by 8,760 hours per year as in the following equation:**

Potential emissions = Source maximum hourly rate x 8,760 hours per year

- **Scale up your actual emissions estimate by converting it to a potential emissions factor using the following equation:**

Potential emissions = Actual emissions x (8,760 hours/actual hours) x (100% capacity/actual capacity)

You should calculate potential to emit for volatile organic compounds (VOC), oxides of nitrogen (NOx), oxides of sulfur (SOx), carbon monoxide (CO), lead (Pb), particulate matter (PM) and hazardous air pollutants (HAP). Potential to emit must always be calculated for the maximum unrestricted operating level of the source unless you have previously obtained a permit restricting its operating level. If you have an existing permit that limits your air emissions, calculate your potential to emit with those limitations. For example, you may have an operating permit that restricts the amount of fuel you burn, limits the number of hours you operate, or requires the use of a control device with a minimum control efficiency. If that is the case, include the restrictions in your calculation of potential to emit.

EXAMPLE 1 - SPRAY PAINTING

You have a spray gun that can apply a coating at a maximum rate of 5 gallons of paint per hour. Of the coatings you use, the one with the highest VOC content contains 2 pounds of VOC per gallon of coating. You would estimate your potential VOC emissions as follows:

Potential emissions **= 5 gallons of paint per hour x 2 pounds VOCs per gallon**
= 10 pounds of VOCs per hour x 8,760 hours per year
= 87,600 pounds per year x 1 ton per 2,000 pounds
= <u>43.8 tons per year</u>

EXAMPLE 2 - WOODWORKING SHOP

You operate a woodworking shop with saws, planes, routers, and drills. Each piece of equipment is inside a booth with a ventilation point near the equipment. All pieces of equipment are vented to a control device. The equipment is set up such that the fan for the ventilation system turns on when the woodworking equipment is turned on. The manufacturer informs you that the cyclone has a control efficiency of 85 percent when properly maintained and operated, which you do. From manifests, you determine that 7,000 pounds of wood dust from the cyclone were disposed last year. Equipment in the woodworking shop is used 28 hours per week. You would estimate your potential to emit PM as follows:

Amount of PM recovered by cyclone **= 7,000 pounds per year**
Amount of PM entering cyclone **= 7,000 pounds per year ÷ 85%**
= 8,235 pounds per year
Actual emissions of PM to atmosphere **= 8,235 pounds per year - 7,000 pounds per year**
= 1,235 pounds per year

Potential to emit PM **= 1,235 pounds of PM per year x (8,760 hours per year ÷ [28 hours per week x 52 weeks per year])**
= 1,235 pounds of PM per year x 6.0
= 7,410 pounds of PM per year ÷ 2,000 pounds per ton
= <u>3.7 tons of PM per year</u>

CHAPTER 5

APPLICABILITY OF PENNSYLVANIA REGULATIONS

Chapters 2 through 4 of this document describe how to complete your air emission inventory. By this point, you should have estimated the *actual* and *potential* emissions of all the regulated pollutants emitted from each of your operations. For some Pennsylvania air regulations, whether a facility must comply with the regulations is determined by either actual or potential emissions. Table 3 and this chapter briefly summarize how you can use this information to determine which of these regulations may apply to you.

TABLE 3

APPLICABILITY THRESHOLDS OF SELECTED PENNSYLVANIA AIR REGULATIONS

Regulation	Pollutant	Threshold	
		Potential Emissions	Actual Emissions
Title V and synthetic minor permits	All	Major source[a]	NA[b]
Reasonably available control technology	VOC, NOx	Major source[a]	NA
Annual emission statement	VOC, NOx	Varies with operation and county	Varies with operation and county
Surface coating	VOC	NA	3 pounds per hour or 15 pounds per day or 2.7 tons per year
Printing	VOC	1,000 pounds per day or 100 tons per year	NA

[a] Major source is defined in the next section of the report.

[b] **NA = not applicable**

After calculating your air pollution emissions, you may discover that your facility is not in compliance with some of the regulations. In that case, you should contact the regional office of the Pennsylvania Department of Environmental Protection (DEP) or the county regulatory agency that covers your area to discuss a schedule for coming into compliance. Chapter 6 gives the addresses and telephone numbers of the regulatory agencies. DEP has a voluntary compliance audit policy that likely will keep you from receiving a civil penalty for noncompliance if you report the problem right away and correct it.

Major Source

Applicability of several of the regulations depends on whether a facility is a major source. A major source is a facility with the *potential* to emit one or more of the following:

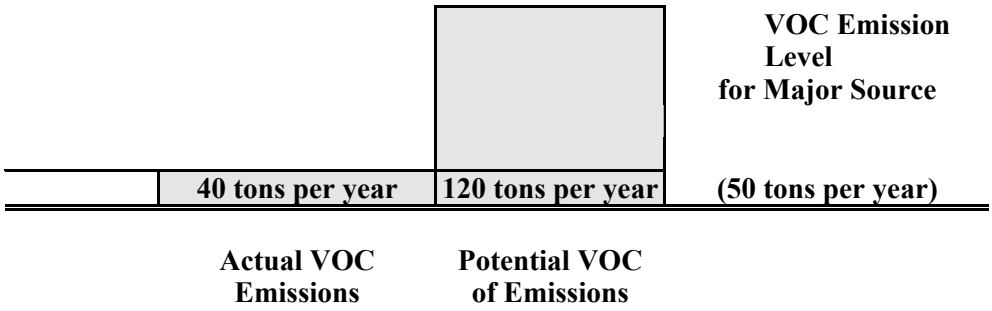
- **10 tons per year or more of a hazardous air pollutant (HAP)**
- **25 tons per year or more of a combination of HAPs**
- **50 tons per year of volatile organic compounds (VOC) in all areas except the five-county Philadelphia area (Bucks, Chester, Delaware, Montgomery, and Philadelphia counties)**
- **25 tons per year of NOx or VOCs in the five-county Philadelphia area**

If you are a small business, you should not automatically assume that you are not a major source. Because the definition of a major source is based on *potential* emissions, small and medium businesses may be included.

EXAMPLE 1 - AUTO BODY SHOP

Joe's Auto Repair and Refinishing Shop is in Tioga County. The shop's actual VOC emissions are 40 tons per year. However, if the shop's air emission sources operate at maximum capacity for 8,760 hours per year, its potential emissions are 120 tons per year.

Because of the potential emissions, the shop is a major source. The chart below illustrates the potential and actual emission levels:



In the above example, Joe's shop *actually* emits VOCs in quantities below the major source rate. However, because it has a *potential to emit* at or above the major source level, Joe's shop is a major source. Remember that your *potential* emissions, not your *actual* emissions, determine your regulatory status. Do not assume that you are a minor source based on your actual emissions. Do not assume you are too small to be considered a major source.

Permits

If your facility is a major source, you must apply for a Title V operating permit. This permit would include all of the air pollution sources at your facility. If you are a major source based on the *potential* emissions, but are unlikely ever to have *actual* emissions of that amount, you can apply for a synthetic minor permit instead of a Title V permit. In a synthetic minor permit, you agree to limit your operations in such a way that your actual emissions would never exceed the thresholds for defining a major source.

The deadline for submitting the application for a Title V or synthetic minor permit was November 27, 1995. If you should have applied for a permit but did not, for whatever reason, contact the regional office of DEP and work with them to develop a schedule for coming into compliance.

If your source of emissions was installed before July 1, 1972 and is not a major source, it has been "grandfathered," meaning no permit has been needed until now. However, grandfathered sources now must apply for an operating permit by November 1, 1996.

Reasonably Available Control Technology (RACT)

All major sources of NOx or VOC emissions must comply with the regulations regarding RACT. RACT is the lowest level of emissions attainable through application of a control technology that is reasonably available, considering technological and economic feasibility. Facilities subject to the RACT requirements should have had a RACT proposal to the DEP regional office or county agency by July 15, 1995. The approved RACT technology should have been in operation by May of 1995. Again, if you have missed this deadline, contact the DEP regional office and work with them to come into compliance.

Annual Emission Statement

Some VOC and NOx sources in Pennsylvania must submit annual reports of their air emissions to the DEP regional office or the county agency. Which facilities must submit annual emission statements depends on the type of operation, *actual* and *potential* emissions and location. Appendix C provides a document from DEP explaining which facilities must submit an annual emission statement. The statements are due to the appropriate DEP regional office or county agency by March 1 of each year.

Industry-Specific Regulations

Pennsylvania has air pollution emission limits for many specific types of operations. Applicability of the regulations for surface coating and for flexographic and rotogravure printing is based on *actual* emissions from these operations.

Surface Coating

There is a regulation that limits the emissions from many types of surface coating operations. The allowable emission limits vary with the type of coating operation. The regulation applies to facilities that perform one or more of these operations and that have had *actual* VOC emissions any time since January 1, 1987 above any of the following thresholds:

- **3 pounds per hour**
- **15 pounds per day**

- **2.7 tons per year**

Printing

There is a regulation limiting emissions from rotogravure and flexographic printing presses. The regulation applies to presses that have the *potential* to emit or have *actually* emitted VOCs any time since January 1, 1987 above the following thresholds:

- **1,000 pounds per day**
- **100 tons per year**

Other Regulations

The discussion above focused only on regulations that require a business to estimate its emissions to determine applicability. There are many other air regulations written and enforced by local, state and federal air pollution control agencies. Additional regulations will be written in the future. Some of these may apply to you. For more information about these regulations, call the AIRHELP Hotline at 1-800-PA-AIRHELP.

CHAPTER 6

WHERE TO OBTAIN MORE INFORMATION AND HELP

The following organizations provide regulatory, technical, or financial information that may be of use to small businesses.

AIRHELP Program

The AIRHELP Program offers the free and confidential services listed below. These services are available to owners and operators of small businesses in Pennsylvania.

AIRHELP Services		
Service	**Purpose**	**Contact**
Hotline	**Answer technical and regulatory questions**	**AIRHELP Hotline 1-800-PA-AIRHELP**
Computer bulletin board	**Provide guidance materials and information on regulations**	**1-800-864-7594**
Quarterly newsletter	**Explore topics on air issues of interest to small businesses**	**AIRHELP Hotline**
Resource centers	**Provide manuals of use to small businesses**	**28 libraries around the state (see pg. 46 for locations)**
Site visits	**Provide on-site compliance review of your operation**	**AIRHELP Hotline**
Permit reviews	**Review permit application for completeness, accuracy of calculations, and general engineering approach**	**AIRHELP Hotline**

DEP, Bureau of Air Quality

The Pennsylvania Department of Environmental Protection (DEP) Bureau of Air Quality is the state agency responsible for administering air quality regulations. Questions should be directed to the regional office nearest to you.

DEP Bureau of Air Quality Regional Offices		
Region	**Address**	**Telephone**
Southeast	**Lee Park, Suite 6010 555 North Lane Conshohocken, PA 19428**	**(610) 832-6241**
Northeast	**2 Public Square Wilkes-Barre, PA 18705**	**(717) 826-2531**
Southcentral	**One Ararat Blvd. Harrisburg, PA 17110**	**(717) 657-4587**
Northcentral	**200 Pine Street Williamsport, PA 17701**	**(717) 327-3637**
Southwest	**400 Waterfront Drive Pittsburgh, PA 15222**	**(412) 442-4000**
Northwest	**230 Chestnut Street Meadville, PA 16335**	**(814) 332-6940**

Related environmental information is available electronically via Internet. Access the DEP-DCNR website at http://www.dep.state.pa.us (choose Information by Environmental Subject/choose Air Quality area).

Small Business Ombudsman and the DEP Office of Pollution Prevention and Compliance Assistance

DEP's Office of Pollution Prevention and Compliance Assistance provides information on and technical assistance for pollution prevention. Case studies, source reduction strategies, a Source Reduction Strategy Manual, fact sheets and other publications are available.

Pennsylvania Department of Environmental Protection
Office of Pollution Prevention and Compliance Assistance
P.O. Box 2063
Harrisburg, PA 17105-2063
(717) 783-0540

The small business ombudsman is located here and can be reached at (717) 783-9981.

Philadelphia County Department of Public Health

If your business is located in Philadelphia County, you should submit information, applications for permits, and other paperwork to this agency. The agency can also answer questions regarding compliance with air quality regulations.

City of Philadelphia
Department of Public Health
Environmental Protection
Air Management Services
321 University Avenue
Philadelphia, PA 19104

Telephone numbers for the agency are as follows:

Department of Public Health	
Topic	**Telephone**
Technical assistance	(215) 685-7572
Asbestos	(215) 685-7576
Complaints	(215) 685-7580

Allegheny County Health Department

If your businesses is located in Allegheny County, you should submit information, applications for permits, and other paperwork to this agency. The agency can also answer questions regarding compliance with air quality regulations.

Allegheny County Health Department
Bureau of Environmental Quality
301 39th Street
Pittsburgh, PA 15201

Telephone numbers for the agency are as follows:

Allegheny County	
Topic	**Telephone**
Permits and regulations	(412) 578-8115
Complaints	(412) 578-8111
Asbestos, abrasives, P2, and toxics	(412) 578-8319

CHIEF (Clearinghouse for Inventories and Emission Factors) Computer Bulletin Board System

CHIEF is a computer bulletin board system (BBS) that provides access to the latest guidance and information on conducting air emissions inventories and on emission factors. The CHIEF BBS offers access to databases, bulletins, news, messages, and E-mail service related to emission factors and inventories for both criteria and toxic pollutants. The CHIEF BBS can be accessed through the EPA Office of Air Quality Planning and Standards Technology Transfer Network (OAQPS-TTN). Access requires a communi-cation software package and a modem. The OAQPS-TTN telephone number is (919) 541-5742. The modem communication software parameters are:

Parameter	Setting
Data bits	8
Stop bits	1
Parity	None
Duplex	Full (may be referred to as ECHO OFF)
Terminal Emulation	VT100 or VT/ANSI
Baud	Up to 14,400

The TTN can also be accessed through the Internet: ttnbbs.rtpnc.epa.gov. When you reach the first screen of the TTN, select "*T*" for gateway, then "*D*" for the CHIEF BBS.

Within CHIEF are several tools for estimating emissions, including AP-42, "Locating and Estimating Air Emissions. . ." documents, Tanks, and FIRE (Factor Information and Retrieval Data System).

Fax CHIEF

With Fax CHIEF, you can use your fax machine to obtain emission factors from the EPA emission factor document referred to as "AP-42" (Ref. 7). A user can call from the telephone handset attached to the fax machine, follow recorded voice instructions, and enter manual requests. Fax CHIEF will then immediately transmit the desired items back to the user's fax machine. Currently, Fax CHIEF contains all of AP-42 Volume I: Stationary Point and Area Sources and Volume II: Mobile Sources; current and back issues of The CHIEF Newsletter; and other technical memoranda and publications.

Info CHIEF

EPA operates a help line for estimating air pollution emissions. Staff can answer your questions about the CHIEF BBS and Fax CHIEF, as well as suggest other possible sources of information.

Pennsylvania Technical Assistance Program (PENNTAP)

PENNTAP is a free and confidential industrial technology extension service that provides technical, engineering, and environmental assistance to businesses. PENNTAP is funded by Pennsylvania State University, the Commonwealth, and the federal government. PENNTAP has representatives at several locations around the state. For referral to the appropriate site, call (814) 865-0427.

Center for Hazardous Materials Research (CHMR)

CHMR is a nonprofit organization that, for a small fee, provides information and on-site consultation on pollution prevention opportunities.

Center for Hazardous Materials Research
320 William Pitt Way
Pittsburgh, PA 15238
(412) 826-5320

AIRHELP Resource Centers
Pennsylvania Small Business Assistance Program

Northeast Region

Allentown Public Library
1210 Hamilton Street
Allentown, PA 18102-4371
(610) 820-2400

Bethlehem Area Public Library
11 W. Church Street
Bethlehem, PA 18018-5888
(610) 867-3761

Easton Area Public Library
6th and Church Streets
Easton, PA 18042-3587
(610) 258-2917

Osterhout Free Library
71 South Franklin Street
Wilkes-Barre, PA 18701-1287
(717) 823-0156

Pottsville Free Library
16 North Third Street
Pottsville, PA 17901-2978
(717) 622-8105

Scranton Public Library
Albright Memorial Building
500 Vine Street
Scranton, PA 18509-3298
(717) 348-3008

Northcentral Region

Centre County Library
203 N. Allegheny Street
Bellefonte, PA 16823-1691
(814) 355-1516

James V. Brown Library
19 East 4th Street
Williamsport, PA 17701-6390
(717) 326-1162

Northwest Region

Eccles-Lesher Library
231 North Main Street
Rimersburg, PA 16248
(814) 473-3800

New Castle Public Library
207 East North Street
New Castle, PA 16101-3691
(412) 658-6659

Seneca District Center
Warren Public Library
205 Market Street
Warren, PA 16365-2377
(814) 72-4650

Southcentral Region

Altoona Area Public Library
1600 Fifth Avenue
Altoona, PA 16602-3639

Conococheague District Library
102 N. Main Street
Chambersburg, PA 17201-1676
(717) 263-1054

East Shore Area Library
4501 Ethel Street
Harrisburg, PA 17019
(717) 652-9380

Lancaster County Library
125 North Duke Street
Lancaster, PA 17602-2883
(717) 394-2651

Martin Memorial Library
159 East Market Street
York, PA 17401-1269
(717) 846-5300

Reading Public Library
100 South 5th Street
Reading, PA 19602-1602
(610) 655-6350

Southeast Region

Bucks County Free Library
150 South Pine Street
Doylestown, PA 18901-4629
(215) 348-0332

Chester County Library
400 Exton Square Parkway
Exton, PA 19341-2496
(610) 363-0884

Southeast Region (continued)

Free Library of Philadelphia
1901 Vine Street
Philadelphia, PA 19103-1189
(215) 686-5414

Montgomery County--
Norristown Public Library
1001 Powell Street
Norristown, PA 19401-3817
(610) 278-5105

Springfield Township Library
70 Powell Road
Springfield, PA 19064-2495
(610) 543-2113

Southwest Region

B. F. Jones Memorial Library
663 Franklin Avenue
Aliquippa, PA 15001-3736
(412) 375-7174

Cambria County Library System
David A. Glosser Memorial Library
248 Main Street
Johnstown, PA 15901-1677
(814) 536-5131

Carnegie Library of Pittsburgh
4400 Forbes Avenue
Pittsburgh, PA 15213-4080
(412) 622-3154

Citizens Library
55 South College Street
Washington, PA 15301-4877
(412) 222-2400

Monessen Public Library
326 Donner Avenue
Monessen, PA 15062-1182
(412) 684-4750

REFERENCES

1. **Air & Waste Management Association. 1995.** ***Emissions Inventory Compliance and Strategies.***

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6. **U.S. Environmental Protection Agency (EPA), Office of Air Quality and Standards. 1995.** ***Compilation of Air Pollution Emission Factors, Volume 1: Stationary Point and Area Sources.*** **5th Edition. EPA No. AP-42.**

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APPENDIX A

AIR POLLUTANTS CURRENTLY REGULATED (1996)

POLLUTANTS FOR WHICH A NATIONAL AMBIENT AIR QUALITY STANDARD HAVE BEEN ESTABLISHED

Pollutant:

Lead (Pb)
Sulfur dioxide (SO_2)
Nitrogen dioxide (NO_2)
Carbon monoxide (CO)
Particulate matter (PM_{10})
Ozone, including precursors:
nitrogen oxide (NO, NO_2, NO_3, N_2O, N_2O_3, N_2O_4, N_2O_5)
volatile organic compounds (VOCs)

As defined in 40 CFR 51.100(s), the term VOC includes any compound of carbon (excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate) which participates in atmospheric photochemical reactions. The EPA has developed a list of substances (which is subject to change) which are excluded from the VOC definition because of their negligible reactivity.

The following organic compounds are excluded from the definition of VOC because they have been determined to have negligible photochemical reactivity:

Acetone
Methane
Ethane
Methylene chloride (dichloromethane)
1,1,1-trichloroethane (methyl chloroform)
1,1,1-trichloro-2,2,2-trifluoroethane (CFC-113)
Trichlorofluoromethane (CFC-11)
Dichlorodifluoromethane (CFC-12)
Chlorodifluoromethane (CFC-22)
Trifluoromethane (FC-23)
1,2-dichloro 1,1,2,2-tetrafluoroethane (CFC-114)
Chloropentafluoroethane (CFC-115)
1,1,1-trifluoro 2,2-dichloroethane (HCFC-123)
1,1,1,2-tetrafluoroethane (HFC-134a)
1,1-dichloro 1-fluoroethane (HCFC-141b)
1-chloro 1,1-difluoroethane (HCFC-142b)
2-chloro-1,1,1,2-tetrafluoroethane (HCFC-124)
Pentafluoroethane (HFC-125)
1,1,2,2-tetrafluoroethane (HFC-134)
1,1,1-trifluoroethane (HFC-143a)
1,1-difluoroethane (HFC-152a)

Perchloroethylene

Perfluorocarbon compounds which fall into these classes:

(I) Cyclic, branched, or linear, completely fluorinated alkanes;

(ii) Cyclic, branched, or linear, completely fluorinated ethers with no unsaturations;

(iii) Cyclic, branched, or linear, completely fluorinated tertiary amines with no unsatuarations; and

(iv) Sulfur containing perfluorocarbons with no unsaturations and with sulfur bonds only to carbon and fluorine

OZONE-DEPLETING SUBSTANCES
SUBJECT TO FEDERAL REGULATION

Class I Ozone-Depleting Substances

Class I ozone-depleting substances have the most negative effect on the earth's protective ozone layer. These substances are the first group of chemicals scheduled for phase-out of production and restrictions on distribution. Class I substances include:

CHLOROFLUOROCARBONS	
CFC-11	**CFC-211**
CFC-12	**CFC-212**
CFC-13	**CFC-213**
CFC-111	**CFC-214**
CFC-112	**CFC-215**
CFC-113	**CFC-216**
CFC-114	**CFC-217**
CFC-115	
HALONS	
Halon-1211	**Halon-1301**
Halon-2402	
SOLVENTS	
Methyl chloroform	**Carbon tetrachloride**
PESTICIDE	
Methyl bromide	
HYDROBROMOFLUOROCARBONS (HBFC)	

Class II Ozone Depleting Substances

Class II ozone-depleting substances are HCFCs that also are associated with the depletion of the earth's protective ozone layer. Although less harmful than CFCs, these chemicals do deplete the ozone layer and, if left unregulated, would contribute to this problem. Class II substances are scheduled for production phase-out and distribution restrictions after the Class I substances. Class II substances include:

HYDROCHLOROFLUOROCARBONS	
HCFC-21	HCFC-225cb
HCFC-22	HCFC-226
HCFC-31	HCFC-231
HCFC-121	HCFC-232
HCFC-122	HCFC-233
HCFC-123	HCFC-234
HCFC-124	HCFC-235
HCFC-131	HCFC-241
HCFC-132b	HCFC-242
HCFC-133a	HCFC-243
HCFC-141b	HCFC-244
HCFC-142b	HCFC-251
HCFC-221	HCFC-252
HCFC-222	HCFC-253
HCFC-223	HCFC-261
HCFC-224	HCFC-262
HCFC-225ca	HCFC-271

APPENDIX B

TABLE OF CONTENTS OF EPA DOCUMENT AP-42
("Compilation of Air Pollutant Emission Factors")

APPENDIX C

CLARIFICATION NOTICE ABOUT PENNSYLVANIA'S REQUIREMENT FOR ANNUAL EMISSION STATEMENTS

TABLE OF CONTENTS

Appendix

TABLES

FIGURES