

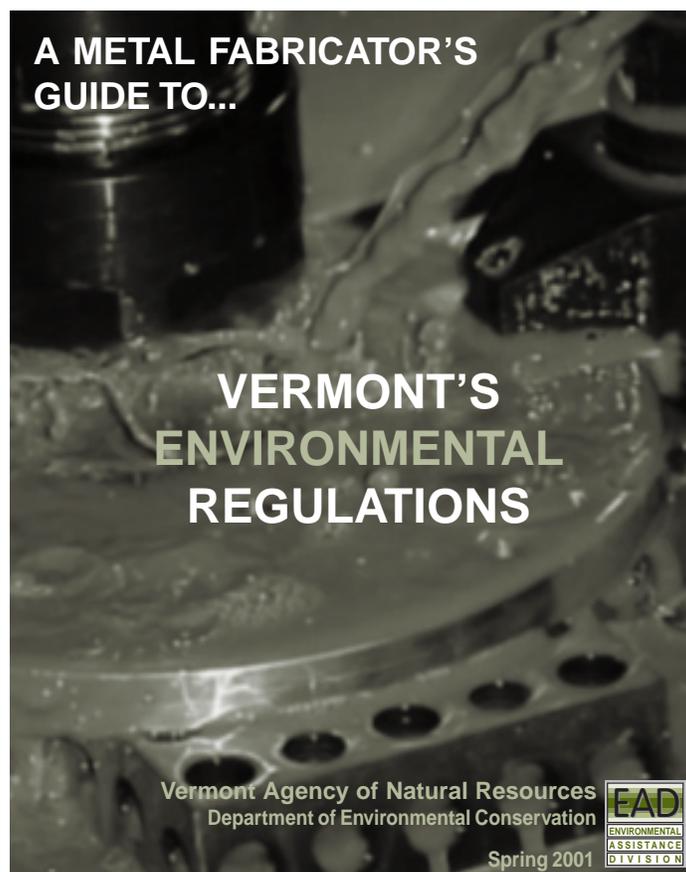
# A METAL FABRICATOR'S GUIDE TO...

# VERMONT'S ENVIRONMENTAL REGULATIONS

Vermont Agency of Natural Resources  
Department of Environmental Conservation



Spring 2001



This Guide was developed by the Vermont Department of Environmental Conservation's Environmental Assistance Division (EAD). This project was funded in part by a U.S. Environmental Protection Agency grant (BG991255-98). EAD provides confidential, non-regulatory assistance to Vermont companies. Services include: on-site assessments, workshops, seminars, written materials, and information and research on pollution prevention and environmental compliance.

Spring 2001

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## Introduction

We have designed this environmental compliance assistance guide to help you, the small and medium-sized metal products manufacturer, to meet your environmental obligations. We have tried to keep it clear and concise, yet with enough detail so that many of your questions can be answered right here. The Guide will not only help you understand Vermont's air pollution, hazardous waste and wastewater disposal regulations, but will also offer ideas for reducing wastes and improving the efficiency of your manufacturing operations. It covers most processes found in a typical metal products business including machining, cleaning and painting. It does not include information on the broad range of inorganic metal finishing processes like electroplating, chemical conversion coatings and anodizing. Please call the Environmental Assistance Hotline (*see below*) for information on these topics.

## How to Use This Guide

Information in the Guide is divided into three sections. The first section consists of Compliance Checklists which are based on the type of waste that is generated: hazardous waste, wastewater discharges and air emissions. Questions are presented in a yes/no checklist format so that if you can answer "yes" to a question, you are likely to be in compliance with that requirement. An answer of "no" could indicate a potential problem that you should investigate further.

If available at your business, the following information resources will help you in completing the checklist questions:

- purchase and/or material usage records for the last 12 months,
- material inventories for the last 12 months,
- material safety data sheets (MSDS) for all products you use,
- hazardous waste shipment manifests, and
- currently held state or local permits, such as discharge permits.

The second section contains Fact Sheets for wastestreams and environmental issues commonly faced by manufacturers of metal products. Fact sheets provide information about regulatory issues, pollution prevention and best management practices that you might want to explore further. The final section, the Appendices, contains additional information that we think you'll find useful, such as sample forms and resource lists.

If you are not sure whether a particular practice or activity at your facility meets the regulations, please contact the Vermont Environmental Assistance Division (EAD) and we will get answers for you. You may also request a free and confidential (non-regulatory) on-site compliance assistance visit by contacting EAD's Small Business Compliance Assistance Program.

**Environmental Assistance Hotline 1-800-974-9559**

- Small Business Compliance Assistance Program
- Waste Prevention/Reduction Assessments
- Research Alternative Technologies/Processes

# Ten Tips for Environmental Success

## #1 Learn About Pollution Prevention and Ask for Help

The less waste you generate in the first place, the less there is to be regulated and the easier your job will be to maintain compliance. You will also save money, improve health in the workplace and contribute to environmental protection. Switching to less toxic products and solvents is a good way to help prevent pollution.

## #2 Keep Good Records

Keep every receipt, bill of lading, and hazardous waste manifest related to the purchase of materials and disposal of waste. Accurate records, filed by year and easily accessible, will help you keep better track of material use and waste management. If you are inspected, good recordkeeping can minimize the time and effort necessary to evaluate compliance. Good recordkeeping can also expedite a property sale or loan.

## #3 Involve Your Employees

More often than not, employees have good ideas on how to generate less waste. Reward them! If their ideas save the company money, consider giving them a percentage of the savings. Make sure your employees know that you welcome their ideas.

## #4 Talk To Your Vendors

Many vendors will continue to sell you what you've always used even though there may be a better product available. Ask your vendor - is there a new coolant package that can increase the efficiency of certain machining operations? Is there a water-based substitute for a coating you could try? Is there a non- or less toxic substitute for a solvent you are using? What do other clients use that might also work for you? BEWARE - learn about the trade-offs: for example, vendor claims that a product doesn't result in the generation of a hazardous waste are typically based on Federal regulations which may differ from Vermont. We (the Environmental Assistance Division) can help with these assessments.

## #5 Learn to Read an MSDS and Avoid Toxics

Material Safety Data Sheets (MSDSs) are documents that should be provided with most of the chemical products that you buy. They give you important environmental, health, and work place safety information. Requesting and reviewing an MSDS before making a purchase could help you avoid problems down the road. Avoid commonly used solvents like toluene, xylene, trichloroethylene and methylene chloride. Ask your supplier for less hazardous alternatives. Gathering MSDSs is a necessary first step in determining your emissions of VOCs (volatile organic compounds) and HACs (hazardous air contaminants) - two common classes of air pollutants and can be helpful in making hazardous waste determinations. (*see Appendix G for details*)

## #6 Train Your Staff

Often times, training is looked upon as unproductive overhead; you can't sell training like you can a product. However, sound coolant management practices or proper spray techniques can significantly reduce raw material and waste disposal costs. A well-trained staff produces finished work more efficiently, creates less waste, spills less, and has fewer accidents. These add up to increased profits in the long run.

## #7 Label Waste Containers and Place Them in One Spot

Nothing can get you into trouble faster than sloppy waste management. Segregating wastes in different containers increases the potential (and value) of a material for recycling, or conversely lessens treatment and disposal costs if there is no market for recycling.

## #8 Don't Throw It in the Dumpster

Hazardous substances should never be handled like regular trash. Liquid wastes (hazardous or not) are generally banned from Vermont landfills as are oily wastes and oil-based paint wastes. Reduce volume by segregating and managing recyclables separately. Look for ways to recycle metal chips and swarf, corrugated cardboard and paper. Contact your local solid waste management district for recycling information and assistance or call the Recycling Hotline at (800) 932-7100.

## #9 Keep It Off the Floor

Spills, leaks and drips of machining fluids and lubricants lead to higher clean-up and disposal costs. Reduce the need to clean your floors (generating contaminated wastewater) and minimize the use of absorbents for spills and leaks by using splash guards to prevent coolant from leaving machines and drip pans to catch oil and coolant leaks where they can't be prevented.

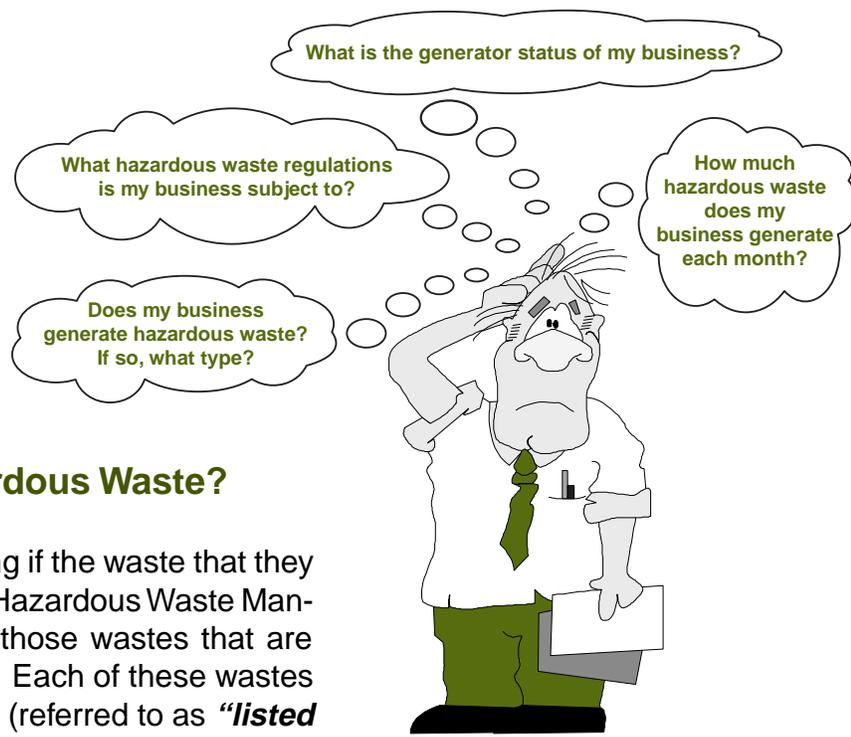
## #10 Ask for Help!

As burdensome as environmental regulations may seem, they were created to protect you and your workers and they are here to stay. So stay ahead of the game - Don't be afraid to use the technical resources available to you - we are here to help you understand and comply with the regulations and look for waste prevention opportunities. Call us! We offer free, confidential assistance ranging from answering an anonymous question over the phone to providing you with a team of experts for on-site assistance.



# HAZARDOUS WASTES

Metal fabricating processes typically result in the creation of liquid and solid wastes. This section of the Guide provides information that will help identify those wastes which may be regulated as hazardous wastes and describe how they need to be managed.



## Does My Business Generate Hazardous Waste?

Business owners are responsible for knowing if the waste that they generate is hazardous waste. The Vermont Hazardous Waste Management Regulations (VHWMR) identifies those wastes that are regulated as hazardous wastes in Vermont. Each of these wastes is either included on at least one of five lists (referred to as **“listed wastes”**) or exhibits one or more of four characteristics (referred to as **“characteristic wastes”**). A more detailed description of listed and characteristic wastes is provide below.

All hazardous wastes are identified by a code that consists of a capital letter(s) followed by a number (i.e. D001, F002, K095, U237, P003, or VT02). The letter part of the code indicates either the specific list on which the waste is included or the specific characteristic that the waste exhibits; the number following the letter(s) is specific to the type of waste. Some wastes may be identified by more than one code. An example is waste acetone solvent that exhibits the characteristic of ignitability (D001) and is listed (spent non-halogenated solvents F003). (See Appendix C for a list of waste codes commonly used by metal fabricators)

### Listed Wastes

A waste is listed as a hazardous waste because it has been shown to be harmful to health and/or the environment when not managed properly. Of the five hazardous waste lists, the two that are most applicable to wastes generated by metal fabricators are:

#### Vermont-List

These are wastes that are not found on any of the Federal hazardous waste lists but have been designated by the State of Vermont as hazardous wastes. Many of the wastes generated by metal fabricating shops are Vermont listed wastes. Examples include: oily solids (Vermont hazardous waste code VT02) and water-based cutting and grinding fluids (Vermont hazardous waste code VT03).

#### F-List

These are wastes from non-specific sources, including halogenated and non-halogenated solvents, certain electroplating solutions and wastewater treatment sludges. These are not concentration-based hazardous wastes, rather they are listed due to the material and process that created it. Examples include: trichloroethylene used for degreasing (hazardous waste code F001) and toluene (hazardous waste code F005).

There are other hazardous waste “lists” including; K, P, and U which will not be discussed in this guide because they seldom apply to wastes generated by metal fabricating operations. More information on these lists can be found in the **“Vermont Hazardous Waste Management Regulations” (VHWMR)**, the **“Conditionally Exempt Generator Handbook”**, and for larger generators, the **“Generator Handbook”**. If you have questions or would like to request any of these publications contact the Waste Management Division at 1-802-241-3888 or EAD at 1-800-974-9559.

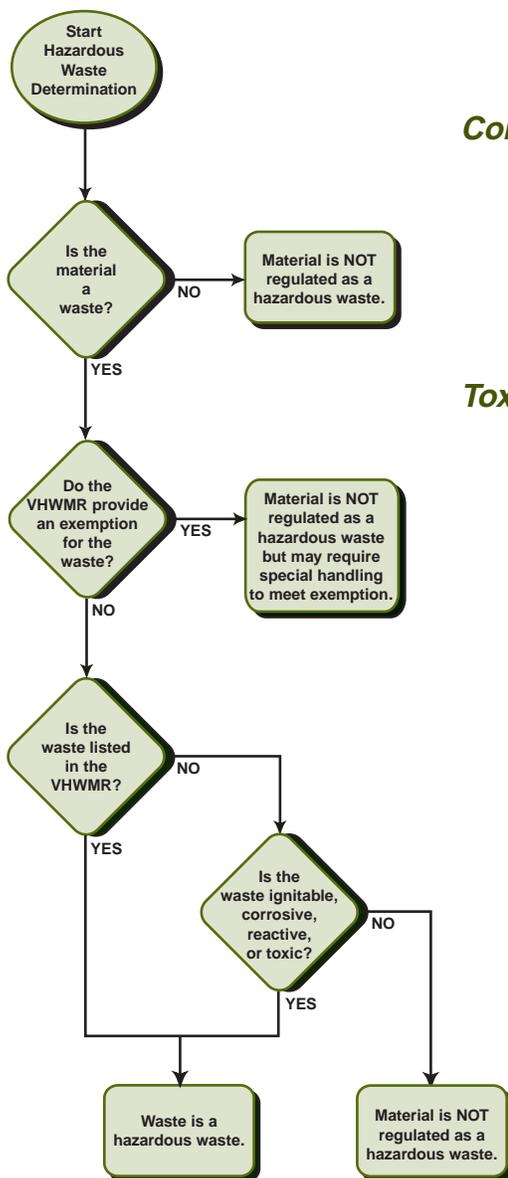
## Characteristic Wastes

Characteristic hazardous wastes are wastes that exhibit one or more of the hazardous waste characteristics (i.e. ignitable, corrosive, reactive, or toxic). Of the four characteristics, the following three are the most applicable to wastes generated in metal fabricating operations:

**Ignitability:** Wastes that have a flashpoint of less than 140°F or are at risk of spontaneous combustion are ignitable. Examples are mineral spirit parts washing solvent and paint thinner. Ignitable wastes are identified by the hazardous waste code D001.

**Corrosivity:** Wastes that are liquid and have a pH **less than 2** or **greater than or equal to 12.5** or that corrode steel at a rate greater than 0.25 inch per year are corrosive. Examples are acid and caustic solutions. Corrosive wastes are identified by the hazardous waste code D002.

**Toxicity:** Wastes containing small amounts of any one of eight (8) metals or thirty-two (32) organic contaminants may exhibit the toxicity characteristic. To determine if a waste contains enough of one of these contaminants to exhibit the toxicity characteristic, the generator can either rely on knowledge of the materials and/or the process generating the waste (see *“Making a Hazardous Waste Determination”* on the following page) or submit a sample of the waste for laboratory analysis. The sample is analyzed using a procedure referred to as the Toxic Characteristic Leaching Procedure (TCLP). The waste is hazardous if the concentration of any of these contaminants exceeds the amount specified in the regulations. A waste that exhibits the characteristic of toxicity would be identified by one or more of the hazardous waste codes of D004 through D043 depending on the toxic contaminant(s) which cause it to exhibit the toxicity characteristic. An example is waste water-based cutting and grinding fluids that have a lead concentration greater than 5.0 mg/l. This waste would be identified by the hazardous waste code D008. If this same waste also had a chromium concentration in excess of 5.0 mg/l it would also have to be coded D007.



Hazardous Waste Determination Simplified Flow Chart

## Making a Hazardous Waste Determination

It is the responsibility of the generator of a waste to determine whether or not it is regulated as hazardous waste. As the flowchart on the previous page shows, the **first step** in making a hazardous waste determination is simply deciding if the material is a “waste”. The regulations define a waste as any material which is “discarded”. It is important to note that the regulations include recycling in their definition of discarded. This means that even materials which are recycled either on or

off-site are wastes and, as such, may also be regulated as hazardous wastes. Essentially, the only byproducts that are not considered waste are those which can be used as a raw material, either on or off-site, without reclaiming the material prior to reuse.

The **second step** in the hazardous waste determination process is to decide if a waste is excluded or exempted from regulation as a hazardous waste. The VHWMRs contain exemptions for many of the wastes generated in a typical metal fabricating operation. Examples include: oil, scrap metal and water-based metalworking fluids. Each of these exemptions require that the waste meet and be managed in accordance with certain criteria (see fact sheets for details).

The **final step** in the hazardous waste determination process involves deciding whether or not the waste meets the regulatory definition of a hazardous waste. As stated previously, this can be based on general knowledge of the process and materials generating the waste, and/or laboratory analysis of the waste. This information would be used in conjunction with the lists of hazardous wastes and definitions of hazardous waste characteristics given in the VHWMRs to make a final determination.

### Making a Hazardous Waste Determination...

#### 👉 KNOWLEDGE OF PROCESS/MATERIALS 👈

This method allows generators to use their knowledge of the process and materials creating the waste to determine if it is either a listed or characteristic hazardous waste. Resources that will be useful in making such a determination include; information provided on raw material and product labels and material safety data sheets (MSDS). A complete listing of the wastes that are regulated as hazardous waste in Vermont, along with detailed definitions, may be found in Subchapter 2 of the Vermont Hazardous Waste Management Regulations.

#### 👉 LABORATORY ANALYSIS 👈

If a waste is not specifically listed or if sufficient information is not available to determine whether a waste is a hazardous waste, it is necessary to have a laboratory analyze a sample of the waste (see Appendix E for a list of analytical laboratories). Such analyses can determine whether the waste is hazardous because it exhibits one of the four characteristics (ignitability, corrosivity, reactivity, or toxicity) or if it exceeds a concentration threshold for some contaminant of concern. You can reduce the cost of laboratory analysis by providing the lab with as much information as possible about the waste. This will enable the lab to perform only those tests needed to determine if the waste is hazardous. For example, if you know the only potentially hazardous contaminant in a waste is chromium, there is no need to test for lead. Contact the Waste Management Division about less expensive alternatives to TCLP analysis (i.e. totals analysis).

## How Much Hazardous Waste Does My Business Generate Each Month?

How your business is regulated is dependent upon the quantity of hazardous waste generated per month and/or the quantity of hazardous waste on-site at any given time. Therefore, it is very important that all of the wastes that your facility generates be identified, characterized (as hazardous/non-hazardous) and quantified (pounds per month). Creating a list of all of the potentially hazardous wastes generated at your facility also makes good business sense. An inventory of wastes will:

- ➔ Allow you to determine your generator status.
- ➔ Help you determine the extent to which your business is regulated.
- ➔ Identify areas to reduce waste, costs and your business' regulatory burden.

## Creating a Hazardous Waste Inventory

Metal fabricating operations result in the creation of a number of wastes. Many of these wastes are potentially subject to regulation as hazardous wastes. The following list includes some of the more common wastes generated by metal fabricators. The list also provides an indication of whether the waste is hazardous because it is listed, exhibits a characteristic, or both. It is important to note that the regulations contain conditional exemptions for some of these wastes.

### Manufacturing

	<u>Possible Regulation Under</u>
water-based cutting/grinding fluids →→→→	VT-listed (coolant), Characteristic (toxicity - metals)
cutting oils →→→→→→→→→→→→→→→→	VT-listed (oil), Characteristic (toxicity - metals)
grinding swarf/sludge →→→→→→→→→→	VT-listed (oil), Characteristic (toxicity - metals)
solvent degreasers →→→→→→→→→→	VT-listed (petroleum distillate), F-listed, Characteristic (ignitability)
water-based degreasers →→→→→→→→	VT-listed (oil), Characteristic (toxicity - metals)
heat treat salt baths →→→→→→→→→→	Characteristic (toxicity - metals)
surface coatings (paints, primers) →→→→	Characteristic (ignitability)
spray gun cleaning solvent →→→→→→→→	F-listed, Characteristic (ignitability)

### Maintenance

tramp oil →→→→→→→→→→→→→→→→	VT-listed (oil)
absorbents →→→→→→→→→→→→→→→→	VT-listed (oil)
shop rags →→→→→→→→→→→→→→→→	VT-listed (oil), F-listed, Characteristic (ignitability)
evaporator sludge →→→→→→→→→→	VT-listed (oil), Characteristic (toxicity - metals)

An example of a hazardous waste identification and quantification worksheet is shown in Table I. The following steps are provided to assist you in performing a hazardous waste inventory:

**STEP 1:** Identify and list in the “Waste Name” column any “potentially hazardous wastes” generated at your facility. A list of some of the wastes generated by metal fabricators is provided above. You may generate some wastes which are not shown on this list that may be hazardous wastes.

**STEP 2:** For each of the wastes listed, if you have an MSDS for the product(s) before use, check the “MSDS” column. An MSDS can be helpful in making a hazardous waste determination, possibly eliminating the need for costly lab analysis. *It is important to remember that a MSDS will not account for any contaminants picked up during the use of a product.*

**STEP 3:** For each of the wastes listed, if laboratory analysis has been done and results are available, check the “Lab Analysis” column. Laboratory analysis is often necessary when available information is not sufficient to determine whether or not a waste is a characteristic hazardous waste.

**STEP 4:** For each of the wastes listed, use the VT and F hazardous waste lists to determine if the waste is a listed waste. If the waste is listed, enter the designated hazardous waste code(s) in the appropriate “Listed Waste” column. It is important that you know the hazardous waste codes for all of the hazardous wastes that you generate. These codes are used on the “Notification of Regulated Waste Activity” form, labels on haz-

ardous waste containers, and hazardous waste manifests.

**STEP 5:** For each of the wastes listed, determine whether or not the waste exhibits one of the hazardous characteristics (ignitability, corrosivity, or toxicity). Use the definitions for ignitability and corrosivity given in the earlier section, “Characteristic Wastes”. To make a toxicity determination, see the list of toxic contaminants and their associated concentration limits in Appendix C (*Note: This is only a partial list, a complete list can be found in Section 7-208 of the VHWMR*). It will be useful to have any pertinent MSDS or lab analyses available. If it is determined that the waste exhibits a hazardous waste characteristic, enter the appropriate waste code(s) in the “Characteristic Waste” column.

**STEP 6:** For each of the wastes that were determined to be a “Listed” or a “Characteristic” waste, check the Fact Sheets section of this guide and/or contact EAD or the Waste Management Division to see if the regulations contain an exemption that might be applicable. If an exemption exists and the waste meets and is being managed in accordance with exemption criteria, place a check in the Exempt column.

**STEP 7:** For each waste that was determined to be **neither** a “Listed” or “Characteristic” waste or that was determined to be hazardous but is being managed in accordance with an exemption, place a check in the “Non-Hazardous” column.

Waste Name	MSDS Available	Lab Analysis Available	Hazardous Waste Determination					Exempt	Non-Hazardous	Hazardous	Monthly Quantity (pounds)
			Listed Waste		Characteristic Waste						
			VT-Listed	F-Listed	Ignitable	Corrosive	Toxic				
Water-Based Coolant	X		VT03					X			
Oily Solids		X	VT02						X		60
Naphtha Solvent	X		VT02		D001				X		210
Acetone	X			F003	D001				X		40
Machine Lubricating Oil	X							X			
Grinding Swarf		X					D007			X	500
<b>Monthly Hazardous Waste Generation</b>											<b>810</b>

Table I

**STEP 8:** For each of the wastes that were determined to be hazardous and no exemption applies, show the quantity (in pounds) of the waste **generated** per month in the “Monthly Quantity” column. This will assist you in determining your generator status.

**STEP 9:** The final step is to establish the total pounds per month of the wastes that were determined to be hazardous at the bottom of the “Monthly Quantity” column. This number is important when determining your “generator status”.

## What is the “Generator Status” of My Business?

Hazardous waste generator status is based on the quantity of hazardous waste generated at your business each month and the quantity of hazardous waste that is accumulated on-site. The following chart will help you determine your generator status. It shows the three categories of hazardous waste generators in Vermont from least to most regulated. Because generator status is based on the quantity of hazardous waste **generated** in a calendar month and not the quantity **shipped** in a month, it is important that you track or estimate monthly generation.

### You are a Conditionally Exempt Generator (CEG) if you...

-  generate **less than** 220 lbs. of hazardous waste in a calendar month (*220 lbs. is about 1/2 of a 55 gallon drum of water*); and
-  **never** accumulate **more than** 2,200 lbs. of hazardous waste at any time.

### You are a Small Quantity Generator (SQG) if you...

-  generate **greater than** or equal to 220 lbs. but less than 2,200 lbs. in a calendar month; (*this is approximately between 1/2 and 5 full 55 gallon drums of water*); and
-  **never** accumulate **more than** 13,200 pounds of hazardous waste at any one time.

### You are a Large Quantity Generator (LQG) if you...

-  generate **greater than** 2,200 lbs. or more of hazardous waste *in a calendar month* (*this is approximately greater than 5 full 55 gallon drums of water*); or
-  accumulate **more than** 13,200 lbs. of hazardous waste at any one time.

## What Hazardous Waste Regulations is My Business Subject To?

The hazardous waste regulatory requirements (or the “level of regulation”) that apply to your business is determined by your generator status. The remainder of this section is comprised of a checklist that will assist you in determining if you are in compliance with the hazardous waste regulations **that apply to a “Conditionally Exempt Generator” (CEG)**. If you find that your business is either a **“Small Quantity Generator” (SQG)** or a **“Large Quantity Generator” (LQG)** and would like assistance with identifying the hazardous waste regulations that affect your business, compliance assistance is available through EAD’s Small Business Compliance Assistance Program (SBCAP). The SBCAP can be reached by calling 1-800-974-9559 or by e-mail at [EAD@anrmail.anr.state.vt.us](mailto:EAD@anrmail.anr.state.vt.us).

### Self-Audit Checklist

### HAZARDOUS WASTE

#### Generator Status & Reporting

1. We have determined which of our wastes are hazardous and which are not.

Yes  No

2. We have calculated our monthly hazardous waste generation and have determined our generator status.

Yes  No  N/A

3. We have filed a “Notification of Regulated Waste Activity” form with the Waste Management Division. We also understand that the form must be resubmitted any time information contained on the form changes.

Yes  No

**Tip:**

A business producing any amount of hazardous waste or used oil is required to file a “Notification of Regulated Waste Activity” form with the Waste Management Division (WMD). After receiving the Form, the USEPA will assign your business an EPA Identification Number. A temporary number can be assigned if you need to ship hazardous waste before a permanent number can be obtained. See Appendix A for more information.

4. We are aware of the requirement to report any discharge or release of petroleum to the environment which exceeds two gallons (or any amount of a hazardous material other than petroleum). See the “Spills” Fact Sheet for information on how to report a spill.

Yes  No

## Container Management and Storage

1. As a CEG, we do not store more than 2,200 pounds of hazardous waste on-site at any one time.

Yes

No

N/A

**Tip:** A word of CAUTION! If you accumulate more than 2,200 pounds of hazardous waste at any one time (roughly five 55-gallon drums) you are subject to all of the requirements of either an SQG or an LQG, depending on how much hazardous waste you have accumulated, as long as you have the waste.

2. Hazardous wastes are stored in containers that are in good condition and are compatible with the wastes being stored in them.

Yes

No

N/A

**Tip:** Labeling waste containers and segregating waste streams prevents mixing of incompatible wastes. Segregating your wastes can also make it easier to recycle and may lower disposal costs.

**Tip:** Periodically inspect ALL hazardous waste containers.

3. We keep containers holding hazardous waste closed except when it is necessary to add or remove waste.

Yes

No

**Tip:** A drum mounted funnel must be covered for a container to be considered closed.

**Tip:** Keeping solvent containers covered reduces fire and explosion hazards and assures that employees breathe less vapors and that your facility emits less pollution.

4. We label all of our hazardous waste containers with the words "Hazardous Waste" **and** other words that identify the contents.

Yes

No

5. We label all of our containers holding used oil with the words "Used Oil".

Yes

No

N/A

6. Containers holding ignitable wastes (e.g. parts cleaning solvents and thinners) are stored at least 50 feet from the property line.

Yes

No

N/A

7. Hazardous wastes and used oil are accumulated and stored on an impervious surface.

Yes  No

**Tip:** Store liquid wastes away from floor drains.

**Tip:** Store hazardous wastes in one place so you can keep better track of them.

8. Any hazardous wastes or used oil containers that are stored outside are protected from rain and snow.

Yes  No  N/A

9. Only hazardous wastes that are not subject to freezing and expansion are stored outdoors.

Yes  No  N/A

10. We manage the following specific wastes as described in the applicable fact sheets contained in this Guide.

Used Oil	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
Water-based Metalworking Fluids	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
Oily Sorbents	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
Parts Cleaning Solvents	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
Metal Grinding Swarf/Sludge	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
Shop Rags	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
Evaporators	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
Used Oil Burning	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
Paint Wastes	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
Floor Drains	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
Spills	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>

### Waste Transport and Disposal

1. We ship hazardous wastes to certified treatment, storage or disposal facilities (TSDF) using licensed hazardous waste transporters and a hazardous waste manifest. (A list of certified transporters can be obtained by calling the Environmental Assistance Division at 1-800-974-9559)

Yes  No  N/A

2. As a CEG, we self-transport hazardous wastes to certified treatment, storage, or disposal facilities; to municipal CEG hazardous waste collection sites or to generator facilities we own.

Yes  No  N/A

**Tip:**

US Department of Transportation hazardous materials transportation regulations will still apply to your vehicle and what it carries. For more information call the Vermont Agency of Transportation, Department of Motor Vehicles Commercial Vehicle Enforcement Unit at 802-828-2078.

# Wastewater Discharges

## How are Wastewater Discharges Regulated?

All facilities generate some type of wastewater. Wastewater discharges are regulated by the Department of Environmental Conservation's (DEC) Wastewater Management Division (WWMD) in Waterbury and through five Regional Offices (see Appendix H for the Regional Office serving your area). Wastewater can be generated from bathroom and kitchen facilities (known as sanitary or domestic

wastewater), from manufacturing or other processes (known as process or non-domestic wastewater), or it can be a combination of sanitary and process wastewater. Under no circumstances should hazardous materials be discharged to any type of wastewater system. Liquid wastes that contain hazardous constituents must be collected and handled as a hazardous waste.

### NOTE:

This section does not cover issues relating to wastewater created by electroplating, electroless plating, anodizing, chromating, phosphating, or chemical etching or milling operations. These process wastewaters are subject to Federal effluent guidelines.

For more information contact:  
Environmental Assistance Division  
at 800-974-9559  
or  
Wastewater Management Division  
at 802-241-3822

Wastewater discharge is typically to a municipal wastewater treatment plant, an on-site subsurface system (e.g. septic system or dry well), or in very limited circumstances, to the surface of the ground. How wastewater discharges are regulated depends on a number of factors including: whether the discharge is sanitary, process, or combined wastewater, the contaminants present in the discharge, the volume of the discharge, and whether the wastewater is being discharged to an on-site subsurface system, a municipal treatment plant or on the surface of the ground.

## How are Discharges to a Municipal Sewer System Regulated?

### Sanitary Wastewater Discharges Only

DEC requires a wastewater disposal permit for any sanitary discharge from a business or other public building to a municipal wastewater treatment plant unless the discharge began prior to 1970 and the system has not been modified since 1970. For more information, contact the WWMD Regional Office serving your area (see Appendix H).

### Process Wastewater Discharges

Facilities that discharge non-sanitary wastewater (e.g. floor drain wastewater, mop water, permeate from the ultrafiltration of water-based cutting/grinding fluids) to a wastewater treatment plant must notify the WWMD, the operator of the municipal plant, and the person responsible for administering the local sewer ordinance. Depending on the volume and make-up of the discharge, the facility might be required to obtain a "pretreatment" permit from the WWMD. It is unlikely that such a permit would be required for "mop water" or other typically low risk discharge, but it is always necessary to make the required notifications, and to obtain approval (in writing, if possible) for the discharge. The municipality may require that non-sanitary wastewater pass through an oil/water separator before discharge to the treatment plant. For more information, contact the WWMD Regional Office serving your area.

## How are Discharges to an On-Site System Regulated?

### Sanitary Wastewater Discharges

Any strictly sanitary discharges from a business or public building requires a permit unless the discharge began prior to 1970 and the system has not been modified since 1970. Contact the WWMD Regional Office serving your area (see Appendix H) for more information on obtaining a wastewater disposal permit for a sanitary discharge.

### Process Wastewater Discharges

All facilities with existing discharges of non-sanitary wastewater to subsurface systems (e.g. septic systems, dry wells and holding tanks) must inform the WWMD Regional Office of the discharge. The specifics of the discharge are reviewed by an engineer in the regional office who determines whether or not the discharge is allowable. This review process applies to any discharge of process wastewater, whether the wastewater is a combination of sanitary and non-sanitary wastewaters (a “combined waste”) or is disposed in an on-site system that is separate from sanitary wastewater (e.g. a dry well).

Although, under limited circumstances, a business might be able to obtain a permit to discharge process wastewater on-site, the potential liability of such a practice should be given serious consideration. Even a small quantity of certain materials can contaminate groundwater. If persons nearby (or your facility) depend on groundwater, you have the potential to contaminate their drinking water well. Therefore, ***the DEC generally discourages the discharge of any non-sanitary wastewater to the subsurface.***

### Discharges to the Ground (Daylighting) of Non-Sanitary Wastewater

Daylighting is the practice of discharging floor drain or other process wastewater to the ground surface. Daylighting of floor drain wastewater is prohibited if the water originates in an area where hazardous materials are used or stored. Note that daylighting *might* be approved by your WWMD Regional Office if all of the following apply:

- the wastewater doesn't discharge directly to surface water (e.g. a stream, pond, wetland);
- the discharge is infrequent and of low volume; and
- the discharge doesn't contain hazardous materials or waste.

### Floor Drains

Floor drains that discharge to a subsurface disposal system (e.g. septic system or dry well) must be registered as an underground injection control (UIC) well with the WWMD Regional Office serving your area (see Appendix H). The registration process consists of completing a Floor Drain Registration Form (Form UIC-A) for review by a WWMD engineer who will determine whether or not a UIC permit is required. Please refer to the Floor Drain Fact Sheet for more information.



**Tip:** If you can't eliminate all floor drains, install positive shut-off to outlet (i.e. valve, plug, etc.) to control what leaves the building.

## **On-Site Dischargers**

1. Our facility is on a septic system and we do not discharge any industrial waste or process chemicals to the system.

Yes

No

N/A

**Tip:** As previously explained, the recommendation is that no process wastewater be discharged on-site. For environmental and liability reasons, it is far preferable to implement pollution prevention opportunities wherever possible to minimize process wastewater. Once source reduction and recycling opportunities have been evaluated, it may be possible to evaporate certain non-hazardous, aqueous wastewater using pre-engineered equipment. Contact the Air Pollution Control Division for information and refer to the Evaporator Fact Sheet.

2. Our facility is on a septic system and we discharge process wastewater to the system and we have applied for a permit from the Underground Injection Control (UIC) Program (*refer to Appendix H for contact information*).

Yes

No

N/A

**Tip:** Any on-site discharge of non-domestic wastewater to the subsurface must be permitted by the UIC program. Future regulations are anticipated that will ultimately require the permanent closure of any floor drains that discharge to a drywell or septic system (see the Floor Drains Fact Sheet).

# AIR EMISSIONS

## What is Air Pollution?

Air pollution can be defined simply as the presence in the outdoor air of any air contaminant in such amounts that may cause harm or interfere with the enjoyment of life. Air pollution can come from both natural sources (forest fires, volcanic eruptions and plants (i.e. pollen)) and man-made sources (factories, automobiles, and dusty roads) and includes such contaminants as suspended particulates, dust, fumes, exhaust, smoke, chemicals and odorous substances. Identifying which activities cause air pollution is the first step towards cleaner and healthier air for everyone to breathe.

## Does the Fabrication of Metal Products Cause Air Pollution?

Metal products manufacturing encompasses a wide variety of operations. In addition to machining, other common operations are welding, heat treating, cleaning and a variety of finishing operations. Many of these operations can cause air pollution, including:

- **Painting and coating operations** - The solvents from spray finishes evaporate and end up in our air. Conventional coatings typically contain 5-10 pounds of volatile organic compound (VOC) solvents per gallon of coating. These solvents can react in the atmosphere to form “smog” and are also of concern due to their toxicity. Also, oversprayed paint solids can become suspended in the air.
- **Machining operations** - While the machining of metal is typically not a concern, some operations may result in the formation of mist that can remain suspended in the air. Other contaminants that might become airborne as a result of machining include: lead or cadmium compounds, borates, chromium, selenium, tin and zinc.
- **Boilers and furnaces** - Wood, oil and gas-fired boilers and furnaces generate air pollution. Wood boilers in particular require diligent attention to their operation to ensure proper combustion and to minimize smoke and other pollution.
- **Diesel engine generators and idling trucks** - Diesel engines have some of the highest emission rates of all combustion sources. Diesel particulates that give diesel exhaust its characteristic odor are of significant concern due to their toxicity. Recent data indicate that diesel exhaust may be carcinogenic.
- **Cleaning and degreasing** - Solvents used for cleaning must be kept covered to minimize evaporative losses. Most solvents are VOCs which are a key ingredient in the formation of smog, and may be of major concern due to their toxicity.

**Note:** This Guide does not cover air pollution issues associated with a broad range of inorganic metal finishing operations including: electroplating, chemical conversion coatings, electroless plating and anodizing. Environmental concerns resulting from such processes usually focus on wastewater and hazardous waste but emissions from process baths and rinse tanks may require controls. Contact the APCD for further information.



**STEP 2:** Make a list of all the different HACs present in all the materials you use. You may want to use a table, like the one below, to keep track of the information.

**STEP 3:** Determine the total weight of each material used in an 8-hour day. If you don't have daily use records, you can use monthly or yearly records and divide by the number of days that you use the particular product. Perhaps your best source of material use information will be determined from purchasing records. You need to repeat this step for each material that you use.

*Note: You may have to convert from gallons to pounds to determine the weight in pounds. If the material you are looking at is a liquid, the MSDS may show its specific gravity instead of its density (in pounds per gallon). To convert to density, you must multiply the specific gravity by 8.34 (the weight of a pound of water) to arrive at weight in pounds/gallon for that material.*

**STEP 4:** For each individual HAC, look at Section 2 (or perhaps 3) of the MSDS for each material that contains that particular compound. There you will find the **percentage of the chosen HAC (by weight)**.

**STEP 5:** For the HAC you chose in Step 4, **determine the emissions of that HAC** using the following formula:

$$\text{HAC} = (\text{Weight of material (in lbs) used in 8 hour}) \times (\% \text{HAC}/100)$$

This will yield HAC emissions for the material in question over an 8-hour period. You will need to repeat this calculation for each material that contains that particular HAC.

**STEP 6:** For the chosen HAC, add up all individual 8 hour calculations developed in Step 5. **Compare that total to the 8 hour Action Level** listed in Appendix G.

**STEP 7:** Choose the next HAC from the list developed in Step 2 and begin the process again. Repeat for each HAC in use at your facility.

*Note: If you exceed the Action Level for even a single HAC, you should contact the DEC Air Pollution Control Division (241-3840) to determine your obligations. (The APCD intends to amend the current regulation so please check to make sure the Action Level taken from Appendix G is still the correct one.)*

HAC Name (from MSDS)	List of Materials containing that HAC	Weight of Material (used in 8 hours)	% HAC (by weight) (from MSDS)	Pounds of HAC (used in 8 hours) (col 3 X col 4)	Action Level (lbs./8 hrs.)
Xylene	coating	8 (gal) X 8 (lb/gal) = 64 lb	11.93	7.64	The Action Level for Xylene is:  <b>86.3</b>  <i>(For a complete list of HACs and their associated Action Levels see Appendix G)</i>
	thinner	6 (gal) X 7 (lb/gal) = 42 lb	35.48	14.90	
	gun cleaner	0.5 (gal) X 7 (lb/gal) = 3.5 lb	22.19	0.78	
<b>Total Xylene</b>				<b>23.32</b>	

1. We maintain purchase and/or usage records to document the quantity of material we use that contains HACs each year.

Yes No 

**Tip:** *You must keep your records for at least five years.*

2. We keep the MSDS for materials we use that contain HACs or other hazardous substances as required by VOSHA.

Yes No 

**Tip:** *You should keep your MSDSs for at least five years. MSDS should be kept in a binder, easily accessible to employees who may have occasion to work or come into contact with those materials.*

3. Our facility is below the “action level,” for all hazardous air contaminants (HACs). If not, we have informed the DEC Air Pollution Control Division.

Yes No 

**Tip:** *HAC emission calculations are described earlier in this section.*

4. Our calculations show that our actual emissions from the facility are below 5 tons per year. If not, we have informed the DEC Air Pollution Control Division.

Yes No 

**Tip:** *Facilities emitting more than 5 tons of air pollutants per year must complete a “source registration” with the Air Pollution Control Division. Facilities emitting more than ten tons annually must obtain an “operating permit.” Call the APCD for more information.*

5. Whenever parts are not being handled, we close the cover on any cold cleaning equipment, such as gun washers and parts cleaning sinks, that uses a VOC-containing solvent (like mineral spirits or petroleum naphtha).

Yes No 

**Tip:** *You should always cover all containers that hold a volatile material to prevent evaporation. Evaporation is a waste that increases worker exposure and the need to purchase virgin material.*

6. *Only applicable to facilities whose manufacturing includes the painting and coating of metal parts where total annual emissions of VOCs (volatile organic compounds) exceed 5 tons:*

We have read and are in compliance with Section 5-253.13 of Vermont's Air Pollution Control Regulations entitled: "Coating of Miscellaneous Metal Parts".

Yes

No

**Tip:** The process for calculating VOC emissions is virtually the same as that used for the calculation of HACs. Many of the solvents found in organic coatings are classified as both a VOC and a HAC. However, there is no comparison with an "Action Level" value to determine regulatory responsibilities as there is with emissions of HACs. The MSDS should state the total VOC content of the coating so you do not need to sum up the individual components of the coating. Please call the APCD (241-3841) or EAD (241-3629) for help with VOC calculations.

**Tip:** Regulation 5.253.13 establishes VOC content limits for coatings in lbs. of VOC per gallon of coating, "less water and exempt solvents". If your coating contains water or acetone, you may need to contact the supplier for the VOC content expressed in the correct units.

7. *Only applicable to facilities whose manufacturing or maintenance activities include the cleaning and removing of soils from metal by spraying, brushing, flushing or immersion while maintaining the solvent below its boiling point. It does not include wipe cleaning nor does this regulation (section 5-253.14) include aqueous cleaning.*

We perform "cold cleaning" of metal surfaces as described above, including the use of parts cleaning sinks or washers, that use solvents that contain VOCs (volatile organic compounds) like petroleum naphtha, mineral spirits or terpenes, and comply with the following:

- ➔ The parts cleaning unit must have a cover and the cover must be closed except when parts are being cleaned.
- ➔ If parts cleaning solvent is sprayed, the pressure of the spray cannot exceed 10 psi.
- ➔ Only parts that are non-porous and non-absorbent can be washed.
- ➔ Discontinue operation of the parts cleaner if visible solvent leaks are detected until such time that leaks are repaired.
- ➔ Drain cleaned parts until dripping ceases.

Yes

No

8. We use an open-top vapor degreaser to remove soils from a batch of metal parts OR we use a conveyORIZED degreaser to remove soils from a continuous stream of metal parts and are in compliance with Section 5-253.14 of Vermont's Air Pollution Control Regulations entitled: "Solvent Metal Cleaning".

Yes

No

**Tip:** Please call the APCD (241-3841) or EAD (1-800-974-9559) if you need a copy of the Regulation or help in understanding how it might affect your operations.



## FACT SHEETS

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# Used Oil

## How Is It Regulated?

Used oil is regulated under the “Used Oil Management Standards” in Subchapter 8 of the Vermont Hazardous Waste Management Regulations. Used oil that is managed in accordance with the Used Oil Management Standards is not considered hazardous waste and should not be counted when determining your generator status. It is not required that you ship “Used Oil” under a manifest. However, if you choose to use a manifest, or your transporter requires it, the material should be identified on the manifest by the VT99 waste code for non-hazardous waste. “Used Oil” might include the following wastes generated in a typical metal fabricating shop:

- machine lubricants and gearbox oils
- hydraulic oils
- compressor oils
- straight cutting oils
- tramp oil skimmings
- oils skimmed from evaporators
- concentrate from the ultrafiltration of water-based metalworking fluids
- quench oils used in heat treating

**NOTE:** *Used oils that contain greater than 1,000 ppm total halogens (in metal fabricating operations the halogen of concern is typically chlorine) are presumed to be hazardous waste due to contamination with halogenated hazardous waste. However, if it can be shown that the halogen content is due to ingredients used in the formulation of the oil (such as chlorinated paraffins used as EP additives in some cutting oils) the oil can be managed as a Used Oil.*

## What Can Be Done With it?

- Send it off-site to be fuel-blended and burned for energy recovery **OR** to be re-refined for reuse as a lubricant.
- Reuse it to lubricate chains, tools and other machinery. Don't let it drip on the ground.
- Burn it on-site as a fuel in a waste oil space heater.  
*(see waste oil burning fact sheet for additional information)*
- Give or sell it to others as a fuel to burn in a waste oil space heater.  
*(see waste oil burning fact sheet for additional information)*

## What Can't Be Done With It?

- Used oil cannot be disposed of in a Vermont landfill.  
*(check with the Solid Waste District in your area to see if they they have a collection program for small businesses)*
- Used oil cannot be applied to roads for dust control.

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- Used oil cannot be mixed with a hazardous waste with the exception that used oil may be mixed with waste that is hazardous solely because it exhibits the characteristic of ignitability (e.g. ignitable-only mineral spirits), provided that the resultant mixture does not exhibit the characteristic of ignitability.

## How Do I Store Used Oil?

If stored **above-ground**, ensure that tanks or containers are:

- in good condition and made of or lined with compatible materials,
- kept closed except when adding or removing used oil,
- labeled with the words “Used Oil”,
- located on an impervious surface within a structure that sheds rain and snow,

You must also adhere to the following requirements:

- up to 1,320 gallons may be stored on-site before arrangements to ship must be made and no single container can exceed 660 gallons capacity. An amount greater than this can only be stored above-ground **IF**:
  - 1) all applicable Spill Prevention, Control and Countermeasure requirements of 40CFR Part 112 are met;
  - 2) oil is not stored on-site longer than 180 days;
  - 3) each container is marked to identify the date it became full.
- tanks located outdoors must be equipped with secondary containment able to hold 110% of the tank's volume.

If stored in an **Underground Storage Tank**, contact the UST Program (241-3888) to obtain a permit.

## How Do I Transport Used Oil?

Used oil generators can self-transport up to 55 gallons at any one time in a Department of Transportation approved container without obtaining a permit. “Used oil transporters” of more than 55 gallons must complete a Notification of Regulated Waste Activity Form and obtain a permit. Call the Waste Management Division (241-3888) for more information.



# Water-Based Metalworking Fluids

## Why Are They Regulated?

Waste water-based metalworking fluids (WMF) are regulated because of their oil content, chemical additives, and possible contamination with toxic metals such as chromium, cadmium, and lead.

## How Must They Be Managed?

How waste WMF must be managed depends on two factors:

- ➔ the contaminants they acquire during use; *and*
- ➔ how you intend to handle them when they are spent.

Water-based metalworking fluid (WMF) waste is a Vermont regulated hazardous waste and is identified by the Vermont hazardous waste code VT03. Although WMF is a Vermont listed hazardous waste, the Vermont Hazardous Waste Management Regulations contain an exemption for this waste provided that:

- ☞ it does not exhibit a hazardous waste characteristic; *and*
- ☞ it is recycled or treated on-site **or** sent off-site for treatment; *and*
- ☞ containers holding WMF waste that is being managed according to the exemption are marked with words that identify the contents; *and*
- ☞ any residue resulting from on-site recycling is managed in accordance with applicable hazardous waste regulations; *and*
- ☞ any contaminated water resulting from on-site treatment is discharged in accordance with applicable wastewater discharge and groundwater protection regulations; *and*
- ☞ any WMF wastes sent off-site for treatment are transported by a certified hazardous waste transporter.

WMF can be a characteristic hazardous waste if it exhibits one or more of the hazardous waste characteristics (ignitability, corrosivity, reactivity or toxicity). Frequently, WMF is determined to be a characteristic hazardous waste because it exhibits the characteristic of “toxicity” due to contamination with one or more heavy metals shown in the table on the right (Note: This is just a partial list of the regulated toxic constituents found in

Metal	Hazardous Waste Code	Regulatory Level (milligrams per liter)
Arsenic	D004	5.0
Barium	D005	100.0
Cadmium	D006	1.0
Chromium	D007	5.0
Lead	D008	5.0
Mercury	D009	0.2
Selenium	D010	1.0
Silver	D011	5.0

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the VHWMR and represents those most likely to be found in waste WMF). WMF that is determined to exhibit a characteristic **cannot** be managed under the above exemption and **must** be managed as a hazardous waste.

If WMF is being managed in accordance with the exemption criteria, it should not be counted when determining your generator status. When shipping exempt WMF off-site under a manifest, the waste should be identified by the VT99 waste code for non-hazardous waste.

## **Pollution Prevention & Best Management Practices**

There are a number of factors that contribute to the degradation of metalworking fluids including: improper coolant concentration, high concentrations of dissolved solids, contamination by machine lubricants and hydraulic oils, buildup of metal fines, microbial contamination, and low pH. The following strategies can be used to extend the fluid's useful life with the added benefits of increasing product quality and productivity while reducing coolant purchasing and disposal costs.

Use a high quality fluid - Fluids exhibiting good stability in hard water, resistance to bacterial growth, and good oil rejecting properties might cost more on a per gallon basis, but the extended life of such a fluid will typically justify the increased purchase cost.

Use good water - Since water-based metalworking fluids can be 90% or more water, the quality of the water used affects overall performance more than any other factor. Hardness minerals and other dissolved solids accumulate in the fluid over time and affect fluid performance. Potential problems associated with high levels of dissolved solids include: machine/workpiece corrosion, residue build-up, increased bacterial growth and demulsification of the fluid. The following water quality guidelines are suggested:

*Initial fluid preparation:*

- hardness of 80-125 ppm
- less than 80 ppm chloride and sulfates
- less than 30 ppm phosphates

*Make-up fluid preparations:*

- use demineralized or deionized water

Implement a fluid monitoring and maintenance program - A fluid monitoring and maintenance program should include:

- daily monitoring of concentration and pH
- microbial growth monitoring
- regular removal of tramp oil
- regular removal of chips/fines
- use of demineralized or deionized water

Assign responsibility for fluid control to one person - Assigning the responsibility for fluid control to a single person assures consistency in management of the fluids and would have the added benefit of requiring that only one person be trained in coolant monitoring and maintenance techniques.

***Additional information on reducing metalworking fluid waste can be obtained by contacting the Environmental Assistance Division at 1-800-974-9559.***



# Oily Wastes

## How Are They Regulated?

Oily wastes comprise a major wastestream for many shops in the metal products industry. Under the Vermont Hazardous Waste Management Regulations (VHWMR) any waste (solid or liquid) contaminated with greater than 5% by weight of petroleum distillates and having a melting point of less than 100°F is considered to be hazardous. Some examples of oily wastes routinely generated in a typical metal fabricating shop and their sources are:

- ➔ oil soaked sorbents (pads, booms or granular)
- ➔ sludge/grit from floor drain troughs
- ➔ sludge/grit from oil/water separators
- ➔ floor sweepings
- ➔ oily wastewater from machine sumps, compressor condensate, parts washers, etc

Any waste materials which contain 5% or more by weight of oil (with the exception of vegetable-based oil) must be managed as a hazardous waste. Where you are unsure as to the amount of oil in these wastes, a one time test of the material for total petroleum hydrocarbons (TPH) can be done to determine the level of oil present. Copies of the test results should be kept on file. For solids like pads or granular material, the weight of uncontaminated material can be compared with its weight after use to determine if there has been at least a 5% increase. *(Note: Granular absorbents are manufactured to absorb up to 300% - 500% its own weight of oil.)*

Oil that can be drained, separated, or removed from any of the above materials can be managed as a "used oil" (see Used Oil fact sheet) and therefore would not have to be managed as a hazardous waste. In the case of oily wastewater, while the separated oil may be managed as a used oil, the remaining oil-contaminated water cannot be, and probably would need to be analyzed to determine if the 5% by weight petroleum threshold has been exceeded. Even where analysis indicated petroleum distillate content of less than 5% (non-hazardous) it would not be possible to discharge this wastewater to a municipal treatment plant without permission of the local authority (refer to Wastewater compliance checklist).

## Best Management Practices

When it comes to minimizing or even eliminating oily waste generation, the rule of thumb is simply to practice *good housekeeping*, including a preventive maintenance program to minimize the chance for leaks and spills.

In many cases, oily wastes are generated in unnecessarily large volumes and can be reduced by some relatively simple source reduction methods. The following are a few suggestions to



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help reduce oily wastes:

- Identify the circumstances that result in oil reaching the shop floor (necessitating the use of sorbents and contaminating floor sweepings and floor drain catch basin grit) and develop a spill prevention plan that addresses each of these circumstances including measures that can be taken to prevent their occurrence.
- Involve the machinists in the planning process; they are the most knowledgeable regarding how and why oily wastes are generated.
- It is impossible to prevent all spills from occurring. When a significant volume of oil is spilled, pick it up with a wet-vac or a squeegee and dust pan and put it in with your waste oil. The use of sorbent materials only increases the volume of waste and results in a waste that now must be managed as a hazardous waste.
- Wipe up drips and small quantities of oil with launderable shop rags. (See Fact Sheet on Shop Rags)
- Use drip pans, funnels, drain trays, etc. to prevent oil and other fluids from reaching the shop floor.
- Where sorbents must be used, try wringable/reusable sorbent pads or socks, or granular type sorbents that have a high absorbency to weight ratio. Sorbents from which oils can be removed so that they can be reused don't have to be managed as a hazardous waste until such time that they must be disposed of. If granular type sorbents must be used, make sure they are completely used prior to disposal. Partially used sorbents may be stored in a secondary container for reuse.
- Preventing oil from getting on the floor is the best way to prevent floor sweepings from having to be handled as a hazardous waste. Clean floors regularly to remove dirt before it has a chance to become contaminated and don't sweep dirt into troughs or basins.



# Parts Cleaning Solvent

## How Is It Regulated ?

Most metal manufacturing facilities use one or more parts wash basins containing petroleum-based solvents. Those that use basins to clean production parts generate significant amounts of solvent waste, while facilities that use them primarily for maintenance-related activities generate much smaller quantities. In some facilities, parts are cleaned and rinsed numerous times during production (for example - when preparing parts for surface coating and removing oil residues from parts after metalworking or oxidation from parts after welding).

Production cleaning encompasses many different processes employing different types of cleaning media. Each medium and associated process produce different wastestreams. Technological advancements of alternative cleaning processes have addressed the need to have parts cleaned effectively and efficiently. It is not the purpose of this fact sheet to discuss the many advancements in cleaning technologies available today, but please call the Environmental Assistance Hotline at 1-800-974-9559 to get more specific information.

Significant air pollution control and hazardous waste management issues are usually associated with the cleaning and/or degreasing of metals. Commonly used solvents in cold cleaning operations like mineral spirits, terpenes and petroleum naphtha are regulated as volatile organic compounds (VOCs) in section 5-253.14 of the Vermont Air Pollution Control Regulations. This regulation also establishes operating standards for open top vapor degreasers where solvents like methylene chloride and trichloroethylene are still occasionally used for some production cleaning. These solvents are highly toxic and closely regulated as hazardous air contaminants (HACs) as well as being VOCs.

Solvent Type	Potentially Hazardous for	Waste Code(s)
Petroleum Naphtha (see Note 1)	Ignitability (if flash point <140°F)	D001
	Petroleum Content	VT02
Aqueous Cleaner (see Note 2)	Petroleum or heavy metals if cleaner becomes contaminated beyond regulatory thresholds (i.e. >5% by weight petroleum, >5ppm chrome, etc.)	VT02 D004 - D011
Terpene Hydrocarbons	Ignitability (if flash point <140°F)	D001
	Same issue of contamination with petroleum or metals	See aqueous above
Trichloroethylene, methylene chloride, acetone, toluene, methyl ethyl ketone, perchloroethylene	Common solvents that are specifically "F-listed" hazardous wastes. The presence of any amount of an "F" solvent in a waste causes that waste to be subject to Vermont's Hazardous Waste Regulations	F001 - F005

The chart on the left shows commonly used parts cleaning solvents, properties that might cause the spent solvent to be regulated as hazardous, and the appropriate hazardous waste code.

**NOTE 1: A spent petroleum solvent that is hazardous waste ONLY because it exhibits the ignitability characteristic may be mixed with Used Oil providing the resulting mixture is not ignitable.**



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**NOTE 2:** *If oil and grease can be separated from spent aqueous cleaning solutions, it may be possible to discharge the resulting wastewater to a municipal treatment plant. Prior to discharge, permission should be obtained from the local sewer authority and Vermont's Wastewater Management Division. Although it is not required, it would be in the best interest of the discharger to obtain this permission in writing.*

## Best Management Practices

- Replace hazardous solvents with less/non hazardous solvents or aqueous-based cleaners. This will not only reduce environmental regulatory burdens but will also improve worker health and safety conditions in your shop. *(For more information on alternative parts cleaning solvents contact the EAD.)*
- Investigate aqueous, microbial parts cleaning solutions. The cleaning chemistry is an aqueous detergent that includes hydrocarbon degrading microbes. The detergent cleans the parts and the microbes clean the cleaner. This can reduce or eliminate parts cleaning waste.
- When parts cleaning sinks are leased from a solvent recycling service, ensure that the solvent is only replaced when it is no longer effectively cleaning parts. Arrange for changeout of solvent to be done as **infrequently** as possible.
- Use a wire brush, launderable rags or some other mechanical method to remove heavy deposits before cleaning with solvent.
- Solvent life can be greatly extended through the use of filtration systems. Purchase or lease equipment that incorporates some type of filtration system (cyclonic, cartridge, etc.) or add filtration to an existing unit. This will extend the solvent's useful life, reducing hazardous waste generation and the cost of purchasing new solvent.
- Never clean parts in your solvent sink using spray cleaners. Many of these cleaners contain halogenated or other organic compounds that may cause your spent solvent to be more strictly regulated.
- Don't leave solvent running and be sure to close the cover on parts cleaning equipment when not in use **(this is required!)**. This will help reduce air emissions and promote a safer, more healthy work environment.
- If more than one parts washer is used, designate only one of them for preliminary cleaning. This will extend the life of the cleaning solvent in the second parts washer, and can assist in evaluating whether further cleaning is necessary.



# Chips and Grinding Swarf

## How Is It Regulated?

*Chips or turnings should always be recycled as scrap metal.* There is a categorical **exemption** in the Vermont Hazardous Waste Regulations (VHWMR: see Section 7-204(e)) for scrap metals that are recycled. Swarf from grinding operations has a relatively high liquid content and is made up of fine metal particles, metalworking fluids, lubricants and abrasive residuals. Grinding swarf is eligible for a “recycle/reuse” exemption under the VHWMR assuming a market can be found.

If no recycling market exists and cuttings, or more likely swarf, must be disposed of, there are essentially three ways the waste would be regulated as hazardous. The first is the material exhibits the hazardous waste characteristic of *toxicity*. Waste is regulated as hazardous for toxicity if it contains constituents found in the table below, and those constituents are found in concentrations above the established regulatory levels. (Note: This is just a partial list of the regulated toxic constituents found in the VHWMR and represents those most likely to be found in waste swarf or cuttings.)

Metal	Hazardous Waste Code	Regulatory Level (milligrams per liter)
Arsenic	D004	5.0
Barium	D005	100.0
Cadmium	D006	1.0
Chromium	D007	5.0
Lead	D008	5.0
Mercury	D009	0.2
Selenium	D010	1.0
Silver	D011	5.0

The second way the waste may be considered hazardous is if oil (not coolant) is used to machine parts, **AND** the resulting cuttings or swarf *exceeds 5% petroleum, by weight*. Any waste that is more than 5% by weight petroleum is a Vermont-listed hazardous waste, coded VT02.

Finally, grinding swarf could be an “F-listed” waste if contaminated by any amount of an F-listed solvent as defined in Section 7-210 of the VHWMR.

Even if your swarf is non-hazardous, it probably will still have to be picked up for disposal by a certified transporter since solid waste landfills will not accept most industrial wastes, especially those with a relatively high liquid content. If this is the best (or only) option for your facility, make sure the material is shipped as non-hazardous (if a manifest is used) and coded VT99. As a non-hazardous waste, the waste is not counted in determining the generator status of the facility nor is the hazardous waste tax assessed.

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## Best Management Practices

There are two widely accepted rules for maximizing the recycling potential (and economic value) of chips and swarf:

- separate metals to maximize purity.
- remove as much fluid as possible from the material.

**NOTE:** The presence of fluid in metal wastes makes scrap dealers reluctant to accept them because of the burden and liability associated with handling the fluid. Grinding swarf can hold a significant amount of fluid, sometimes as much fluid as solids.

Fluids may be separated from metal chips and grinding swarf by simple gravity draining, or by using more sophisticated filtration, mechanical action and/or spinning equipment. Fluid recovery may be greatly enhanced by using a *wringer*, or centrifuge which spins metal cuttings so fluid may be recovered for reuse. Equipment manufacturers claim these machines can recover up to 75% or more oil or coolant versus simple gravity draining. Similar technology exists for the removal of fluids from swarf. The most efficient mechanism for fluid separation depends largely on the size of the particles.

***For vendor information on fluid separation and/or sludge drying equipment, call the Environmental Assistance Division at 1-800-974-9559. We may also be able to put you in touch with another Vermont company who is currently using similar technology.***



# Shop Rags

## How Are They Regulated?

Wipers, shop towels and other reusable absorbents that are contaminated with “listed” hazardous waste or that exhibit a hazardous waste “characteristic” (see Hazardous Waste compliance checklist) are by policy considered to be exempt from the provisions of the Vermont Hazardous Waste Management Regulations if:

- ☞ shop towels or absorbents are picked up, cleaned and delivered back to the customer under a contractual agreement with a commercial laundering service which uses either a solvent-based dry cleaning or a water-based laundering process to clean the wipers/absorbents; **and**,
- ☞ hazardous waste has not been disposed of onto the wipers and free liquid hazardous waste is not present; **and**,
- ☞ hazardous waste-contaminated reusable absorbents that are on-site must be:
  - ➔ stored in closed bags or containers on an impervious surface in a roofed enclosure so as to be protected from the elements; **and**
  - ➔ containers labeled as “Used Rags or Absorbents Destined for Laundering”, **and**
  - ➔ the laundering facility properly manages all residuals and waste from the laundering process.

Under this policy exemption, provided that all of the above management requirements are met, reusable absorbents that have been soiled with hazardous waste(s);

- ➔ do not have to be managed as hazardous waste (although they must be stored as outlined above),
- ➔ do not need to be shipped under a manifest to a licensed hazardous waste treatment, storage, or disposal facility,
- ➔ do not count toward the total monthly on-site generation of hazardous waste.

Generators of contaminated absorbents (managed under this policy exemption) should be aware that such materials are still considered to be hazardous substances and that liability remains with the generator in the event of mismanagement or an environmental release. Also, it is the generator’s responsibility to meet all Vermont Occupational Safety & Health Act (VOSHA) requirements regarding the safe storage of hazardous materials, including that absorbents contaminated with an ignitable material be stored in a closed *metal* container.

**NOTE:** *Rags or other reusable absorbents that are contaminated with a Vermont or Federal “listed” hazardous waste or that exhibit a hazardous “characteristic”, and that are not handled in accord with this policy, must be managed as hazardous waste.*

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# Evaporators

## How Are They Regulated?

An evaporator may be defined as an engineered process unit that is designed to change a substance from its liquid state to a vapor or gas. Evaporation technology can be used at various points in a process or waste treatment operation. Evaporators differ in their basic design (e.g. atmospheric, vacuum) as well as the types and volumes of materials that they can receive. Regulatory requirements may differ depending upon the type of evaporator used, the point of application and the material(s) to be processed. For example, an atmospheric evaporator that is used for “end-of-pipe” treatment to reduce the volume of hazardous waste for off-site shipment will be subject to a very different set of standards than one which receives nonhazardous wastewater for material recovery and reuse within a process.

Evaporators may result in the cross-media transfer of chemical pollutants, for example, from wastewater to the air. Further, evaporators are used to reduce the volume of a waste (physical treatment) after it has been generated. Pollution prevention seeks to reduce or eliminate hazardous substances entering any waste stream *prior to* treatment, recycling or disposal. The Vermont DEC strongly encourages all facilities to reduce the amount of material to be treated by using any feasible pollution prevention method prior to considering the installation of evaporator units. Call an EAD Pollution Prevention Specialist at 1-800-974-9559 to assist with the evaluation of pollution prevention strategies for your manufacturing operations.

The following guidelines are intended to assist in the determination of applicable regulatory requirements.

### Hazardous Waste

Generally, use of an evaporator to reduce the volume of a hazardous waste is considered “treatment” and requires a permit under the Vermont Hazardous Waste Management Regulations. There are some important exceptions however.

A permit is not required where:

- 1) wastewater is determined to be non-hazardous; **or**
- 2) the evaporator system that treats hazardous waste is “totally enclosed”, which means hard-piped directly to the production process in a manner that prevents the release of any hazardous contaminant to the environment (including air); **or**
- 3) water-miscible metal cutting and grinding fluid is evaporated so long as:
  - it does not exhibit a “characteristic” of hazardous waste; and
  - it is stored in appropriate containers and labeled to identify contents; and
  - any residue from evaporation is managed as a hazardous waste; **or**



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- 4) water is evaporated from hazardous waste that is identified **only** by the VT02 (ie. >5% by weight petroleum) hazardous waste identification number so long as:
- ☐ evaporation equipment is approved by the Air Pollution Control Division (APCD);  
**and**
  - ☐ oily residue remaining is managed as a hazardous waste *or* in accord with the Used Oil Management Standards (Subchapter 8 of the VHWMR).

**NOTE:** *Even where aqueous wastewater is not determined to be hazardous, it may be necessary to test the concentrated residues from evaporation to assure that this material is not a hazardous waste.*

## Air Pollution Control

Construction permits are not typically required by the Air Pollution Control Division (APCD) for the installation of evaporator systems. The Engineering Services Section of the APCD does review proposed new systems for the following key parameters, and in most cases, is able to approve the installation without the facility having to apply for and obtain a construction permit.

- ☞ The evaporator system should be designed and pre-engineered for the task at hand;
- ☞ The volume of liquid waste stream to be evaporated must be estimated and the presence of any volatile organic compounds (VOCs) and especially hazardous air contaminants (HACs) identified. If there is a requirement for a construction permit, it is usually necessitated by the fact that an “action level” is exceeded for one or more hazardous air contaminants as listed in Appendix C of the Vermont Air Pollution Control Regulations.



# Used Oil Burning

## How Is It Regulated?

All activities related to the burning of used oil are regulated under Subchapter 8 of the Vermont Hazardous Waste Management Regulations (VHWMR). Used oil burning activities include: burning used oil generated at your facility, burning used oil generated by others, and giving or selling your used oil to another burner. If you are involved in any of these activities, you must

### USED OIL FUEL SPECIFICATIONS

Constituent/Property	Allowable Level
Arsenic	5 ppm maximum
Cadmium	2 ppm maximum
Chromium	10 ppm maximum
Chlorine	500 ppm maximum
Lead	100 ppm maximum
Flash Point	140°F minimum
Total Halogens	1000 ppm maximum
Polychlorinated biphenyls (PCBs)	< 2 ppm maximum
Net Heat of Combustion	8000 BTU/lb minimum

notify the Waste Management Division. Notification is done using the Notification of Regulated Waste Activity Form (see Appendix A). This fact sheet only addresses the burning of used oil in small fuel burning equipment, defined as having a maximum operating heat input equal to or less than 500,000 BTU/hr (*the use of "pot burners" or "vaporizing burners" is prohibited*). Burning in larger equipment is subject to more stringent regulation.

**NOTE:** other types of used oil (e.g. hydraulic fluids, compressor oils, etc) may be burned provided permission is first obtained from the Waste Management Division (WMD). Decisions are based on a review of any relevant material safety data sheets and a description of the process generating the used oil.

## Burners of Specification Used Oil

The types of used oil that may be burned in small fuel burning space heaters are vehicle crankcase and machine gearbox oil which meets the "specifications" shown in the table above. Specification used oil from the following sources can be burned in small fuel burning equipment:

- ☞ used oil generated on site,
- ☞ used oil generated off-site from either "do-it-yourselfers" (used oil generated by households) or from facilities owned or operated by the burner,
- ☞ used oil generated off-site from facilities not owned by the used oil burner provided:
  - ➔ the "marketer" (defined on the following page) of the used oil demonstrates that the used oil meets specifications;
  - ➔ the facility accepting the used oil retains records which show the amount of used oil accepted, specification testing results, and the name, address and telephone number of the marketer for a period of three years; and
  - ➔ the facility accepting the used oil has notified the Waste Management Division of its status as a used oil collection facility.



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Burners of used oil in small fuel burning equipment must also comply with the following requirements:

- ☞ The combustion gases from burning used oil must be vented to ambient air.
- ☞ Used oil generators that burn their own used oil on-site, or that burn off-site generated used oil received in shipments less than or equal to 55 gallons in volume, must initially test the used oil from each source for **total halogens**. A field screening test kit may be used to assure that no more than 1,000 parts per million (ppm) of total halogens are present in the used oil. If there is reason to believe that any of the remaining specifications would not be met by a volume of used oil (e.g. >500 ppm chlorine), the used oil generator must test the used oil for any suspected constituents or properties.
- ☞ Used oil marketers offering used oil fuel to burners in shipments greater than 55 gallons must initially test the used oil and maintain copies of analytical and testing results to establish that the oil meets **each** of the specifications.
- ☞ Used oil fuel from a specific source must be re-tested if there is reason to believe that the quality of the used oil - or the process that generates the used oil - has changed such that the specifications would not be met.
- ☞ A facility burning used oil fuel shall maintain records documenting the amount of used oil fuel burned on-site. These records shall be retained for a period of three years.
- ☞ No more than one space heater may be connected to an above-ground storage tank (VOSHA).

## Specification Used Oil Marketers

A used oil “marketer” is any entity that either directs used oil fuel from their facility to a used oil burner or who first claims that used oil (intended to be burned for energy recovery) meets the used oil fuel specifications. Anyone who gives, sells, or otherwise provides used oil to someone else to be used for fuel blending or burning is considered to be a marketer. Marketers must complete a Notification of Regulated waste Activity form. Used oil marketers initiating or accepting a shipment of used oil fuel must maintain the following records for a minimum of three years:

- ☞ Copies of all analytical and test results applicable to the shipment of used oil fuel, and/or documentation of total halogen field screening results;
- ☞ An operating log for all shipments of used oil fuel that includes the following information:
  - ➔ the name, EPA identification number, and address of the facility to which used oil fuel is sent or from which used oil fuel is received;
  - ➔ the quantity of used oil fuel shipped or received;
  - ➔ the date of shipment or delivery; and
  - ➔ name, EPA identification number, and address of the transporter.

**Contact the Environmental Assistance Division at 1-800-974-9559  
or the Waste Management Division at 802-241-3888 for more information**



# Paint Wastes

## How Are They Regulated?

Painting wastes occur in solid, liquid and gaseous forms and can include the following:

- ☐ paint sludge and filters
- ☐ spent solvents and paint sludge from equipment cleaning
- ☐ air emissions during paint application, curing and drying
- ☐ obsolete or unwanted paint

Most painting operations use solvent-based materials. Waste paint and thinners typically contain organic solvents such as xylene, methyl ethyl ketone, toluene and acetone all of which are ignitable. These wastes are also hazardous for their toxicity not only for the solvents that are present, but because pigmented coatings may contain heavy metals compounds like lead, cadmium or chromium.

Solid paint wastes like used spray booth filters and overspray (booth sweepings) many times are hazardous for ignitability, even though most if not all of the organic solvents contained in the coating have evaporated. Lacquer dust in particular is almost always hazardous for ignitability. In addition, paint-related wastes often exhibit the hazardous waste characteristic of toxicity (e.g. metals and solvents). Product Material Safety Data Sheets (MSDS) will help with this determination, but often the only way to know for sure is to have the a sample of the material analyzed in a laboratory.

Use of solvent-based paints and thinners also results in the emission of two major types of air contaminants - VOCs (volatile organic compounds) and particulates (small, air-borne particles of solid or liquid matter). Facilities that apply paints to “miscellaneous metal parts” and whose VOC emissions exceed 5 tons per year must comply with requirements in section 5-253.13 of the Vermont’s Air Pollution Control Regulations (VAPCR). Many of the VOCs found in paint products are also Hazardous Air Contaminants (HACS) and a calculation described in the Air Checklist of this Guide should be performed to determine if an “action level” is exceeded. The VAPCR also contain broad authority prohibiting the discharge of particulates to the air, especially where such emission can result in a public nuisance and/or odor.

## How Must They Be Managed?

Solvent-based paints, thinners and related by-products generally must be managed and disposed of as hazardous. (See Section on Hazardous Waste)

If your facility is a Conditionally Exempt Generator (CEG) of hazardous waste, meaning your business generates less than 220 pounds per month of **all** hazardous wastes combined, you have some flexibility in how to manage, store and transport small amounts of hazardous waste.



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Many of the Solid Waste Districts around the state have collection programs that will accept small quantities of hazardous waste from CEGs for proper disposal.

## What Can't Be Done With Them?

- Liquid paints and thinners *cannot* be disposed of in the landfill. Small quantities of dried latex paints (less than 1 gallon) may be disposed of in the landfill.
- Solvent-based paints and thinners *cannot* be discharged to a sewer (see the Water-borne Coatings" section of this fact sheet for disposal information).

## Pollution Prevention & Best Management Practices

- 1) Eliminate the need to paint by using surface-free-coating materials, like stainless steel.
- 2) Improve current operating practices:
  - Buy only the material you need. Return expired materials to suppliers for reblending. Make sure vendors understand that unused samples or complimentary products will be returned if they are not used.
  - Standardize paints and colors to minimize the number of different types of paint used.
  - Schedule jobs to maximize color runs.
- 3) The method of paint application chosen depends on the type of substrate to be coated, the type of coating, and the size and shape of the surface. Improvements in transfer efficiency can lead to less waste being generated and lower emissions of VOCs. Dip, curtain and roll coating have high transfer efficiencies and high production rates but all have specific limitations. Most metal is coated using spray application.
- 4) If you spray, *talk to vendor(s)* to determine the gun type with the highest transfer efficiency for your specific coating process. Average overspray rates from conventional guns are 60 to 80%! Real transfer efficiency however, depends on many things, especially solids content, wet film thickness, application equipment and operator experience. Things to consider include: operator distance to the workpiece, optimal fan size, possibility of reducing atomizing air pressure and/or fluid pressure, spacing between workpieces, and reducing air turbulence and air velocity in spray booths (not below recommended VOSHA limits).
- 5) If you spray, consider operator training to improve technique and save material:
  - Hold gun parallel to the work, keeping the gun at a right angle.
  - Trigger the gun at the beginning and end of each pass, making sure the gun is in motion before triggering.
  - Overlap each successive stroke (e.g. 50% for conventional spraying), using a cross hatch overlap when required.
  - Spray border edges first to keep spray patterns minimal.
  - Keep fluid pressure as low as possible; set at pressure tank or remote location, not at the gun with the fluid needle adjusting spring.
  - A good rule: The lower the viscosity of the material, the smaller the I.D. of the fluid tip.
  - Lubricate gun with proper lubricant at fluid needle packing, air valve assembly and fluid needle adjustment spring.



- 6) *Talk to vendor(s)* about the potential use of **alternative coatings**. VOC emissions are directly related to the types of prep-coats, primer/surfacers, sealers and/or topcoats used.

**High-Solids Coatings** - These coatings have a higher percentage of paint solids and a lower percentage of solvent carriers than conventional solvent-based coatings. In practice, any paint with a solids content of 60% or better can be called high-solids. High-solids coatings result in fewer hazardous air emissions, provide higher layer thicknesses per application, and can be applied with conventional spray equipment, although coatings usually have to be heated to lessen viscosity.

**Water-borne Coatings** - These coatings use water (up to 80%) as the primary solvent to disperse the resin. They usually contain small amounts of other solvents, such as glycol ethers. Application technology for water-borne coatings is comparable to that of solvent-borne, although non-corrosive delivery systems are required. While water-borne coatings have the major advantage of significant reductions in emissions and improved worker safety, there are usually well-established limitations that must be addressed on a process-specific basis for waterborne to be used successfully. Small amounts of dried water-borne coatings can typically be disposed of in the landfill as non-hazardous waste. Rinsewater used to clean equipment may be allowed for discharge to a wastewater treatment plant provided approval is received from the local municipality. Again, it will be important to consult the MSDS provided by the coating vendor to know what, if any, constituents may cause a concern for treatment and to give the operator an idea of likely flows to the plant. If discharge is not allowed, it is always wise to consider the feasibility of recycling for beneficial reuse or volume reduction prior to off-site disposal (in most cases as a non-hazardous waste).

**Powder Coatings** - Powder coating uses 100% resin in a dry, powdered form. The powder is pneumatically fed through a spray gun where it gains a positive charge. Parts to be painted are grounded so the charged powder particles are strongly attracted to the parts' surfaces. The coated part is then pulled through an oven where the powder melts and fuses into a smooth coating. substrates must generally be able to withstand temperatures of 260 degrees or higher. Powder coatings do not produce hazardous wastes (overspray is collected and reused) or wastewater sludges and do not release VOCs when cured. However, the technology does require the complete conversion of the coating line, which is usually costly.

**Radiation Curing** - Radiation curing uses ultraviolet (UV) and electron beam (EB) electromagnetic radiation to polymerize specially formulated coatings directly on a substrate. Coatings can be 100% reactive liquids, completely eliminating the use of solvents. Uncured coatings are reused so waste is minimal.

- 7) Use a gun washer to reduce wastes generated during equipment cleaning. Cleaning is accomplished by recirculating solvent sprays. These units can reduce waste solvent by 50-75%, VOC emissions by up to 20%, and labor time by 60%. Units can be leased or purchased for around \$600-\$1500.
- 8) Recover and reuse waste solvents by processing through distillation equipment. Approximately 70-80% of the used solvent is recovered. The remaining 20% (sludge) is managed as hazardous waste. Onsite distillation equipment comes in a wide range of capacities, with small 5-gallon per 8 hour shift batch units starting at around \$1,500.
- 9) If spraying, install a booth with filters to remove overspray from the exhaust. Spray booths do



not abate emissions of VOCs. The primary purpose of spray booths is to protect the painter and other employees from exposure to vapors and particulates. Another function is to prevent fires by venting high concentrations of flammable solvent vapors out of the building. Always vent *above the roofline* to maximize dispersion of emissions and to minimize the potential for nuisance odors in the vicinity. For these reasons, Do Not use rain-caps unless absolutely necessary. Options include using stacks with sleeves or automatic dampers that open when air flow commences up the stack.

- 10) Ensure that employees have the proper personal protection equipment, such as respirators with paint prefilters. Check MSDS to identify coatings that may require special precautions, for example, coatings that contain isocyanates.

An excellent resource is: ***Pollution Prevention in Metal Painting and Coating Operations***, prepared by Northeast Waste Management Officials Association (NEWMOA) April, 1998. Call the Vermont Environmental Assistance Division at **1-800-974-9559** to obtain a copy.



# Floor Drains

## How Are They Regulated?

The discharge of fluid wastes from floor drains to the subsurface (leach field, drywell, etc) is regulated as an Underground Injection Control (UIC) Well. The discharge of fluid wastes from floor drains to the ground surface is a practice referred to as *day-lighting*. In either case, the activity is regulated by the Wastewater Management Division. Floor drains are subject to the Floor Drain Procedure signed by the Commissioner of the Department of Environmental Conservation (DEC) in October, 1993 and the EPA Class V Injection Wells Rule.

## Day-lighting

Floor drain discharges to the ground surface are **prohibited** if the discharges originate from vehicle maintenance areas or from vehicle washing facilities. However, snow melt from vehicles in areas where service work is not performed may be day-lighted.

## Injection Well Prohibition

All floor drains discharging to injection wells pose some risk to groundwater quality. An injection well is defined as, "any opening in the ground used as a means of discharging waste". Accordingly, the construction of a **new** floor drain in an area where vehicles are serviced or where hazardous chemicals are stored *is prohibited* unless 1) the floor drain is connected to a public sewer or a holding tank or 2) the chemical is contained within a bermed area. Permission to connect to a holding tank or the public sewer must be obtained from the Wastewater Management Division's Regional Office prior to construction. If a holding tank is used, the wastewater may be disposed of at a municipal wastewater treatment facility (with the facility's approval) or via a certified hazardous waste hauler. In either case, you'll have to test the wastewater to determine whether or not it meets the definition of 'hazardous' in the Hazardous Waste Management Rules.

## Floor Drain Registration

All businesses with **existing** floor drains that discharge to the subsurface are required to register their floor drains with the Wastewater Management Division in Waterbury, VT. Contact 241-3822 to request a registration form. As with new construction, the Regional Office of the Wastewater Management Division must be contacted if discharging to either a holding tank or public sewer. New injection wells are prohibited nationwide as of April 2000.

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## Future Regulatory Change

You should be aware that in accordance with the EPA Class V Injection Wells Rule dated November 1999, the State of VT has until December 2000 to seek delegation of this Rule. If the program is delegated, the State of VT's UIC Section would be authorized to oversee and enforce the new federal rule. The UIC section will be developing a procedure in the future that will require the eventual permanent closure of any existing floor drain located where hazardous materials are used or stored. The schedule for closure and acceptable means for accomplishing closure will be addressed in the pending procedure. When the procedure is adopted, registered floor drain owners will be notified of the new requirements.

Floor drains located in areas where hazardous materials are not stored, may be eligible to receive a permit to continue discharging to a UIC well. While exterior vehicle washing is permissible under the Procedure, it is unlikely that car or fleet wash businesses in general would qualify for a UIC permit due in part to the significant volume of wastewater typically generated. No permit will be issued for "under the hood", "under vehicle", heavy equipment, or parts washing. It is likely that any permit issued for such restricted vehicle washing would require that floor drains have both grit traps and oil-water separators prior to any wastewater discharge to the subsurface. The permit might also specify a maintenance schedule for traps and separators, as well as periodic environmental monitoring for contaminants.

## Best Management Practices

- Always try to keep floors as clean as possible.
- Minimize and try to eliminate the use of water for floor cleaning.
- If you must have floor drains, we recommend using removable drain plugs to ensure that discharged wastewater is acceptable under the UIC Program standards.



# Spill Reporting

## What Is It?

A spill is an accidental release of a hazardous material *to the environment*. For example, three gallons of used oil that is spilled on an impermeable floor that ends up going down the floor drain which leads directly to a dry well must be reported, whereas the same three gallons, contained and recovered before it is released to the environment, does not need to be reported.

## When Is Reporting Required?

Any spill of petroleum that results in a release to the environment of 2 gallons or more must be reported as soon as possible to the Waste Management Division at 241-3888 during normal working hours or by calling the 24-hour emergency number at 244-8721 or 1-800-641-5005. Spills of hazardous materials *other than petroleum* must be reported, regardless of the amount. By Vermont statute, the primary obligation to report a spill lies with the “responsible party”; however, any person with knowledge should report a spill if the responsible party is unable or unwilling to do so. Reporting is necessary so the Department of Environmental Conservation (DEC) can assess the impact of the spill on human health and the environment. DEC Spill Team members, if requested, will travel to the scene to make first-hand assessments of the environmental impact, or to oversee cleanup efforts.

### In the event of a spill...

- ☞ Report the spill as described. All releases to the environment must be cleaned up by Vermont law.
- ☞ Contain the flow of material by using a bucket, barrier, temporary dike, channel or other containment vessel to make cleanup and recovery easier. *Don't let it enter floor drains.*
- ☞ Recover liquids for recycling if possible, otherwise properly dispose of them. An explosion-proof wet vac or squeegee can sometimes be used to collect as much of the liquid as possible. This will minimize the amount of material (such as used absorbents) which will have to be disposed of as hazardous waste. If you rely on absorbents, (speedi-dri, pads, “magic sorb”, etc) make sure they are used up as much as possible before drumming for disposal.

## Best Management Practices

- ➔ Develop a spill prevention plan that involves employees as they are usually the most knowledgeable regarding how and why spills sometimes occur.
- ➔ Maintain spill control and containment equipment in a designated area.



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- Instruct employees in spill response procedures, including basic safety precautions like:
  - □ Minimize touching or walking in spilled material.
  - □ Minimize inhalation of any resulting gases, vapors or smoke.
  - □ Wash promptly if skin comes in contact with material.
- Post a list of emergency numbers next to the phone. This must include local fire officials.
- Use drip trays and funnels when transferring liquids.
- Use spring-loaded covers, valves or other positive shut-offs to prevent the accidental discharge of hazardous materials to floor drains.



# Recyclable Materials

## How Are They Regulated?

Over the past decade, the Vermont legislature has enacted laws to reduce the volume of trash going to landfills in the state and to help cities and towns save money by recycling. Communities are encouraged to adopt ordinances requiring source separation of materials listed in the statute. Common recyclable materials are: (1) cardboard, including corrugated and boxboard (2) glass containers (3) compostable yard and food waste (4) newsprint (5) office paper (6) steel and aluminum cans (7) plastic containers made of HDPE and PET. Today, over half of Vermont's population lives in one of the 99 towns with mandatory recycling ordinances. An additional 147 towns have some form of recycling on a voluntary basis.

## How Should They Be Managed?

Source separated materials are recyclable, just like those that are banned from landfill disposal. Check with your waste hauler, town clerk or solid waste district to find out if your town has mandatory recycling and what materials can be recycled in your town.

Addison County Solid Waste Management District .....	(802) 388-2333
Bennington County Regional Commission .....	(802) 375-2576
Central Vermont Solid Waste Management District .....	(802) 229-9383
Chittenden Solid Waste District .....	(802) 872-8111
Greater Upper Valley Solid Waste Management District .....	(802) 296-3688
Lamoille Regional Solid Waste Management District .....	(802) 888-7317
Mad River Solid Waste Alliance towns .....	(802) 244-7373
Northeast Kingdom Waste Management District .....	(802) 626-3532
Northwest Vermont Solid Waste Management District .....	(802) 524-5986
Rutland County Solid Waste District .....	(802) 775-7209
Rutland JMISC/SWAC towns .....	(802) 235-2710
Southern Windsor/Windham County Solid Waste Management District .....	(603) 543-1201
Windham Solid Waste Management District .....	(802) 257-0272

## What Should Not Be Done With These Materials?

If your community has a mandatory recycling ordinance, you can't just throw your recyclables in the trash. Even in towns where recycling is voluntary, it is often costs less to recycle these materials than it does to landfill them.

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## Best Management Practices

- Find out which materials must or may be recycled in your town.
- See if your waste hauler offers separate containers and/or rates for recyclables.
- Separate and store recyclable materials by type (unless told otherwise).
- Store recyclable materials where they will stay clean and dry.
- Choose to purchase or carry products which use less packaging or packaging which can be recycled locally.
- Buy in bulk or in returnable containers.
- Talk with scrap metal dealers. They may pay for some materials and/or pick them up at no charge.

## APPENDICES

Appendix A .....	Notification of Regulated Waste Activity Form
Appendix B .....	Hazardous Waste Manifest
Appendix C .....	Hazardous Waste Codes Commonly Used by Metal Fabricators
Appendix D .....	Municipal Wastewater Treatment Plant Contacts
Appendix E .....	Environmental Analysis Laboratories
Appendix F .....	How to Read a Material Safety Data Sheet (MSDS)
Appendix G .....	List of Hazardous Air Contaminants (HACs)
Appendix H .....	Additional Information and Assistance Resources



## **APPENDIX A**

### **Notification of Regulated Waste Activity Form & Instructions**



# VERMONT NOTIFICATION OF REGULATED WASTE ACTIVITY FORM

## For Hazardous Waste, Universal Waste, and Used Oil Handlers

1.  First Notification (Provisional ID N<sup>o</sup>, if applicable: VTP-\_\_\_\_\_-\_\_\_\_\_-\_\_\_\_\_)   
  Subsequent Notification (EPA ID N<sup>o</sup>: VT\_\_\_\_\_-\_\_\_\_\_-\_\_\_\_\_) (please also complete entire form)   
 Reason(s) for change (e.g., name change, change of ownership with date, waste streams, regulatory status): \_\_\_\_\_
2. Company Name (as will appear on manifests): Precision Centerless Grinding, Inc.
3. Location Address (e.g., 22 Main St - not P.O. Box or rural route N<sup>o</sup>): 454 Water Soluble Way   
 City/Town: Springfield County: Windsor Zip Code: 05555-5555
4. Mailing Address:  same as 3, above; OR \_\_\_\_\_   
 City/Town: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_
5. Company Contact Person: (Last Name) Green (First Name) Joe   
 Job Title: Environmental Manager Phone N<sup>o</sup>: ( 802 ) 123-4567   
 Address: 454 Water Soluble Way State: Vermont Zip: 05555-5555
6. Name of Legal Property Owner(s): Precision Centerless Grinding, Inc.   
 Address:  same as 3, above; OR  same as 4, above; OR \_\_\_\_\_   
 State: \_\_\_\_\_ Zip Code: \_\_\_\_\_ Phone N<sup>o</sup>: ( 802 ) 123-4567
7. Legal land status:  Private (individual(s)/corp(s))  Federal  State  County  Municipal  Indian  District   
 Legal facility-owner status:  Private  Federal  State  County  Municipal  Indian  District
8. Does your company own other facilities or have affiliates in Vermont?  Yes  No   
 If yes, please list name(s) & location(s): \_\_\_\_\_
9. Hazardous Waste Activity (does not include either "used oil" or "universal waste" activities):
  - a. Generator Status (consider the total amount of hazardous waste generated per month — not the amount shipped):   
  Conditionally Exempt Generator (< 220 pounds/month of hazardous waste and < 2.2 lbs/mo of acutely hazardous waste generated)   
  Small Quantity Generator (220 to 2,200 pounds/month of hazardous waste and < 2.2 lbs/mo of acutely hazardous waste generated)   
  Large Quantity Generator (> 2,200 pounds/month of hazardous waste or ≥ 2.2 lbs/mo of acute hazardous waste generated)   
 (NOTE: 220 pounds = 100 kilograms; 220 pounds of waste with a density similar to water fills approx. ½ of a 55-gallon drum)
  - b. Transporter (see instructions before marking this section):  of own waste only  for commercial purposes   
 Mode of transportation:  air  rail  highway  water  other: \_\_\_\_\_
  - c. Other Activities (please see instructions before marking this section):  hazardous waste transfer facility   
  on-site recycling (e.g., solvent distillation; not antifreeze or silver recovery)  certified treatment, storage or disposal   
  off-site recycling  hazardous waste fuel burner (Note: on-specification used oil is not hazardous waste fuel)   
 Please give details here: \_\_\_\_\_

Type or print clearly in dark ink. If additional sheets are needed, please mark each appended sheet with the information required by lines 2 and 3; each additional sheet should also be signed by an authorized representative and dated, per line 13. Refer to instructions; for further assistance in completing this form, contact the Hazardous Waste Program at 802-241-3888.

[Please continue on reverse side]

d. Description of Wastes Generated or Handled:

Regulated Waste Description	EPA/State Waste Code(s)*	Amount Generated On-site (in gallons or pounds/month)
Oil Soaked Absorbent Material	VT02	55 gallons
Metal Grinding Sludge	D007, D008, VT02	800 pounds
Petroleum Naphtha Solvent	D001, VT02	30 gallons

\* see instructions and attached sheets for frequently-used waste codes; for additional assistance, call 802-241-3888

10. Used Oil Activity (please mark all that apply):

- a.  Person first claims that used oil fuel meets specifications
- b.  Person who directs used oil to a used oil burner - go to e, below (burner(s) name/address: \_\_\_\_\_)
- c.  Person who burns used oil on-site - go to h, below (\_\_\_\_\_)
- d.  Person who directs shipment of used oil to a re-refinery
- e.  Used Oil Fuel Marketer:  specification used oil  off-specification used oil  
 hazardous waste fuel  Marketer who directs shipment of used oil to other marketers
- f.  Used Oil Collection Facility
- g.  Used Oil Transporter
- h.  Used Oil Fuel Burner:  specification used oil  off-specification used oil  hazardous waste fuel

Type of equipment used:  space heater (rated @ <0.5 million BTU/hr)  utility boiler  
 industrial boiler (rated @ >10million BTU/hr at manufacturing facility)  industrial furnace (integral component of manufacturing process)  
 other (please specify) \_\_\_\_\_

Is used oil fuel accepted from an off-site locations to be burned on-site?  Yes  No

If yes, please list the company/ies and address(es) from which used oil is accepted: \_\_\_\_\_

11. Universal Waste Activity: (e.g., batteries, Hg-lamps, PCB ballasts, pesticides)  large quantity handler  destination facility

Type(s) of universal waste handled: \_\_\_\_\_

12. Comments: \_\_\_\_\_

13. I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature of authorized representative: Joe Green Date: 11/28/00

Name: Joe Green Title: Environmental Manager

## Instructions for Completing the Vermont Notification of Regulated Waste Activity Form

***Background:*** The Vermont Hazardous Waste Management Regulations (VHWMR) requires anyone “who generates or who is in control of a waste” in Vermont to determine if that waste is a hazardous waste; the only exception is waste produced by household activities. A hazardous waste is any waste which is listed as such in the VHWMR or that is ignitable, corrosive, reactive, or toxic. These broad categories include many of the wastes commonly produced by businesses and municipalities. Everyone who manages hazardous waste (e.g., who creates, stores, transports, treats, recycles, or disposes of it) is a “handler” of that waste and is required to submit a notification form.

### ***Notification Requirement:***

- ✓ Section 7-104 of the VHWMR requires that “**Any person who generates or transports hazardous waste or who owns or operates a . . . facility for the treatment, storage, use, disposal, or recycling of hazardous waste shall notify** the Secretary of such activity” (this includes the generation, marketing, burning, and/or transportation of waste oil, as well as some universal waste management activities).
- ✓ Hazardous waste handlers are required to maintain an up-to-date notification form with this Division which accurately describes current waste activity, waste generation at the facility location, and ownership of the hazardous waste handler. **There is no fee for notifying.** Notification forms should be submitted prior to conducting any regulated waste activity.
- ✓ Submittal of a notification form results in a permanent, unique U.S. Environmental Protection Agency (EPA) ID number being issued to that hazardous waste handler’s site of operations.
- ✓ If a company handles hazardous waste at more than one location, a separate notification and EPA identification number is needed for each (unless they are on adjacent parcels of land with the same land owner).
- ✓ If a facility no longer handles hazardous waste at a location that has been issued an EPA ID number, the Vermont Waste Management Division should be notified in writing. A letter should be submitted that includes the handler’s name, address, EPA ID number, and a brief explanation of the change in waste handling activities.
- ✓ Notification is required upon transferral of ownership of an entity that was required to notify previously for a hazardous waste activity. Since EPA ID numbers are assigned to waste handler locations, the U.S. EPA ID number will not change if ownership of a facility changes.

Hazardous, universal, and used oil waste managed in the course of doing business, including at municipalities, is regulated by the VHWMR. Although household hazardous waste is exempted per Section 7-203(a), hazardous waste generated by a business run out of a home is regulated.

**Generally, the less hazardous waste generated, the fewer regulations apply. The Vermont Environmental Assistance Division is available to provide free assistance in reducing the amount or toxicity of hazardous waste produced. In Vermont you can contact that non-regulatory office by calling 1-800-974-9559.**

***Instructions:*** Pursuant to Section 7-104 of the VHWMR, the attached two-sided Notification of Regulated Waste Activity form must be completed by all hazardous waste handlers in Vermont and submitted to the Vermont Waste Management Division. Please type or print clearly in dark ink, not pencil. If additional sheets are needed, please mark each appended sheet with the information required by lines 2 and 3; each additional sheet should also be signed by an authorized representative and dated, in accordance with line 12. The following instructions complement the limited instructions that have been included on the notification form:

Line 1: Mark “**first notification**” if the handler location either does not have an identification number or if a 12-digit number beginning with the letters “VTP” (used to denote a provisional, or temporary, number) had been issued in the past. The “**subsequent notification**” section must be completed if the facility has already been assigned a permanent ID number and there have been changes to the facility address, the installation contact person, facility ownership, or the type or quantity of regulated waste activity. If the facility ownership has changed, or if an owner has been added, also please include the date of this change on the “reason for change” line. *NOTE: the entire form must be completed when submitting a subsequent notification.*

Line 5: Indicate a person who is responsible for regulated waste activities at the facility location. Generally, this should not be a consultant or your facility’s hazardous waste contractor.

Line 7: Choose the best description of who owns the land for the property being notified about. For incorporated companies, mark “**private**” even if shares are publicly traded on a stock exchange.

Line 9a: Section 7-305 of the VHWMR specifies that “a generator is any person, by site, whose act or process produces hazardous waste or whose act first causes hazardous waste to become subject to regulation.” A waste is considered to be generated when it is put into a container for disposal or when a determination has otherwise been made that a material is a waste; all waste needs to be evaluated to determine whether it is hazardous or not. A Hazardous Waste Generator Status Comparison Table, comparing the differences between the three categories of hazardous waste generators — Conditionally Exempt (CEGs), Small Quantity (SQGs), and Large Quantity (LQGs) — is attached to this informational package. Hazardous waste managed in the course of doing business — including at municipalities and at home-based businesses — is regulated by the VHWMR.

It is important that you figure out your generator status by tracking the amount of hazardous waste **generated** per month; status is not based on how much hazardous waste is **shipped** in that month. Note that materials that are generated, reclaimed, and reused at the facility location only need to be counted once.

Line 9b: *Do not complete this section if your company plans to hire another company to transport the wastes from your generation location. If your facility wishes to be a hazardous waste transporter, this activity requires a permit — contact the Waste Management Division at 241-3888 for more information.* Mark “**of own waste only**” if you wish to transport hazardous waste and you do not meet the provision that allows conditionally exempt generators to transport their own hazardous waste to an authorized facility or event.

Mark “**for commercial purposes**” only if you are requesting a permit to transport other peoples’ hazardous waste.

Line 9c: Mark “**hazardous waste transfer facility**” only if your facility wishes to be a permitted hazardous waste transporter that manages hazardous waste for up to ten days on a transfer basis.

Mark “**certified treatment, storage or disposal facility**” only if your facility plans to engage in any of the following activities:

- ✓ conduct on-site hazardous waste treatment or disposal activities, or
- ✓ accept hazardous waste from off-site for treatment, storage, or disposal — unless your company accepts hazardous waste from a CEG in Vermont that is owned and operated by the same entity as your company and generator standards are met for the waste storage activities; or,
- ✓ store hazardous waste for longer than the VHWMR allows generators to store hazardous waste. Allowable time limits for hazardous waste storage are as follows:

**CEGs:** no time limit provided that no more than 2,200 pounds of hazardous waste, 2.2 pounds (1 kilogram) of acutely hazardous waste, or 220 pounds of any residue or contaminated soil, waste or debris resulting from clean-up of a spill of acutely hazardous waste are accumulated at any one time

**SQGs:** full containers — or those with >55 gallons — of hazardous waste, may be stored for up to 180 days without requiring certification to store hazardous waste

**LQGs:** full containers — or those with >55 gallons — of hazardous waste, may be stored for up to 90 days without requiring certification to store hazardous waste

Mark “**hazardous waste fuel burner**” only if hazardous waste or a mixture thereof is burned on-site. Note that the burning of used oil does not make an entity a “hazardous waste fuel burner.” Report used oil activity in Section 10 of the notification form.

Line 9d: In order to complete this section, evaluate all material that is discarded from the waste handler location to determine if it is hazardous waste — including manufacturing by-products and off-specification, out-dated, or otherwise unusable products. Waste determination may be based on general knowledge of the materials and processes, information provided on Material Safety Data Sheets, or it may be necessary to perform laboratory analysis on the waste. Frequently, business associations, chemical suppliers, or product manufacturers can assist in making a waste determination; however, if you request assistance from these sources, they may not be aware that Vermont regulates certain wastes as hazardous that are not regulated as hazardous wastes either Federally or in other states (e.g., “Waste containing greater than 5% by weight of petroleum distillates with melting points of less than 100° F” is a VT02 hazardous waste). There are seven categories of hazardous wastes:

- ⇒ characteristic wastes (defined by waste codes D001 through D043);
- ⇒ listed wastes from non-specific sources (waste codes F001 - F039);
- ⇒ listed wastes from specific sources (waste codes K001 - K151);
- ⇒ commercial chemical products, intermediates, or off-specification products:
  - ⇒ acutely-hazardous wastes have waste codes P001 - P123;
  - ⇒ non-acute wastes have waste codes U001 - U359; and
- ⇒ Vermont-listed wastes (waste codes VT01 - VT99).

Refer first to the attached list of Frequently-Used State and Federal Hazardous Waste Codes; this includes some of the more common Federal hazardous wastes (with their codes) as well as the seven Vermont listed hazardous wastes. A complete listing of the Federal codes, with detailed definitions, may be found in the VHWMR.

Line 10: “**Specification used oil**” means that the oil has not been mixed with any hazardous waste (except for ignitable waste), does not exceed any maximum allowable levels of contaminants, and meets the minimum allowable levels listed in the following table.

<b>Constituent/Property</b>	<b>Allowable Level</b> (parts per million, or ppm, dry weight basis)
Arsenic	5 ppm maximum
Cadmium	2 ppm maximum
Chromium	10 ppm maximum
Chlorine	500 ppm maximum
Lead	100 ppm maximum
Flash Point	140° Fahrenheit minimum
Total Halogens	1000 ppm maximum
Polychlorinated biphenyls (PCBs)	< 2 ppm maximum
Net Heat of Combustion	8000 BTU/lb minimum

Line 10e: The VHWMR § 7-802 defines “**marketer**” as follows: “any person, with the exception of do-it-yourselfers, who . . . (a) Directs a shipment of used oil fuel from their facility to a used oil burner; or (b) First claims that used oil that is to be burned for energy recovery meets the used oil fuel specifications set forth in Table 1 of Section 7-812(c).” This means that anyone who gives, sells, or otherwise provides used oil to someone else to be used for fuel blending or burning is considered to be a marketer. *Note that giving or selling used oil to an entity that re-refines the oil is not included in this “marketer” designation.*

Line 10h: Mark “**space heater**” if used oil is burned in a heater designed to have a maximum capacity of not more than 0.5 million BTUs per hour and combustion gases are vented to the outside ambient air

Mark “**utility boiler**” if used oil is burned in a device used to produce electric power, steam, or heated or cooled air (or other gases or fluids) for sale.

Line 11: Mark “**large quantity handler**” if your facility accumulates a total of 5,000 kilograms (11,000 pounds) or more of universal waste(s) (pesticides, thermostats, polychlorinated biphenyl- (PCB-) containing ballasts, or mercury-containing lamps, calculated collectively) at any time. This designation as a large quantity handler is retained through the end of the calendar year in which a total of 5,000 kilograms or more of universal waste is accumulated.

Mark “**destination facility**” if your facility treats, disposes of, or recycles a particular category of universal waste. A facility at which a particular category of universal waste is only accumulated is not a destination facility for purposes of managing that category of universal waste.

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*For additional assistance in completing this notification form, if you are unsure whether the waste you handle is hazardous, or for more information regarding the Hazardous Waste Management Regulations, please contact the Vermont Hazardous Waste Management Program at (802) 241-3888 or visit our website at:*

***<http://www.anr.state.vt.us/dec/wmd.htm>***

***The Vermont Environmental Assistance Division is available to provide free assistance in reducing the amount or toxicity of hazardous waste produced. In Vermont, you may contact that non-regulatory office by calling 1-800-974-9559.***

**APPENDIX B**

**Hazardous Waste Manifest**



# Hazardous Waste Manifest Information

## The Hazardous Waste Manifest

A manifest is a multiple copy shipping form that is used to track the movement of a hazardous waste from the place of its generation to the place of its final disposal. If the final resting place in this “cradle to grave” system is a hazardous waste landfill, some wastes will need to be accompanied by a second form to certify they meet certain pre-disposal treatment standards. This form is called the Land Disposal Restriction (LDR) Notification. Every shipment of hazardous waste must be accompanied by at least a Uniform Hazardous Waste Manifest and possibly by an LDR form.

In most cases, your hazardous waste transporter will help you get your wastes pre-approved for disposal and will provide you with completely filled out manifests and, if necessary, LDR forms. The Waste Management Division (WMD) can provide a list of certified transporters. Contact the WMD at 802-241-3888.

Although you may only have to sign the manifest, you are still responsible for all of the information on it. It is a good idea to check the form to make sure the information is correct and complete. Instructions on how to complete the form are usually printed on the back. After the transporter has accepted your waste he will sign the form and then give you several copies. Make sure you get the right copies. The copies are numbered and have printed on them where they are to be sent.

The following sample manifest is for a hypothetical machine shop in Vermont using a New Jersey hazardous waste transporter to send its waste to a facility in Ohio. Many states require hazardous wastes being shipped into their state to be reported on their state’s manifest form. Nevertheless, the US EPA requires all states to use the same basic form. LDR notifications vary by transporter.



**VERMONT AGENCY OF NATURAL RESOURCES  
HAZARDOUS MATERIALS MANAGEMENT**

103 South Main Street  
Waterbury, Vermont 05671-0404  
802-241-3866

Please type (or Print) (Form designed for use on elite (12-pitch) typewriter.)

<b>UNIFORM HAZARDOUS WASTE MANIFEST</b>		1. Generator's US EPA ID No. V.T.D.0.1.2.3.4.5.6.7.8		Manifest Document No. 0.0.0.0.1	2. Page 1 of 1	Information in the shaded areas is not required by Federal law, but may be required by State law.		
3. Generator's Name and Mailing Address (where returned manifestes are managed) Precision Centerless Grinding, Inc. 454 Water Soluble Way, Springfield, Vermont 05555-5555					A. State Manifest Document Number VT 0110763			
4. Generator's Phone (802) 123-4567					B. Generation Site (if different) SAME			
5. Transporter 1 Company Name On The Road Transport, Inc.			6. US EPA ID Number N.J.D.0.1.2.3.4.5.6.7.8					
7. Transporter 2 Company Name			8. US EPA ID Number		C. Trans. 1 Lic. St. NJ Plate # HOD-123			
9. Designated Facility Name and Site Address All Gone, Inc. 21 Roadway's End Cleveland, Ohio 87654					10. US EPA ID Number O.H.D.0.1.2.3.4.5.6.7.8			
11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)					12. Containers No.	13. Total Quantity	14. Unit Wt/Vol	15. Waste No.
a. Non-Regulated Material, PER 40 CFR, 49 CFR (State Regulated Waste)					0.0.1	D.M	0.0.0.5.5	G EPA STATE VT02
b. Waste Toxic Solid, Inorganic N.O.S., Toxic Materials, UN3288, PGI					0.0.4	D.M	0.1.6.2.0	P EPA D007, D008 STATE VT02
c. Petroleum Naphtha, Combustible Liquid, UN1255 PGII					0.0.2	D.M	0.0.1.1.0	G EPA D001 STATE VT02
d. Non-Hazardous Waste, PER 40 CFR, 49 CFR					0.0.2	D.M	0.0.1.1.0	G EPA STATE VT99
J. Additional Descriptions for Materials Listed Above				K. Handling Codes for Wastes Listed Above				
a. Oil Soaked Absorbent Material		c. Petroleum Naphtha Solvent						
b. Metal Grinding Sludge Containing Lead, Chromium and Oil (T)		d. Water Based Metalworking Fluid						
15. Special Handling Instructions and Information					Point of Departure or Entry - City, State			
16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations, and all applicable State law and regulations. If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity operator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.								
Printed/Typed Name Joe Green			Signature Joe Green			Month Day Year 2 24 99		
17. Transporter 1 Acknowledgement of Receipt of Materials								
Printed/Typed Name			Signature			Month Day Year		
18. Transporter 2 Acknowledgement of Receipt of Materials								
Printed/Typed Name			Signature			Month Day Year		
19. Discrepancy Indication Space								
20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted on Item 19.								
Printed/Typed Name			Signature			Month Day Year		

GENERATOR

TRANSPORTER

FACILITY

VT 0110763

## **APPENDIX C**

### **Hazardous Waste Codes Commonly Used in the Metal Fabricating Industry**



# State and Federal Hazardous Waste Codes Frequently-Used in the Metal Fabricating Industry

*This is only a partial list of hazardous waste codes. For a complete listing, refer to the Vermont Hazardous Waste Management Regulations (VHWMR) and/or contact the Hazardous Waste Section of the Waste Management Division at 802-241-3888 or the non-regulatory Environmental Assistance Division at 800-974-9559.*

## CHARACTERISTIC WASTES

Wastes identified by a “D” code are those that are considered hazardous because they exhibit one or more of the following characteristics; ignitability, corrosivity, reactivity, and/or toxicity (see the VHWMR for definitions of these terms). Common “D” coded wastes generated in the metal fabricating industry are:

D001 - ignitable (flash point of less than ~ 140° F)

D002 - corrosive (pH  $\leq 2$  or  $\geq 12.5$ )

Other “D” codes for hazardous wastes exhibiting the characteristic of “toxicity” are shown below. Wastes containing any of the materials in this list, in amounts that exceed the concentrations given, are hazardous for toxicity. This is usually determined either through knowledge of the materials and processes generating the waste or by subjecting a representative sample of the waste to an analytical test called the “Toxicity Characteristic Leaching Procedure (TCLP)”. Metal fabricating wastes that may need to be identified as “toxic” are water-based metalworking fluids (WMF) (WMFs can become contaminated during use with heavy metals such as lead, chromium, etc.), heat treat salt baths (typically contain barium in concentrations greater than 100.0 mg/l) and parts cleaning solvent (may contain toxic solvents such as trichloroethylene).

D004 - Arsenic (5.0 mg/l)

D005 - Barium (100.0 mg/l)

D006 - Cadmium (1.0 mg/l)

D007 - Chromium (5.0 mg/l)

D008 - Lead (5.0 mg/l)

D010 - Selenium (1.0 mg/l)

D011 - Silver (5.0 mg/l)

D018 - Benzene (0.5 mg/l)

D035 - Methyl ethyl ketone (200.0 mg/l)

D039 - Tetrachloroethylene (0.7 mg/l)

D040 - Trichloroethylene (0.5 mg/l)

## LISTED WASTES

The following codes are used for “listed” hazardous wastes. Please note that the following codes are used if the process generating the waste matches the description in the listing, no matter what the concentration of hazardous constituent is in the total resultant waste (e.g. a disposable rag used to apply a solvent that contains  $\geq 10\%$  acetone by volume would be coded F003).

### “F” Listed Wastes

F001 The following spent halogenated solvents used in degreasing (if  $\geq 10\%$  by volume of the unused product): Tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, and chlorinated fluorocarbons. Also still bottoms from these spent solvents and solvent mixtures.

- F002 The following spent halogenated solvents (if  $\geq 10\%$  of the unused product): Tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1 trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoro-ethane, ortho-dichlorobenzene, trichlorofluoromethane, and 1,1,2-trichloroethane. Also still bottoms from these spent solvents and solvent mixtures.
- F003 The following spent non-halogenated solvents (if  $\geq 10\%$  of the unused product): Xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, and methanol. Also still bottoms from these spent solvents and solvent mixtures.
- F004 The following spent non-halogenated solvents (if  $\geq 10\%$  of the unused product): Cresols and cresylic acid and nitrobenzene. Also still bottoms from these spent solvents and solvent mixtures.
- F005 The following spent non-halogenated solvents (if  $\geq 10\%$  of the unused product): Toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, benzene, and 2-nitropropane. Also still bottoms from these spent solvents and solvent mixtures.

### **Vermont Listed Wastes**

[Note: A Vermont listed hazardous waste that also meets the definition of a Federal hazardous waste must be identified by its U.S. EPA waste code.]

- VT02 Waste containing greater than 5% by weight of petroleum distillates with melting points of less than 100°F, including but not limited to kerosene, fuel oil, hydraulic oils, lubricating oils, penetrating oils, tramp oils, quenching oils, and crankcase and automotive oils which have not been exempted under the VHWMR Section 7-203(14). Note: Waste petroleum distillates with a flashpoint less than 140°F are classified as D001 (ignitable).
- VT03 Water-miscible metal cutting and grinding fluid waste.  
Note: The VHWMR include an exemption for water-miscible metal cutting and grinding fluid waste that is managed in accordance with Section 7-203(l) of the regulations.
- VT08 Waste ethylene glycol based coolants, antifreezes and solutions containing greater than 700 ppm of ethylene glycol.
- VT09 All residues from the bottoms of tanks (tank bottoms) containing any materials which exhibit a characteristic described in Sections 7-204 through 7-207 or are listed in Sections 7-210 through 7-214.

**APPENDIX D**

**Municipal Wastewater  
Treatment Plant Contacts**



# Municipal Wastewater Treatment Facility Plant Contacts

November 2000

Facility Owner/Contact	Phone #	Facility Name/Chief Operator	Phone #
Alburg~Village of Henry Baker	802-796-3763	Alburg Alton Brusco	802-796-3800
Barre~City of Robert Yandow	802-476-0250	Barre City Joseph Rouleau	802-476-0261
Barton~Village of Ronald Gagnon	802-525-4747	Barton Paul Moyer	802-525-3219
Bellows Falls~Village of Roberta Smith	802-463-3964	Bellows Falls Robert Wheeler	802-463-3044
Bennington~Town of Stuart Hurd	802-442-1037	Bennington George LeBlanc	802-442-4544
Benson~Town of Guy Charlton	802-537-2611	Benson Guy Charlton	802-537-2611
Bethel~Town of Delbert Cloud	802-234-9340	Bethel Timothy Mills	802-234-6840
Bradford~Village of Louise Allen	802-222-4727	Bradford Dale Thornton	802-222-9640
Brandon~Town of Arthur Sanborn	802-247-3635	Brandon Stephen Cijka	802-247-6730
Brattleboro~Town of Jerry Remillard	802-254-4255	Brattleboro George Dow	802-257-2318
Bridgewater~Town of Nelson Lee Jr.	802-672-3334	Bridgewater Dufresne-Henry (Contracted)	802-723-4424
Brighton~Town of Joel Cope	802-723-4405	Brighton Marshall Frizzell	802-723-4424
Burlington~City of Laurie Adams	802-863-4501	Burlington Main Stephen Foster	802-862-6565
Burlington~City of Laurie Adams	802-863-4501	Burlington North Stephen Foster	802-862-7164
Burlington~City of Laurie Adams	802-863-4501	Burlington River Gary Greenwood	802-863-4878
Canaan~Town of Ursala Johnson	802-266-3370	Canaan Robert Kimball	802-266-7723
Castleton~Town of Beverly Davidson	802-468-5319	Castleton Edward Tracey	802-468-5315
Cavendish~Town of Richard Svec	802-226-7291	Cavendish Howard Pixley	802-226-7743
Chelsea~Town of Jack C Johnson	802-685-4460	Chelsea Hale Mattoon	802-685-7727
Chester~Town of Susan Spaulding	802-875-2173	Chester Barry Goodrich	802-875-4325

<b>Facility Owner/Contact</b>	<b>Phone #</b>	<b>Facility Name/Chief Operator</b>	<b>Phone #</b>
Cold Brook FD#1 Roberta Carey	802-464-0460	Cold Brook-Base Arthur Wright	802-464-2191
Cold Brook FD#1 Roberta Carey	802-464-0460	Cold Brook-Golf Arthur Wright	802-464-5341
Danville~Town of Marion Sevigny	802-684-3352	Danville Leslie Parker	802-684-2108
Enosburg Falls~Village of Stephen McNeil	802-933-4443	Enosburg Falls Samuel Gates	802-933-6669
Essex Junction~Village of Charles Safford	802-878-6944	Essex Junction James Jutras	802-878-6943
Fair Haven~Town of Patricia Paolillo	802-265-3010	Fair Haven Peter Laramie	802-265-3544
Fairfax~Town of Edward Nuttall	802-849-6111	Fairfax Randy DeVine	802-849-6033
Hardwick~Town of Daniel Hill	802-472-6120	Hardwick Jefferson Tolman	802-472-5939
Hartford~Town of Thomas Coutermarsh	802-295-3622	Hartford-WRJ Larry Rogers	802-295-6563
Hartford~Town of Hunter Rieseberg	802-295-3622	Quechee Larry Rogers	802-295-9528
Hinesburg~Town of Edwin Gallagher	802-482-2096	Hinesburg Edwin Gallagher	802-482-2590
Jeffersonville~Village of Dennis Smith	802-644-5523	Jeffersonville Glenn Brooke	802-644-5534
Johnson~Village of Eric Osgood	802-635-2611	Johnson Donald Garrett	802-635-2951
Ludlow~Village of Brian Henderburg	802-228-2841	Ludlow Loran Greenslet	802-228-8431
Lunenburg Fire District #2 Randy Smith	802-892-7717	Lunenburg FD#2 Calvin Colby	802-892-7780
Lyndon~Town of Eric Osgood	802-626-5834	Lyndonville Earth Tech (Contracted)	802-626-5939
Manchester~Town of Jefferey Wilson	802-362-1313	Manchester Alan Baccei	802-362-3339
Marshfield~Village of Constance Durkee	802-426-3260	Marshfield Gordon Durkee Sr.	802-426-3257
Middlebury~Town of Betty Wheeler	802-388-4041	Middlebury Robert Wells	802-388-7994
Milton~Town of Ted Nelson Jr.	802-893-1605	Milton Roger Hunt	802-893-1170
Montpelier~City of Stephen Gray	802-223-9508	Montpelier Ronald Mercier	802-223-9511
Morrisville~Village of Oneal Demars	802-888-6370	Morrisville Michael Cochran	802-888-3138
Newport~City of John Ward	802-334-2124	Newport City David Parenteau	802-334-8886

<b>Facility Owner/Contact</b>	<b>Phone #</b>	<b>Facility Name/Chief Operator</b>	<b>Phone #</b>
North Branch FD# 1 Linda Holland	802-464-7560	North Branch FD# 1 John West	802-464-7560
North Troy~Village of James Wentworth	802-988-4700	North Troy Marcel Mayhew	802-988-4787
Northfield~Village of William Lyon	802-485-6121	Northfield Rudy Silvirea	802-485-7355
Orleans~Village of Larry Wilcox	802-754-8584	Orleans Larry Austin	802-754-2150
Orwell~Town of Paul Stone	802-948-2221	Orwell Ruth James	802-948-2032
Pawlet~Town of Richard Hulett	802-325-3309	West Pawlet Jonathan Folger	802-645-0387
Pittsford~Town of James O'Gorman	802-483-6500	Pittsford Jack Shedd (Simon Oprs Serv)	802-483-6297
Plainfield~Town of Rose Paul	802-454-8461	Plainfield Jay Jewett	802-454-7173
Poultney~Village of Jonas Rosenthal	802-287-4003	Poultney Wayne Tracey	802-287-9727
Proctor~Town of Richard Horner	802-459-3333	Proctor Todd Blow	802-459-2501
Putney~Town of James Mullen	802-387-5862	Putney Johathan Sprague	802-387-4345
Randolph~Town of Mel Adams	802-728-5433	Randolph Glen Gingras	802-728-9079
Readsboro~Town of Barry Berard	802-423-5405	Readsboro Barry Howes	802-423-7681
Richford~Village of Gary Snider	802-848-7752	Richford Garry Shover	802-848-7040
Richmond~Town of Ronald Rodjenski	802-434-2178	Richmond Kendall Chamberlain	802-434-2178
Royalton~Town of Wayne Manning	802-763-7967	Royalton Ralph Lavigne	802-763-8033
Rutland~City of Warren Conner	802-773-1813	Rutland City Grover Hotaling	802-773-1851
Ryegate~Town of Hoyt Darby	802-757-3605	Ryegate FD# 2 Jeff Morin	
Saxtons River~Village of Louise Luring	802-869-2566	Saxtons River Robert Wheeler	802-869-2725
Shelburne~Town of William Finger	802-985-5110	Shelburne Plant 1 David Rathburn	802-985-3533
Shelburne~Town of William Finger	802-985-5110	Shelburne Plant 2 David Rathburn	802-985-3700
Sheldon~Town of Richard Brouillette	802-933-2524	Sheldon Springs Andrew Reed	802-933-8359

<b>Facility Owner/Contact</b>	<b>Phone #</b>	<b>Facility Name/Chief Operator</b>	<b>Phone #</b>
Sherburne FD# 1 David Lewis	802-422-3241	Sherburne FD# 1 Daniel Lewis	802-422-3831
South Burlington~City of Donald Whitten	802-658-7953	Airport Parkway Robert Baillergeon	802-658-7964
South Burlington~City of Donald Whitten	802-658-7953	Bartlett's Bay Michael Fortin	802-658-7965
Springfield~Town of Jeff Strong	802-885-2104	Springfield Mike Emond	802-885-2854
St Albans~City of William Cioffi	802-524-1500	St Albans Brian Willett	802-524-1509
St Albans~City of William Cioffi	802-524-1500	St Albans Corr Brian Willett	802-524-1517
St Johnsbury~Town of John Hall	802-748-3926	St Johnsbury Leroy Houghton	802-748-9124
Stowe~Town of Scott Dunn	802-253-7350	Stowe Gregory Lewis	802-253-6135
Swanton~Village of George Lague	802-868-3397	Swanton Jeff Gratton	802-868-3241
Troy & Jay~Towns of Lucille Cadieux	802-988-2663	Troy/Jay Kenneth Hamelin	802-988-2636
Vergennes~City of Melvin Hawley	802-877-3637	Vergennes Martin Williams	802-877-2931
Wallingford FD# 1 Jane Maciejewski	802-446-2964	Wallingford FD# 1 John West	802-446-8415
Wilmington~Town of Sonia Alexander	802-464-8591	Wilmington Stephen Lazelle	802-464-3862
Windsor~Town of Tony Torchia	802-674-5950	Windsor Main Harry Benner	802-674-5950
Windsor~Town of Tony Torchia	802-674-5950	Weston Heights Harry Benner	802-674-5950
Winooski~City of Ann Cookson	802-655-6410	Winooski Tim Grover	802-655-6421
Woodstock~Town of Philip Swanson	802-457-3456	Woodstock Main Rusty Eastman	802-457-1910
Woodstock~Town of Philip Swanson	802-457-4675	Taftsville Russell Eastman	802-457-1910

## **APPENDIX E**

### **Environmental Analysis Laboratories**



## INDEPENDENT VERMONT LABORATORIES

July, 1999

1. Severn Trent Laboratories  
55 South Park Drive  
Colchester, Vermont 05446  
(802) 658-1074
2. I.E.A. (Industrial & Environmental Analysis)  
P.O. Box 626  
Essex Junction, Vermont 05452  
(802) 878-5138
3. Spectrum Labs  
PO Box 122  
Montpelier Vermont 05601  
(802) 223-7088
4. Sci-Test (Dubois & King Lab)  
P.O. Box 339  
Route 66  
Randolph, Vermont 05060  
(802) 728-3379
5. Endyne Laboratory (Harry Locker)  
32 James Brown Drive  
Williston, Vermont 05495  
(802) 879-4333
6. Precision Valley Laboratory (Ginny Deyo)  
113 Clinton Avenue  
Springfield, Vermont 05156  
(802) 885-5157
7. Green Mountain Laboratories (Testing water only, no wastewater)  
RR 3, Box 5210  
Montpelier, Vermont 05602  
(802) 223-1468
8. Aquacheck Labs  
RR1, Box 489  
Weathers Field Business  
Intersection 106 and 131  
Perkinsville Vermont 05151
9. Environmental Waterworks Inc.  
So. Main Street, Box 18  
Wilmington VT 05363
10. Eastern Analytical Inc.  
25 Chenell Drive  
Concord NH 03301  
(Performs numerous analyzes for VT Facilities and is NH Certified)

NOTE: There is no wastewater certification program for laboratories in the state of Vermont



## **APPENDIX F**

### **How to Read a Material Safety Data Sheet (MSDS)**

# A Quick Guide to Reading a Material Safety Data Sheet

The information provided in the table below should help you to understand how a Material Safety Data Sheet (MSDS) is formatted and what kind of information it contains. It is always a good idea to ask vendors for a copy of an MSDS for a chemical or product BEFORE actually purchasing the product. This will allow you to evaluate the product and compare it to others that perform a similar function. By doing this you can select the product or chemical that represents the least hazard to your employees and will result in the least amount of regulation.

<b>What is This Stuff?</b>	
Section I: Product Identity	Allows you to match the MSDS with the product.
Section II: Hazardous Ingredients	Names the hazardous ingredients and tells you the maximum amount you can be exposed to without harm.
<b>How Does This Chemical Behave?</b>	
Section III: Physical Data	Helps to figure out where to store the chemical and how likely it is to evaporate and give off vapors (leading to exposure and/or fires).
<b>Is This Product Dangerous?</b>	
Section IV: Fire and Explosion Data	Discusses when a chemical will ignite and how to extinguish the fire.
Section V: Reactivity Data	Tells you if the substance will explode or breakdown in the presence of sunlight or air.
<b>Can This Product Hurt My Health?</b>	
Section VI: Health Hazards Data	Tells you how the chemical can get into your body (e.g. absorbed through the skin, inhalation, etc.) Explains what the health effects may be if you are exposed and whether it can cause cancer. It also includes first aid procedures.
<b>How Should I Work With This Stuff?</b>	
Section VII: Precautions for Handling	What to do in case of a spill. How to dispose of the waste.
<b>How Should I Be Protected?</b>	
Section VIII: Control Measures	Includes respirators, ventilation, eye protection, or special clothing.

## **APPENDIX G**

### **List of Hazardous Air Contaminants (HACs)**



# HAZARDOUS AMBIENT AIR STANDARDS

November 2000

## CATEGORY I

Hazardous Air Contaminants known or suspected to cause carcinogenicity

<u>Contaminant</u>	<u>Hazardous Ambient Air Standard and Stationary Source Hazardous Air Impact Standard</u>	
	<u>Annual Average</u> (ug/m <sup>3</sup> ) <sup>a</sup>	<u>Action Level</u> (lbs/8 hr)
Acrylamide .....	0.01 .....	0.00083
Acrylonitrile .....	0.015 .....	0.0012
Allyl chloride .....	0.29 .....	0.023
Aniline .....	0.01 .....	0.00083
Antimony trioxide .....	0.01 .....	0.00083
Arsenic Compounds .....	0.00023 .....	0.000019
Arsine .....	0.01 .....	0.00083
Asbestos, all forms .....	0.00012 .....	0.00001
Benzene .....	0.12 .....	0.0096
Benzidine .....	0.000015 .....	0.0000012
Benzo-a-pyrene .....	0.00030 .....	
.....	0.0013 .....	0.00010
Biphenyl .....	0.01 .....	0.00083
Bromoform .....	0.01 .....	0.00083
1,3-Butadiene .....	0.035 .....	0.0028
Cadmium Compounds .....	0.00057 .....	0.000047
Carbon tetrachloride .....	0.067 .....	0.0054
Chlorodibenzodioxins/ chlorodibenzofurans .....	0.02 pg/m <sup>3</sup> <sup>b</sup> .....	1.6x10 <sup>-9</sup> <sup>b</sup>
Chloroform .....	0.043 .....	0.0034
Chloroprene .....	0.01 .....	0.00083
Chromium (VI) Compounds .....	0.000085 .....	0.0000071 <sup>c</sup>
Diazomethane .....	0.01 .....	0.00083
Dichloroethyl ether .....	0.0031 .....	0.00025
Dimethyl sulfate .....	0.01 .....	0.00083
2,4-Dinitrotoluene .....	0.011 .....	0.00091
Dioxane .....	0.01 .....	0.00083
Epichlorohydrin .....	0.35 .....	0.028
Ethylene dibromide .....	0.000085 .....	0.0000071
Ethylene dichloride .....	0.038 .....	0.0030
Ethylene oxide .....	0.010 .....	0.00083
Formaldehyde .....	0.08 .....	0.0066
Hexachlorobenzene .....	0.0021 .....	0.00017
Hexachlorobutadiene .....	0.045 .....	0.0036
Hexachloroethane .....	0.25 .....	0.020

# HAZARDOUS AMBIENT AIR STANDARDS

November 2000

## CATEGORY I (cont'd)

Hazardous Air Contaminants known or suspected to cause carcinogenicity

**Hazardous Ambient  
Air Standard  
and  
Stationary Source  
Hazardous Air Impact  
Standard**

**Annual Average**  
(ug/m<sup>3</sup>)<sub>a</sub>

**Action Level**  
(lbs/8 hr)

**Contaminant**

Methyl bromide .....	0.01 .....	0.00083
Methyl chloride .....	0.01 .....	0.00083
Methylene chloride .....	2.0 .....	0.16
Methyl iodide .....	0.01 .....	0.00083
Nickel carbonyl .....	0.01 .....	0.00083
Nickel Compounds .....	0.0033 .....	0.00026
2-Nitropropane .....	0.01 .....	0.00083
Polychlorinated biphenyls .....	0.00081 .....	0.000065
Propylene dichloride .....	0.01 .....	0.00083
Propylene imine .....	0.01 .....	0.00083
Propylene oxide .....	0.01 .....	0.00083
1,1,2,2-Tetrachloroethane .....	0.017 .....	0.0014
Tetrachloroethylene .....	0.41 .....	0.033
o-Toluidine .....	0.01 .....	0.00083
1,1,2-Trichloroethane .....	0.061 .....	0.0049
Trichloroethylene .....	0.42 .....	0.034
2,4,6-Trichlorophenol .....	0.18 .....	0.014
Vinyl chloride .....	0.20 .....	0.016

# HAZARDOUS AMBIENT AIR STANDARDS

November 2000

## CATEGORY II

Hazardous Air Contaminants believed to cause chronic systemic toxicity due to long term exposure

<u>Contaminant</u>	<u>Hazardous Ambient Air Standard</u>	
	<u>Annual Average</u> (ug/m <sup>3</sup> ) <sup>a</sup>	<u>Action Level</u> (lbs/8 hr)
Barium, total .....	11.9 .....	1.0
Bisphenol A epichlorohydrin .....	74 .....	6.1
4-Butyrolactone .....	12 .....	1.0
Chlorobenzene .....	833 .....	69.1
Chromium Compounds, except for Cr (VI) Compounds .....	0.12 .....	0.01
Cumene .....	583 .....	48.4
Cyclohexene .....	2,420 .....	201
Dimethoxyethane .....	17 .....	1.4
Dimethylphthalate .....	120 .....	10.0
Ethanolamine .....	190 .....	15.8
Fluoranthene .....	130 .....	11.0
Fluoride Compounds .....	59.5 .....	4.9
Lead Compounds .....	0.25 <sup>d</sup> .....	0.014
Manganese Compounds .....	119 .....	9.9
Mercury Compounds .....	0.12 .....	0.01
Mercury, alkyl compounds .....	0.024 .....	0.0020
2-Methoxyethanol .....	381 .....	31.6
Molybdenum Compounds .....	12 .....	1.0
Naphthalene .....	120 .....	10.0
Octachloronaphthalene .....	0.24 .....	0.020
Pentachloronaphthalene .....	1.19 .....	0.10
Pentachlorophenol .....	1.19 .....	0.10
Phenanthrene .....	1.30 .....	0.10
Pyrene .....	3.40 .....	0.28
Pyridine .....	357 .....	29.6
Selenium, total .....	4.80 .....	0.40
Silica, amorphous .....	240 .....	19.9
Silica, crystalline .....	0.12 .....	0.010
Silica, fused .....	0.24 .....	0.020
Silicon tetrahydride .....	16.7 .....	1.4
Silver Compounds .....	0.24 .....	0.020
Sodium Bromide .....	1,470 .....	122
Stoddard solvent .....	12,500 .....	1,040
Styrene monomer .....	512 .....	42.5
Tellurium Compounds .....	2.40 .....	0.20

# HAZARDOUS AMBIENT AIR STANDARDS

## CATEGORY II (cont'd)

Hazardous Air Contaminants believed to cause chronic systemic toxicity due to long term exposure

### Hazardous Ambient Air Standard

<u>Contaminant</u>	<u>Annual Average</u> (ug/m <sup>3</sup> ) <sub>a</sub>	<u>Action Level</u> (lbs/8 hr)
Tetrachloronaphthalene .....	4.80 .....	0.40
Tin Compounds .....	4.8 .....	0.4
Trichloronaphthalene .....	11.9 .....	1.0
Triethylamine .....	98 .....	8.1
Triethylenetetramine .....	16 .....	1.3
Trifluorobromomethane .....	14,525 .....	1,210
Trimethyl benzene .....	293 .....	24
1,2,4-Trimethyl benzene .....	0.15 .....	0.013
Xylene .....	1,040 .....	86.3

# HAZARDOUS AMBIENT AIR STANDARDS

November 2000

## CATEGORY III

Hazardous Air Contaminants believed to cause short-term irritant effects

<b>Contaminant</b>	<b>Hazardous Ambient Air Standard</b> (ug/m <sup>3</sup> ) a	<b>Averaging Time</b>	<b>Action Level</b> (lbs/8 hr)
Acetaldehyde .....	1,800 .....	8 hr .....	75.6
Acetic acid .....	250 .....	8 hr .....	10.5
Acetic anhydride .....	200 .....	8 hr .....	8.4
Acetone .....	178,000 .....	8 hr .....	7,480
Acetonitrile .....	7,000 .....	8 hr .....	294
Acrolein .....	2.5 .....	8 hr .....	0.11
2-Amino-2-methyl- 1-propanol .....	65 .....	24 hr .....	3.4
Ammonia .....	1,800 .....	8 hr .....	75.6
Ammonium sulfamate .....	23.8 .....	24 hr .....	1.2
n-Amyl acetate .....	53,000 .....	8 hr .....	2,230
s-Amyl acetate .....	66,500 .....	8 hr .....	2,790
Antimony Compounds .....	50.0 .....	8 hr .....	2.1
1,2-Benzenedicarboxylic acid .....	357 .....	24 hr .....	19
Benzyl alcohol .....	10 .....	8 hr .....	0.42
Bisphenol A resin .....	210 .....	24 hr .....	11
Bromodichloromethane .....	42 .....	24 hr .....	2.2
2-Butoxyethanol .....	12,000 .....	8 hr .....	504
Butoxyethyl acetate .....	270 .....	8 hr .....	11
2-(2-Butoxyethoxy)-ethanol .....	300 .....	24 hr .....	15.6
n-Butyl acetate .....	7,100 .....	8 hr .....	298
s-Butyl acetate .....	95,000 .....	8 hr .....	3,990
t-Butyl acetate .....	95,000 .....	8 hr .....	3,990
n-Butyl alcohol .....	360 .....	24 hr .....	18.7
s-Butyl alcohol .....	3,050 .....	8 hr .....	128
t-Butyl alcohol .....	3,000 .....	8 hr .....	126
Butylamine .....	150 .....	8 hr .....	6.3
Butyl propasol .....	142 .....	24 hr .....	7.4
p-t-Butyltoluene .....	143 .....	24 hr .....	7.4
1,4-Butyldiol .....	0.1 .....	24 hr .....	0.005
Calcium oxide .....	20.0 .....	8 hr .....	0.84
Carbon disulfide .....	714 .....	24 hr .....	37.1
Chlorine .....	30.0 .....	8 hr .....	1.3
Chlorine dioxide .....	3.0 .....	8 hr .....	0.13
2-Chloroethyl vinyl ether .....	1.0 .....	24 hr .....	0.05
Cobalt Compounds .....	0.12 .....	24 hr .....	0.0062
Copper Compounds .....	100 .....	8 hr .....	4.2
Cyanide Compounds .....	500 .....	8 hr .....	21.0
Cyclohexane .....	10,500 .....	8 hr .....	441
Cyclohexanol .....	2,000 .....	8 hr .....	84.0
Cyclohexanone .....	240 .....	24 hr .....	12.5

# HAZARDOUS AMBIENT AIR STANDARDS

## CATEGORY III (cont'd)

Hazardous Air Contaminants believed to cause short-term irritant effects

<b>Contaminant</b>	<b>Hazardous Ambient Air Standard</b> (ug/m <sup>3</sup> ) a	<b>Averaging Time</b>	<b>Action Level</b> (lbs/8 hr)
Cyclohexylamine .....	95 .....	24 hr .....	5.0
Decane .....	1,300 .....	8 hr .....	54.6
Decaborane .....	0.71 .....	24 hr .....	0.037
Diacetone alcohol .....	565 .....	24 hr .....	29
Dibenzoyl peroxide .....	50 .....	8 hr .....	2.1
Dibromochloromethane .....	39 .....	24 hr .....	2.0
Dibutyl phthalate .....	500 .....	8 hr .....	21.0
o-Dichlorobenzene .....	3,000 .....	8 hr .....	126
Dichlorodifluoromethane .....	118 .....	24 hr .....	6.1
1,1-Dichloroethane .....	19,300 .....	24 hr .....	1,004
1,2-Dichloroethylene .....	79,000 .....	8 hr .....	3,320
s-Dichlorotetrafluoroethane .....	167,000 .....	24 hr .....	8,680
Diethanolamine .....	130 .....	8 hr .....	5.4
Diethylamine .....	71.4 .....	24 hr .....	3.7
Diethylaminoethanol .....	480 .....	8 hr .....	20
Diethylene glycol ethyl ether .....	297 .....	8 hr .....	12.5
Dimethyl ammonium chloride .....	49 .....	24 hr .....	2.5
Dimethoxymethane .....	7,380 .....	24 hr .....	384
Dimethylamine .....	42.9 .....	24 hr .....	2.2
n,n-Dimethyl dodecylamine .....	63 .....	24 hr .....	3.3
Dimethylethanolamine .....	27 .....	8 hr .....	1.1
2,6-Dimethyl-4-heptanone .....	345 .....	24 hr .....	18
n,n-Dimethyl octadecylamine .....	5.5 .....	24 hr .....	0.3
1,3-Dioxolane .....	92 .....	24 hr .....	4.8
Diphenylmethane diisocyanate .....	0.48 .....	24 hr .....	0.025
Dipropylene glycol .....	1,680 .....	8 hr .....	70
Dipropylene glycol methyl ether .....	6,000 .....	8 hr .....	252
Dodecylguanidine hydrochloride .....	0.6 .....	8 hr .....	0.025
Doxorubicin .....	115 .....	24 hr .....	6.0
1,2-Epoxy butane .....	11 .....	8 hr .....	0.58
2-Ethoxyethanol .....	45.2 .....	24 hr .....	2.4
2-Ethoxyethyl acetate .....	64.3 .....	24 hr .....	3.3
Ethyl acetate .....	140,000 .....	8 hr .....	5,880
Ethyl alcohol .....	44,770 .....	24 hr .....	2,330
Ethylamine .....	42.9 .....	24 hr .....	2.2
Ethyl benzene .....	43,500 .....	8 hr .....	1,830
Ethyl bromide .....	8,900 .....	8 hr .....	374
Ethyl butyl ketone .....	2,300 .....	8 hr .....	96.6
Ethylene diamine .....	60 .....	24 hr .....	3.1
Ethyl-3-ethoxy propionate .....	230 .....	24 hr .....	12
Ethylene glycol .....	1,270 .....	8 hr .....	53

# HAZARDOUS AMBIENT AIR STANDARDS

## CATEGORY III (cont'd)

Hazardous Air Contaminants believed to cause short-term irritant effects

<u>Contaminant</u>	<u>Hazardous Ambient Air Standard</u> (ug/m <sup>3</sup> ) a	<u>Averaging Time</u>	<u>Action Level</u> (lbs/8 hr)
Ethyl ether .....	120,000 .....	8 hr .....	5,040
2-Ethyl hexanol .....	130 .....	24 hr .....	6.9
2-Ethylhexyl ester acrylic acid .....	29 .....	8 hr .....	1.2
Ethyl mercaptan .....	125 .....	8 hr .....	5.3
Fluorine .....	200 .....	8 hr .....	8.4
Formic acid .....	90.0 .....	8 hr .....	3.8
Furfural .....	80.0 .....	8 hr .....	3.4
Glutaraldehyde .....	8,200 .....	8 hr .....	340
Glyoxal .....	130 .....	24 hr .....	6.8
Heptane .....	16,000 .....	8 hr .....	672
Hexamethylene-1-6-diisocyanate .....	0.082 .....	24 hr .....	0.004
n-Hexane .....	4,290 .....	24 hr .....	223
Hydrogen chloride .....	16.7 .....	24 hr .....	0.87
Hydrogen fluoride .....	59.5 .....	24 hr .....	3.1
Hydrogen peroxide .....	15.0 .....	8 hr .....	0.63
Hydrogen sulfide .....	33.3 .....	24 hr .....	1.7
Hydroquinone .....	4.8 .....	24 hr .....	0.2
Iodine .....	100 .....	8 hr .....	4.2
Iron Compounds .....	24 .....	24 hr .....	1.2
Isoamyl acetate .....	5,250 .....	8 hr .....	221
Isoamyl alcohol .....	3,600 .....	8 hr .....	151
Isobutyl acetate .....	7,000 .....	8 hr .....	294
Isobutyl alcohol .....	1,500 .....	8 hr .....	63.0
Isobutyl ester isobutyric acid .....	580,780 .....	24 hr .....	30,200
Isophorone .....	1,400 .....	8 hr .....	59
Isopropyl acetate .....	9,500 .....	8 hr .....	399
Isopropyl alcohol .....	98,000 .....	8 hr .....	4,120
Isopropylamine .....	120 .....	8 hr .....	5.0
Isopropyl ether .....	10,500 .....	8 hr .....	441
Kerosene .....	51,000 .....	24 hr .....	2,650
Methoxyethoxyethanol .....	595 .....	24 hr .....	31
o-Methoxyphenol .....	47 .....	24 hr .....	2.4
1-Methoxy-2-propanol .....	3,600 .....	8 hr .....	151
Methyl acetate .....	1,450 .....	24 hr .....	75.4
Methyl alcohol .....	6,190 .....	24 hr .....	322
Methylamine .....	120 .....	8 hr .....	5.0
p-Methylaminophenol sulfate .....	5,100 .....	24 hr .....	265
Methyl amyl ketone .....	2,330 .....	8 hr .....	98
Methylcyclohexanol .....	560 .....	24 hr .....	29.1
Methyl ester salicylic acid .....	180 .....	24 hr .....	9.4

# HAZARDOUS AMBIENT AIR STANDARDS

## CATEGORY III (cont'd)

Hazardous Air Contaminants believed to cause short-term irritant effects

<u>Contaminant</u>	<u>Hazardous Ambient Air Standard</u> (ug/m <sup>3</sup> ) a	<u>Averaging Time</u>	<u>Action Level</u> (lbs/8 hr)
Methyl ethyl ketone .....	5,900 .....	8 hr .....	248
Methyl ethyl ketone peroxide .....	15.0 .....	8 hr .....	0.63
Methyl isoamyl ketone .....	2,400 .....	8 hr .....	100
Methyl isobutyl ketone .....	490 .....	24 hr .....	25
Methyl methacrylate .....	41,000 .....	8 hr .....	1,720
3-Methyl-2-oxazolidone .....	57 .....	8 hr .....	2.4
1-Methyl-2-pyrrolidone .....	960 .....	24 hr .....	49.9
Minerals Spirits .....	3,210 .....	24 hr .....	167
Morpholine .....	700 .....	8 hr .....	30
Nitric acid .....	500 .....	8 hr .....	21.0
Nitric oxide .....	71.4 .....	24 hr .....	3.7
Nitrobenzene .....	119 .....	24 hr .....	6.2
p-Nitrochlorobenzene .....	71.4 .....	24 hr .....	3.7
Nitroethane .....	738 .....	24 hr .....	38.4
Nitromethane .....	2,500 .....	8 hr .....	105
1-Nitropropane .....	900 .....	8 hr .....	37.8
1-Nitrotoluene .....	262 .....	24 hr .....	13.6
Oxalic acid .....	100 .....	8 hr .....	4.2
1-Pentanol .....	120 .....	24 hr .....	6.1
2-Pentanone .....	1,680 .....	24 hr .....	87
Perchloric acid .....	50 .....	24 hr .....	2.6
Phenol .....	1,900 .....	8 hr .....	78.9
Phenoxyethanol .....	81 .....	24 hr .....	4.2
Phenyl ether .....	700 .....	8 hr .....	29.4
1-Phenyl-3-pyrazolidone .....	13 .....	24 hr .....	0.67
Phosgene .....	40.0 .....	8 hr .....	1.7
Phosphine .....	40.0 .....	8 hr .....	1.7
Phosphoric acid .....	100 .....	8 hr .....	4.2
Phosphorus pentachloride .....	10.0 .....	8 hr .....	0.42
Phosphorus pentasulfide .....	10.0 .....	8 hr .....	0.42
Phosphorus trichloride .....	15.0 .....	8 hr .....	0.63
Phthalic anhydride .....	600 .....	8 hr .....	25.2
Picric acid .....	0.24 .....	24 hr .....	0.012
Platinum Compounds .....	0.005 .....	24 hr .....	0.0003
Potassium hydroxide .....	20.0 .....	8 hr .....	0.84
1,2-Propanediol .....	1,300 .....	24 hr .....	67
2-Propoxyethanol .....	4.3 .....	8 hr .....	0.18
Propoxypropanol .....	210 .....	24 hr .....	11
n-Propyl acetate .....	8,350 .....	24 hr .....	350
n-Propyl alcohol .....	50,000 .....	8 hr .....	2,100

# HAZARDOUS AMBIENT AIR STANDARDS

## CATEGORY III (cont'd)

Hazardous Air Contaminants believed to cause short-term irritant effects

<u>Contaminant</u>	<u>Hazardous Ambient Air Standard</u> (ug/m <sup>3</sup> ) a	<u>Averaging Time</u>	<u>Action Level</u> (lbs/8 hr)
1,2-Propylene carbonate .....	1,260 .....	8 hr .....	53
Sebacic Acid .....	268 .....	8 hr .....	11
Sodium hydroxide .....	20.0 .....	8 hr .....	0.84
Sodium tripolyphosphate .....	84 .....	24 hr .....	4.4
Sulfuric acid .....	23.8 .....	24 hr .....	1.2
Sulfur monochloride .....	600 .....	8 hr .....	25.2
1,1,2,2-Tetrachloro- 1,2-difluoroethane .....	9,930 .....	24 hr .....	516
Tetrahydrofuran .....	14,050 .....	24 hr .....	731
Texanol .....	207 .....	24 hr .....	11
Titanium dioxide .....	240 .....	24 hr .....	12
Toluene .....	8,930 .....	24 hr .....	464
Toluene-2,4-diisocyanate .....	0.10 .....	24 hr .....	0.0052
p-Toluenesulfonic acid .....	113 .....	24 hr .....	5.9
1,1,1-Trichloroethane .....	190,000 .....	8 hr .....	7,980
Trichlorofluoromethane .....	133,500 .....	24 hr .....	6,940
1,2,3-Trichloropropane .....	14.3 .....	24 hr .....	0.74
1,1,2-Trichloro- 1,2-trifluoroethane .....	181,000 .....	24 hr .....	9,410
2,4,6-Tri(dimethyl animomethyl) phenol .....	78 .....	24 hr .....	4.0
Triethanolamine .....	400 .....	24 hr .....	20
Triethyl ester phosphoric acid .....	970 .....	24 hr .....	80
Triethyl orthoformate .....	190 .....	24 hr .....	9.8
s,s,s-Trimethyl ester phosphorotrithioic acid .....	78 .....	24 hr .....	4.1
Triorthocresyl phosphate .....	0.24 .....	24 hr .....	0.012
Turpentine .....	1,300 .....	24 hr .....	69
4-Undecanol, 7-ethyl-2-methyl- hydrogen sulfate .....	13 .....	24 hr .....	0.67
Vanadium Compounds .....	1.2 .....	24 hr .....	0.06
Vinyl acetate .....	350 .....	8 hr .....	14.7
Vinyl toluene .....	5,710 .....	24 hr .....	297
VM & P naphtha .....	3,210 .....	24 hr .....	167
Zinc chloride .....	2.4 .....	24 hr .....	0.12
Zinc Compounds .....	12.0 .....	24 hr .....	0.62

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- a - All HAAS concentrations in ug/m<sup>3</sup> unless otherwise noted.
- b - Expressed as 2,3,7,8-Tetrachlorodibenzo-p-dioxin equivalents.
- c - The hexavalent chromium *emissions* from municipal waste *incinerators* shall be set at 10% of the total chromium concentration as measured in the exhaust gases from municipal waste *incinerators*.
- d - Lead HAAS expressed as a three (3) month average.



## **APPENDIX H**

### **Additional Information & Assistance Resources**



# Information and Assistance Resources

## **DEPARTMENT OF ENVIRONMENTAL CONSERVATION (DEC)**

<http://www.anr.state.vt.us/dec/dec.htm>

### **Air Pollution Control**

Engineering Services Section (Permits) 241-3840

### **Environmental Assistance Division**

Toll-free Pollution Prevention Hotline 1-800-974-9559

Small Business Compliance Assistance Program 1-800-974-9559

#### **Permit Specialists**

Barre 476-0195

Essex Junction 879-5676

No. Springfield 885-8850

Rutland 786-5907

St. Johnsbury 751-0127

### **Waste Management Division**

Hazardous Waste Program 241-3888

Solid Waste Program 241-3444

Recycling Hotline 1-800-932-7100

Underground Storage Tank Program 241-3888

### **Wastewater Management Program**

#### **Regional Offices**

Barre 476-0190

Essex Junction 879-5656

No Springfield 885-8855

Rutland 786-5900

St. Johnsbury 751-0130

#### **Waterbury Central Office**

Underground Injection Control Program 241-4455

Pretreatment Discharge Program (to POTW) 241-3822

## **BUSINESS ASSISTANCE**

Small Business Development Center 1-800-464-SBDC

Vermont Manufacturing Extension Center 728-1421

## **INTERNET RESOURCES**

### *Clearinghouses of Information*

EnviroSense - <http://es.epa.gov>

Waste Reduction Resource Center - Information by Industry Sector  
<http://wrrc.p2pays.org/nframe.asp?page=indsectinfo.asp>

Small Business Environmental Home Page - Publications  
<http://www.smallbiz-enviroweb.org/pubsector.asp>

### *Technical Links*

Institute of Advanced Manufacturing Sciences  
<http://www.iams.org/xcellenc/grnfluid.htm>

Metal Working Fluid Magazine  
<http://metalworkingfluid.com/organiza.htm>

Compoundings (Magazine)  
<http://www.irma.org/compold.htm>

### *Metal Machining Trade Associations*

Association for Manufacturing Technology  
<http://www.mfgtech.org/>

National Tooling and Machining Association  
<http://www.ntma.org>

Tooling and Manufacturing Association  
<http://www.tmanet.com/>

Independent Lubricant Manufacturers Association  
<http://www.irma.org/index.htm>