

Waste Education Series

Solid and Hazardous Waste Education Center



Cooperative Extension • University of Wisconsin-Extension

425.WP.9706

ENVIRONMENTAL REGULATORY GUIDE FOR SMALL - MEDIUM LITHOGRAPHIC PRINTERS IN WISCONSIN

This Guide overviews key environmental regulations affecting smaller lithographic operations in Wisconsin. It is especially written for shops not large enough to benefit from the services of an in-house environmental professional, familiar with understanding and navigating the often-confusing maze of environmental regulations. Although this Guide can help give you a first-cut analysis as to which regulations most likely pertain to your operations, be sure to talk directly with regulators to get a definitive answer on whether specific regulations apply to you. Additionally, you may want to talk with industry sources, such as Printing Industries of Wisconsin, or an environmental consultant. If specific regulatory programs do or might apply to you, obtain and carefully read those regulations; this Guide is not intended to replace familiarity with the actual regulations where they apply.

As a smaller lithographic printer, your key environmental management and compliance issues are likely to include any or all of the following:

- ! management of used cleanup solvents;
- ! recovery of silver from wastewater from prepress operations;
- ! air emissions from blanket and roller washes;
- ! air emissions from alcohol and alcohol substitutes in fountain solutions
- ! management of ink wastes;
- ! disposal of empty containers.

This Guide focuses on how Wisconsin regulations affect the management of these wastes and emissions from smaller printing operations in the state. Specific regulatory programs reviewed in this Guide include the following: hazardous waste management; recycling; air emissions; water pollution; emergency planning; spill and release notification; and community/employee right-to-know requirements.

Remember, proper management of wastes not only helps you comply with environmental regulations; at least as importantly, it reduces your exposure to environmental liabilities that could threaten the financial health of your company.

HAZARDOUS WASTE MANAGEMENT

Most printers generate hazardous wastes, though many do not realize it. By knowing how to recognize and properly manage hazardous wastes, you can comply with environmental regulatory requirements and minimize your liability. Hazardous wastes are defined in Wisconsin as any solid, liquid or gaseous wastes that are either listed in the Hazardous Waste Regulations (Ch. NR 600-685 WI Adm. Code), or are hazardous to human health and the environment because they exhibit one or more of four characteristics: (1) ignitability, (2) corrosivity, (3) reactivity or (4) toxicity.

Hazardous wastes that are specifically listed in the Hazardous Waste Regulations are appropriately called "listed" hazardous wastes. The "listed" hazardous wastes that a printer might generate are described in **Table 1**. "Characteristic" wastes that a printer might generate are listed in **Table 2** on the following page. These tables will help you to identify the hazardous wastes that you may be generating.

Another good source of information about the management of hazardous wastes is the DNR Booklet: "Managing Your Hazardous Wastes: A Guide for Wisconsin Small Quantity Generators." To obtain this guide call the DNR at 608/267-9523 and ask for publication: Publ-SW-071 93REV.

In general, the waste materials generated by lithographic printers that may be classified as hazardous waste include:

- ! **Cleanup Solvents.** Check solvent to see if it qualifies as a listed or characteristic hazardous waste.
- ! **Solvent-Saturated Rags and Wipes.** An exemption, explained later, is provided for properly managed laundered rags and disposable wipes.
- ! **Ink Waste.** Lithographic inks are not usually hazardous waste, unless contaminated with hazardous waste solvent.
- ! **Photographic Fixers and Rinsewater.**

Once wastes are identified as hazardous, they need to be managed as such, including following required procedures for storing, shipping and reporting. There are several waste management/disposal alternatives available to you including reuse and recycling options, which allow you to manage the wastes as non-hazardous if proper management practices are used.

TABLE 1

"F-Listed" Hazardous Wastes	
<i>The following solvents generated by printers are classified as hazardous wastes and are identified in the regulations as "F-Listed" wastes.</i>	
F-Listed Waste Category	Some solvents used by printers that become F-Listed wastes when disposed.
F001	Spent halogenated degreasers: ! trichloroethylene ! methylene chloride ! 1,1,1-trichloroethane ! carbon tetrachloride
F002	Spent halogenated solvents: ! trichloroethylene ! methylene chloride ! 1,1,1-trichloroethane ! 1,1,2-trichloroethane ! 1,2,2-trifluoroethane ! chlorobenzene
F003	Spent non-halogenated solvents: ! xylene ! acetone ! methanol ! methyl isobutyl ketone (MIBK)
F005	Spent non-halogenated solvents: ! toluene ! methyl ethyl ketone (MEK) ! carbon disulfide ! benzene
F001 through F005	Any still bottoms generated from distillation or recycling of these must be managed as a hazardous waste.
Mixtures of spent solvents containing at least 10% by volume before use of one of the above compounds are also F-Listed wastes.	

TABLE 2
"CHARACTERISTIC" HAZARDOUS WASTES THAT MAY BE FOUND IN PRINTING WASTE

Characteristic	Criteria of Characteristic Waste	Possible printing-related sources																				
Ignitable Wastes; Haz. Waste Code: D001	Any liquid waste that has a flash point below 140° F (60° C). Any non-liquid capable of spontaneous combustion under normal conditions. An ignitable compressed gas or oxidizer (as defined by DOT).	! blanket and roller washes ! isopropyl alcohol ! solvent-based coatings																				
Corrosive Wastes; Haz. Waste Code: D002	An aqueous material with pH less than or equal to 2.0 or greater than or equal to 12.5.	! film/plate processing chemicals ! acids ! waste battery acid ! highly alkaline cleaners																				
Reactive Wastes; Haz. Waste Code: D003	Unstable materials that react violently without detonating. React violently with water or form an explosive gas, vapor or fume when mixed with water. Contain cyanide or sulfide and generate toxic gas vapors/fumes at a pH between 2 and 12.5.	! waste bleaches and oxidizers																				
Toxic Wastes; Haz. Waste Code: D004 through D043	Contains specific contaminants above threshold levels. Typically determined using a test called the Toxicity Characteristic Leaching Procedure (TCLP). Principal candidate contaminants for printers' wastes include: <table style="margin-left: 40px; border: none;"> <thead> <tr> <th style="text-align: left;">Contaminant (mg/l)</th> <th style="text-align: left;">Regulatory level</th> </tr> </thead> <tbody> <tr> <td>Barium, D005</td> <td>100.0</td> </tr> <tr> <td>Chromium, D007</td> <td>5.0</td> </tr> <tr> <td>Carbon tetrachloride, D019</td> <td>0.5</td> </tr> <tr> <td>Methyl ethyl ketone, D035</td> <td>200.0</td> </tr> <tr> <td>Silver, D011</td> <td>5.0</td> </tr> <tr> <td>Tetrachloroethylene, D039</td> <td>0.7</td> </tr> <tr> <td>Trichloroethylene, D040</td> <td>0.5</td> </tr> <tr> <td>Vinyl Chloride, D043</td> <td>0.2</td> </tr> <tr> <td>Lead, D0008</td> <td>0.5</td> </tr> </tbody> </table>	Contaminant (mg/l)	Regulatory level	Barium, D005	100.0	Chromium, D007	5.0	Carbon tetrachloride, D019	0.5	Methyl ethyl ketone, D035	200.0	Silver, D011	5.0	Tetrachloroethylene, D039	0.7	Trichloroethylene, D040	0.5	Vinyl Chloride, D043	0.2	Lead, D0008	0.5	! waste fixer ! cleanup solvents ! plate processing chemicals For example: a waste with a TCLP (tested) leachable silver content at or above 5 ppm is assigned waste code D011. (Note: ppm = mg/l)
Contaminant (mg/l)	Regulatory level																					
Barium, D005	100.0																					
Chromium, D007	5.0																					
Carbon tetrachloride, D019	0.5																					
Methyl ethyl ketone, D035	200.0																					
Silver, D011	5.0																					
Tetrachloroethylene, D039	0.7																					
Trichloroethylene, D040	0.5																					
Vinyl Chloride, D043	0.2																					
Lead, D0008	0.5																					

Of course, the best waste management alternative is not generating hazardous wastes in the first place. Not generating, or reducing the amount of wastes that you generate, is called source reduction. Source reduction gives the best long-term strategy, but before the benefits of source reduction can be fully appreciated, you have to understand the management requirements for each of these wastes.

Cleanup Solvents can be reused as long as they serve their intended purpose. If reused, cleanup solvents do not become wastes until they are discarded. Reducing your solvent use will decrease purchase and disposal costs. Some printers reuse cleanup solvent that is drained, wrung or spun from rags as makeup solvent for a parts cleaner unit that is used to clean dirty press parts.

Additional tips on reducing solvent wastes and costs are provided in a SHWEC fact sheet titled, "Management of Solvents and Wipes in the Printing Industry." Once collected, cleanup solvents that can't be reused need to be disposed of properly. Do not discharge solvents down the drain unless you have a permit or authorization to do so from your local wastewater treatment plant. Solvents that cannot be reused should be transported via a licensed hazardous waste hauler to a fuel blender, solvent recycler or hazardous waste incinerator.

Solvent-saturated rags or towels may be hazardous wastes. However, DNR guidance states that shop towels and rags do not have to be managed as hazardous wastes if the solvent is drained, wrung out by hand or removed by centrifuging. No free liquids should be present in the soiled shop towel containers. Launder the towels/rags and, if possible, reuse the collected solvent. Remaining dirty solvent can be collected for either recycling or incineration; if the solvent qualifies as a hazardous waste, it must be managed as such. If the saturated rags or towels are to be discarded, then a hazardous waste determination must be made.

Disposable wipes may not be landfilled unless the generator has first determined that the wipes are non-hazardous, given remaining solvents and ink or other residues in the wipes. However, if the wipes are to be sent to a fuel blender for incineration, the DNR does not require disposable wipes to be managed as hazardous wastes, provided that recommended management practices, listed above for towels, are followed. For further details on DNR requirements for management of shop towels and wipes, review the DNR fact sheet titled "Solvent-Contaminated Shop Towels, Wipes, and Other Materials" which is available from the DNR by calling 608/266-2111.

Uncontaminated, lithographic inks from excess ink inventory or those removed from ink fountains are typically not hazardous wastes. Discarded uncontaminated lithographic inks would typically only be hazardous wastes in the unlikely situation that they contain high concentrations of heavy metals. (See the discussion of toxicity in **Table 2** above.)

As described above, lithographic inks alone are not usually hazardous, but when inks are mixed with solvents, the **ink waste** (solvent and ink) mixture is often hazardous if hazardous solvents are used for cleanup. You can reduce your costs of managing ink wastes by separately collecting (a) used cleanup solvents and inks contaminated with those solvents from (b) non-contaminated inks and ink skins. Also, collect hazardous waste solvents separately from non-hazardous solvent wastes. These steps will reduce the amount of hazardous waste that you generate, and the cost to manage those wastes.

Another potential source of hazardous waste is **photographic fixers and rinsewaters**. When these solutions are discharged down the drain to the local wastewater treatment plant without being accumulated or stored, they are not defined as hazardous wastes. However, these solutions have to meet the discharge requirements established by the local wastewater treatment plant. Typically these requirements specify that the silver has to be removed to meet an established wastewater discharge standard. There are a variety of silver recovery technologies that can be used to remove enough of the silver so that the solutions meet the local discharge limits. A good description of options for recovering silver can be found in a SHWEC fact sheet titled "Opportunities for Printers to Reduce Image Processing Costs by Minimizing Waste and Recovering Silver." Finally, be aware that silver-laden solutions that are shipped off-site for silver recovery do have to be managed as hazardous wastes if the TCLP test for silver shows concentrations above the regulatory threshold.

None of the materials described above become classified as hazardous waste until they cannot be used for their intended purpose or you decide to dispose of them.

Since many of these materials are consumed during printing-related processes, it is unlikely that your shop will generate hazardous wastes besides waste cleanup solvents and associated ink cleanup wastes. One exception would be the case in which your shop has off-spec products that you cannot use. In this case, try to return the products to your supplier instead of having to manage them as hazardous wastes. You should also return all unused portions of new product

samples that vendors leave for you to test.

Another good rule to follow is to keep hazardous wastes separate from non-hazardous wastes. When hazardous and non-hazardous wastes are combined the resulting mixture may need to be managed as a hazardous waste, unnecessarily increasing your costs. The mixing activity itself may be considered to be hazardous waste treatment. To prevent mixing hazardous wastes with non-hazardous wastes in your shop, be sure you know which wastes are hazardous, and collect those materials separately from non-hazardous wastes. For example, if you have any inks with hazardous constituents, collect those waste inks separately from non-hazardous inks.

Does Your Shop Know How to Manage Empty Containers?

Containers, including drums, bottles and cans that once held inks, solvents, and other chemicals may need to be managed as hazardous wastes if they contain listed or characteristic hazardous wastes. However, if these containers are properly emptied, they can be disposed of as non-hazardous wastes. All containers should be "empty" by definition, before disposal.

The regulatory definition of an empty container is any container that contains less than one inch of residue or no more than 3% of the original content for containers smaller than 110 gallons, whichever is less. Ink cans that are scraped out would normally be considered "empty."

OK, I generate Hazardous Waste . . . now what do I have to do?

Hazardous waste regulations administered by the Wisconsin Department of Natural Resources (DNR) are intended to protect your employees, the environment, and the general public. Complying with the hazardous waste requirements is necessary to avoid being fined and to minimize your future environmental liability. Not complying is illegal, irresponsible and risky. One option to simplify your compliance obligations is to buy inks and solvents that don't have to be managed as hazardous wastes. Switching to less hazardous materials will allow you to avoid many of the headaches associated with being a hazardous waste generator, but this transition may take time. As long as you generate hazardous wastes, you have a responsibility to know and follow the rules described below which vary, depending on generator type.

First, determine whether you are a very small quantity generator (VSQG), small quantity generator (SQG), or large quantity generator (LQG) of hazardous wastes. You get classified as a certain type of generator based on the amount of hazardous waste that you generate. The requirements for each are described in **Table 3** below.

Very Small Quantity Generator	Small Quantity Generator	Large Quantity Generator
Generates less than 220 lbs. of hazardous waste per month and stores less than 2,205 lbs. of hazardous waste on-site before having the waste transported to a hazardous waste treatment, storage, disposal (TSD) or recycling facility.	Generates at least 220 lbs., but less than 2,205 lbs. of hazardous waste per month. Limits storage of hazardous waste to 13,230 lbs.	Generates more than 2,205 lbs. of hazardous waste per month and never store hazardous wastes on-site longer than 90 days.

If you are a small lithographic printer, it is very unlikely that you are a large quantity generator.

TABLE 3: WISCONSIN DNR HAZARDOUS WASTE GENERATOR REQUIREMENTS

REQUIREMENT (WI Admin. Code NR600-685)	Applicability, by Generator Classification			WHAT HAS TO BE DONE TO COMPLY
	VSQG	SQG	LQG	
Identify Hazardous Wastes Generated	U	U	U	Identify and quantify wastes. Use knowledge of the waste or perform testing. Document and keep determination on file.
Collect, Label and Date Hazardous Wastes	Not required, but it is recommended.	U	U	Label drum/container "HAZARDOUS WASTE" with an initial accumulation date. (No date required for VSQG.)
Inspect Containers; Keep a Log of Inspections	Log not required, but recommended.	U	U	Inspect leak-proof drum weekly to make sure that it is in good condition and that it is closed when not being filled.
Package to Meet DOT Requirements Prior to Shipping	U	U	U	Your transporter can help you meet these requirements. Check the DNR guide for SQGs for more details.
Obtain EPA ID Number, Manifest Hazardous Waste Shipments	Not required, but recommended. May be required by hauler.	U	U	The manifest records ID number, where the waste goes, who transports the waste, and which company is responsible for its treatment and/or disposal. If you do not receive a signed copy of the manifest back from the disposal facility within 35 days of shipping the waste, call the DNR and file an Exception Report with them. See Waste Minimization Certification below.
Annual Reporting	Not required. Unless recycling on-site	U	U	Complete and mail this annual summary of hazardous waste shipments to DNR.
Licensed Transporter to Licensed or Exempt Transportation, Storage and Disposal Facilities	U	U	U	If the waste is dealt with offsite, a licensed hazardous waste hauler must be used to transport hazardous wastes to a facility which processes it legally.
Land Disposal Restrictions	Not required.	U	U	Determine if your wastes can be landfilled (e.g. meet land disposal treatment standards). If not, notify the TSD facility. If yes, send certification along with the notification.

Safety, Training, & Emergency Procedures: •Safety Preparation & Discharge Prevention •Emergency Procedures •Contingency Plan •Employee Training •Training Records	Not required.	U U none U possibl e	U more U more U	See the description below of Safety, Training, and Emergency Procedures that apply to SQGs. If you are a LQG, see NR 615 for more information about the requirements that apply to you, or call the DNR Bureau of Solid & Hazardous Waste Management at 608/266-2111 for regulatory assistance.
--	---------------	-------------------------------------	-----------------------------	---

Waste Minimization Certification for generators who use a manifest for transportation. Part of the hazardous waste transportation manifest, which must be signed, includes a statement that you have developed a Hazardous Waste Minimization Plan. The goal is to reduce the volume or quantity and toxicity of the waste to the greatest economically practicable degree. The written program should include descriptions of waste generation, waste management costs and the associated accounting methods, periodic waste minimization assessments, and how the program is evaluated. All of the minimization methods discussed in this fact sheet which apply to your facility are candidates for incorporation in your minimization plan. It might be possible for you to minimize waste to such an extent that your generator status is reduced, lightening your compliance burden.

Safety, Training, and Emergency Procedures.

The following apply to Small Quantity Generators (more extensive requirements which apply to Large Quantity Generators are listed in NR 615, WI Adm. Code):

1. Safety Preparedness and Discharge Prevention.

Have the following equipment and procedures in place:

- ! assign one individual to be the emergency coordinator (EC), or lead person in responding to an emergency involving hazardous wastes. Alternate ECs should be identified because an EC is required to be on call at all times;
- ! an internal communication or alarm system capable of warning facility personnel during an emergency;
- ! a telephone or radio for calling police, ambulance, etc., during an emergency;
- ! portable fire extinguishers, fire control equipment, spill control equipment, decontamination equipment, and enough water for emergency response;
- ! an equipment testing program to ensure emergency equipment is in good condition and readily available;
- ! adequate aisle space for movement of emergency equipment and personnel; and
- ! service agreements with local police, fire departments, hospitals, and emergency response teams.

2. Emergency Procedures:

a. Post the following information next to the telephone:

- ! name and telephone number of the emergency coordinator;
- ! location of fire extinguishes, spill control material, and if applicable, fire alarms; and

! telephone number of the fire department.

b. The EC acts to control any spills, contacts proper authorities, and files reports.

3. **Employee Training:**

Train all employees in the proper handling of hazardous wastes and what to do in the case of an emergency involving hazardous wastes. Document all training sessions.

4. **Training Records:**

Maintain records of employee training if 1,000 kg or more of hazardous waste is stored on-site.

On-site Combustion of Used Oil by Very Small Quantity Generators

Although not practical or necessary for most printers, Wisconsin regulations allow Very Small Quantity Generators to mix used oil with hazardous wastes which are listed hazardous wastes solely based upon their ignitability, and burn the mixture for energy recovery in on-site space heaters if the following conditions are met:

- ! The heater generates less than 500,000 BTU/hr and is approved by the Department of Commerce for burning used oil.
- ! The heater is vented outside the building.
- ! The mixture contains less than 1,000 ppm of total halogens and has a flash point above 100° F.

If you are interested in this option, be sure to review details with the DNR's local office or the DNR Printing Sector Specialist.

RECYCLING

Under the Wisconsin Recycling Act of 1989, the following materials are banned from disposal and incineration in Wisconsin:

- | | | |
|--|--|--|
| ! Corrugated cardboard and other container board | ! Aluminum containers | ! Grass clippings, leaves, brush, sticks |
| ! Newspaper and other materials printed on newsprint | ! Glass containers | ! Vehicle batteries |
| ! Plastic containers | ! Bi-metal (steel/aluminum) containers | ! Used oil |
| | ! Foam polystyrene | ! Major appliances |
| | ! Magazines (with some exceptions) | ! Office paper |

All business owners, including printers, are required to separate these materials from wastes for recycling, or send these materials (mixed) directly to a facility that will separate and recycle them.

When setting up your recycling program, be sure to check out the range of options available to you, especially with respect to paper wastes. Recycling markets for paper include purchasing by waste haulers, recycling centers, and paper brokers. Check with your paper marketer to see if it is worthwhile for you to sort waste paper by grade or color to increase its value.

AIR EMISSIONS

Air emissions are regulated by the DNR and EPA in order to protect and improve air quality. Volatile Organic Compounds (VOCs) and Hazardous Air Pollutants (HAPs) are the contaminants of concern being emitted from lithographic print shops. VOCs cause ground level ozone (smog). VOCs that may be found in products used by printers are listed in **Table 4**. HAPs are hazardous air pollutants; a discussion of HAPs and a list of materials used by printers that may contain HAPs is included at the end of this section.

Most regulations contain exemptions from permit and management requirements. The emphasis here is on clarifying the exemptions that most typically apply to smaller lithographic print shop.

RACT Rule (under the Clean Air Act) for Lithographic Printers .

The Wisconsin DNR in 1995 adopted the Reasonably Available Control Technology (RACT) Rule for lithographic printers, which can be found in Section NR 422.142 of the Wis. Adm. Code. This rule limits VOC emissions from printing operations in the nine ozone nonattainment counties in southeastern Wisconsin. Specifically, the RACT rule applies in the following counties: Kenosha, Kewaunee, Manitowoc, Milwaukee, Ozaukee, Racine, Sheboygan, Washington, and Waukesha.

Lithographic print shops in any of these counties is subject to the RACT rule if it has "maximum theoretical emissions" of VOCs greater than or equal to 1,666 pounds in any month from all lithographic printing operations at the shop. Typical sources of VOC emissions in litho shops include inks, blanket and roller washes, and fountain solutions. A print shop claiming exemption from RACT Rule requirements because its maximum theoretical emissions of VOCs are always less than 1,666 pounds per month should keep a record of how the calculation was made to substantiate its position.

It is important to remember that the 1,666 lb/month RACT applicability threshold is based on maximum theoretical emissions, not actual emissions. Unless there are restrictions in a permit, the maximum theoretical emissions from your lithographic printing presses can be calculated by assuming that all presses operate at design capacity or maximum production capacity, for 24 hours per day, 365 days per year. This calculation should not include any emission reductions due to VOC control equipment, and should assume you consistently use the highest VOC content materials used by your shop and print with the highest realistic coverage rate of ink. To determine applicability, the RACT rule allows you to reflect the fact that not all VOCs in the ink are released to the air. A significant portion is retained in the substrate. Specifically, the VOC content of non-heatset inks should be multiplied by 0.05 (reflecting 95% retention), and the VOC content in heatset inks should be multiplied by 0.80 (20% retention), to determine maximum theoretical ink VOC air emissions. The Wisconsin DNR will allow this non-heatset factor and a different factor for heatset inks to be used in all other emissions calculations as described below.

Even if your maximum theoretical emissions of VOCs, as calculated above, exceed 1,666 lb/month, you may be able to avoid many impacts of the RACT rule by choosing to obtain an operating permit in which you commit to conditions which limit your plant's maximum theoretical emissions. For example, in such a permit, you can agree to restrict hours of operation to less than 24 hours per day, 365 days per year, or to limit the VOC content of materials used. Typically such a permit will require you to maintain records documenting that you are complying with the agreed-upon restrictions.

TABLE 4

VOLATILE ORGANIC COMPOUNDS (VOCs) FOUND IN CHEMICALS USED BY SOME PRINTERS

VOCs emitted from print shops can include:

- ! Isopropyl alcohol
- ! Methyl ethyl ketone
- ! Methyl isobutyl ketone
- ! Toluene
- ! Stoddard solvent
- ! Mineral spirits
- ! Napthas

These restrictions could lower the maximum theoretical emissions below 1666 pounds of VOC in any month such that you are not subject to the RACT rule. An operating permit application form is available from the Wisconsin DNR, Bureau of Air Management, 606/266-7718.

Lithographic printers in the nine county area regulated by the RACT Rule are subject to various requirements. If your shop does, or might, fall under the RACT rule restrictions, you should study the rule. Printers not regulated by the RACT rule may be subject to other rules and requirements. You are encouraged to obtain help to determine specific requirements that affect your operations. Several sources for such assistance are listed below. Some specific requirements that do apply to sheetfed lithographic printers in the nonattainment area that have to comply with the Rule include:

- ! limits on VOC content of fountain solution;
- ! limits on either VOC content or vapor pressure of blanket and roller washes;
- ! temperature monitoring requirements for fountain solutions;
- ! record-keeping requirements for VOC content of fountain solutions and blanket and roller washes used;
- ! requirement to submit self-certification of compliance to DNR.

RACT Rule requirements are different for web printing operations.

General VOC Control Requirements. Printers outside the nine county area who have a process line, (press) constructed or modified after August 1, 1979 which emits more than 15 pounds of VOCs in any day must control the VOC emissions by 85%. There are two options available. If it can be demonstrated to the DNR that 85% control is technologically infeasible, an agreement can be reached with the DNR which, for that press, describes the Latest Available Control Techniques and operating practices demonstrating best Current Technology, commonly referred to as LACT. You can alternatively request, and the DNR can approve, that you meet the emission limitations of the RACT rule.

Calculating Emissions. The DNR's approved emission calculation procedures include reductions to reflect the fact that a significant portion of the VOCs in an ink are retained in the paper substrate to which the ink is applied, rather than released to the air. To calculate air emissions, VOC content for non-heatset web and sheetfed inks should be multiplied by 0.05 (reflecting 95% retention), and heatset ink VOC content should be multiplied by 0.85 (reflecting 15% retention).

Also, rather than assume all VOCs in cleaning solvents are released to the air, DNR has approved factors that reflect the solvent remaining in rags or wipes that are properly managed. Proper management means that: (1) the soiled towels are (1) kept in closed containers on-site and during transport to the laundering or disposal facility, and (2) the towels are properly handled, and either laundered, incinerated or disposed of in accordance with all applicable regulations. If these requirements are met, the VOC content of the used solvents may be multiplied by 0.50 (reflecting 50% retention in the towels) if the cleanup solvent is less than 30% VOC by weight or the composite vapor pressure of the solvent is 10 mm mercury or less (indicating a solvent which evaporates relatively slowly). If the VOC content is more than 30% or the vapor pressure is between 10 and 25 mm mercury, the solvent VOC content should be multiplied by 0.60 (reflecting 40% retention in the towels).

The above substrate retention factors for inks, and the towel retention factors for cleanup solvents, have been approved by DNR for all compliance demonstration, permitting and annual air emission reporting requirements other than RACT applicability.

Resources that can help you clarify how RACT and other rules apply to your operations include: Mike Sloat, the Printing Sector Specialist for the DNR's Bureau of Air Management, 608/273-5608, or the general phone number: 608/266-7718; the Wisconsin Department of Development's Small Business Clean Air Assistance Program, 608/267-9214; and Printing Industries of Wisconsin, 414/785-9090. The full text of Wisconsin's air pollution control regulations, the NR400 series, can be accessed through the World-Wide Web at "<http://www.dnr.state.wi.us/eq/air/regs.htm>".

Air Permits. The DNR has two basic types of permits: construction and operating. Both permit programs apply statewide, but many small printers may not need one or both of the permits due to exemptions provided within each program. The following is a brief description of the exemptions available for small printing operations. Whether or not a source needs a permit depends on several different factors, such as location of the facility and design capacity of the operation. Each operation needs to be evaluated on a case-by-case basis. If you are exempt and do not need a permit, you must keep and maintain records of materials used, along with emission or production rates to demonstrate that your plant qualifies for the permit exemption.

Construction Permit: Construction permits are issued for proposed projects, such as the construction of new sources or modification of existing sources. Section NR 406.04 lists the criteria for determining if you are exempt and do not need a construction permit. The proposed project, whether it is for the construction of a new facility or the modification of an existing one, must meet at least one of the items in **Table 5** to be exempt.

TABLE 5

EXEMPTION FROM THE DNR CONSTRUCTION PERMIT	
For a project (construction or modification) to be exempt from the need to obtain a permit, it must meet at least <u>one</u> of the following ¹ :	
!	Actual emissions (before control devices) from the proposed project are less than 1,666 pounds of VOCs per month.
!	Maximum theoretical emissions ² from the proposed project are less than 5.7 pounds per hour of VOCs, particulate matter, and nitrogen oxides, individually and less than 24 pounds per hour of PM ₁₀ and less than thresholds listed in Chapter NR 445 of any HAP; and less than 25 tons per year of any combination of HAPs regulated under section 112(b) of the federal Clean Air Act.
¹	Emissions estimates include associated cleaning operations.
²	"Maximum theoretical emissions" means the quantity of air contaminant that theoretically could be emitted from a source without any control devices.

TABLE 6

EXEMPTION FROM THE DNR OPERATION PERMIT	
To be exempt from the need to obtain an operation permit, the facility must meet at least <u>one</u> of the following ¹ :	
!	Actual facility emissions (before control devices) are less than 1,666 pounds of VOCs per month.
!	Maximum theoretical emissions ² from the entire facility are less than 5.7 pounds per hour of VOCs, particulate matter, and nitrogen oxides, individually; and less than thresholds listed in Chapter NR 445 of any HAP; and less than 10 tons per year of any single HAP; and less than 25 tons per year of any combination of HAPs regulated under section 112(b) of the federal Clean Air Act.
¹	Emissions estimates include associated cleaning operations.
²	"Maximum theoretical emissions" means

Operating Permit: Under the Clean Air Act, operating permits are issued to an entire facility. For smaller lithographic print shops, the operating permit exemption criteria appear similar to those used for construction permits. However, the analysis to determine if you need an operating permit must consider all processes in the entire facility. Your facility must meet at least one of the items in **Table 6** to be exempt from an operating permit. If you think you may need an air permit, you can contact your DNR Bureau of Air Management Regional Office, and a permit engineer will help you evaluate your facility's permit situation. You may also want to seek permit application assistance from the Printing Industries of Wisconsin or an environmental consultant.

Air Emission Inventory. While you may be exempted from

permitting requirements, you may still need to complete an annual Air Emission Inventory (AEI) report. Printers that emit more than 3 tons per year of VOCs, or more than the threshold of any criteria pollutant listed in Chapter NR 438, must complete an annual AEI report and submit it to the DNR by March 1 of the following year. Completing an AEI, even if you are not required to do so, can be extremely helpful in determining your facility's air emission status.

Hazardous Air Pollutants. Both the EPA and DNR have identified compounds considered to be hazardous air pollutants (HAPs). It is unlikely that HAP control requirements would apply to small or medium-sized print shops. The DNR rules for the control of HAPs are contained in Ch. NR 445. To minimize potential health effects to workers, it is wise to avoid using materials with HAPs when suitable alternatives are available. The most likely sources for HAPs in a lithographic print shop include cleanup solvents and fountain solutions, especially fountain solutions containing alcohol replacements (e.g., glycol ethers).

HAPS present in some products used by printers include:

Benzene	Diethanolamine	Isophorone	Propylene oxide
Cadmium compounds	Ethyl benzene	Lead compounds	Toluene
Carbon tetrachloride	Hexane	Methanol	2,4-Toluene diisocyanate
Chromium compounds	Hydrochloric acid	Methyl ethyl ketone	1,1,2-Trichloroethane
Cobalt compounds	Ethylene glycol	Methyl isobutyl ketone	Trichloroethylene
Cumene	Formaldehyde	Methylene chloride	Vinyl chloride
Dibutylphthalate	Glycol ethers ¹	Perchloroethylene	Xylene

¹Glycol ethers include but are not limited to:

2-Ethoxyethanol (EGEE)	2-Methoxyethanol (EGME)
2-Ethoxyethyl acetate (EGEEA)	2-Methoxyethyl acetate (EGMEA)
Isopropoxyethanol	2-Butoxyethanol (EGBE, a DNR - only HAP)

WATER POLLUTION

Printing companies typically discharge wastewater to a publicly owned treatment works (POTW). It is important for printers to know where the wastewater from their shop is going, and to minimize pollution going "down the drain." Do not discharge to a septic tank or directly to Wisconsin's waters unless you have a permit from the DNR allowing such discharges. Even if you discharge wastewaters to a POTW, the treated water eventually gets discharged to surface waters in the state. Furthermore, POTWs are not equipped to treat all types of industrial wastes (e.g., some solvents can pass through a POTW without being removed or treated). However, smaller printers served by sewer systems are rarely required to obtain a wastewater discharge permit.

There are three typical sources of water pollution from printing operations:

- ! Photo developing rinses can contain silver, strong acid or alkaline wastes, or other hazardous components. **Use silver recovery techniques to remove silver** from these solutions. Removing silver is cost-effective, and necessary for printers to comply with State and local wastewater discharge limits.
- ! Inks or solvents can be a problem if dumped down the drain. **Do not dump solvents into any drains**, regardless of whether they discharge to a sanitary sewer or a septic system, because such disposal is usually prohibited by State and local regulations.
- ! Materials discharged to floor drains. Remove any inks, chemicals, oils, etc., before wet rinsing areas that have open

floor drains. You can minimize the potential for any unintended releases to the sewer system by putting removable, sealed covers on your floor drains.

The most serious concern with wastewater discharges from print shops is the high level of silver contained in photographic fixer solutions and rinsewaters. These solutions won't meet wastewater treatment plant discharge limits unless the silver is removed. Every print shop that performs image processing operations should be recovering silver from these solutions and know whether they are required to obtain an industrial waste discharge permit from their local POTW. Although you may not be required to obtain a permit, you will have to comply with the discharge limits established in ordinances administered by your local POTW. Call your local POTW to find out what kind of permit requirements apply to print shops in your area, and ask for a copy of the local industrial wastewater discharge requirements so that you can ensure that you meet the discharge limit for silver.

In addition to wastewater discharges, printers should be concerned about stormwater discharges. You can reduce the potential for stormwater contamination at your property by storing raw materials and wastes indoors. If there is no potential for contaminating stormwater on your facility's grounds, then you are not required to obtain a permit. On the other hand, you should have already applied for a stormwater permit if there is the possibility that stormwater, rainfall, or snow melt water will come into contact with: material handling equipment or activities, raw materials, intermediate products, final products, waste materials, by products or industrial machinery that have the potential of contaminating stormwater. If you have questions about whether or not your facility is required to obtain a stormwater discharge permit, call the WI-DNR stormwater permit staff in Madison at 608/264-8534.

EMERGENCY PLANNING, SPILL & RELEASE NOTIFICATION AND COMMUNITY/EMPLOYEE RIGHT-TO-KNOW REQUIREMENTS

Emergency planning requirements are intended to prepare emergency responders for potential problems caused by the storage and use of hazardous materials. Notification requirements mandate that emergency responders be notified of spills, releases, and other emergencies. Community and Employee Right-to-Know requirements were established to provide communities and employees with information about hazardous materials used in their neighborhoods and places of work. Most smaller printers qualify for exemptions from reporting under the Emergency Planning and Community Right-to-Know requirements.

Emergency Planning. If a printer uses or stores extremely hazardous substances in excess of the threshold planning quantity described in **Table 7**, that printer is required to notify the State Emergency Response Board (SERB) and Local Emergency Planning Committee (LEPC) of such storage. This requirement was put in place so that LEPCs could plan appropriate responses to fires/emergencies at businesses that use and store chemicals that could be hazardous to fire fighters. To find out the name of the LEPC in your area, contact Wisconsin Emergency Management, (WEM) at 608/242-3232.

Emergency Notification. If a printer spills or releases a hazardous substance to the environment, WEM and the DNR informed by calling 800-943-0003. If the substance is released to surface waters or the amount of the substance that is spilled or released

TABLE 7

THRESHOLD PLANNING QUANTITIES (TPQs) FOR EXTREMELY HAZARDOUS CHEMICALS

The following extremely hazardous chemicals have been used by printers:

Chemical Name	TPQ (lbs)

exceeds the reportable quantity described in **Table 8**, the National Response Center (NRC) also has to be notified of the spill; the NRC's phone number is 1-800-424-8802.

Community Right-to-Know. If a printer stores any hazardous substance on-site in excess of 10,000 pounds at any one time, the printer is required to submit a Material Safety Data Sheet (MSDS) for the substance being stored to the LEPC, SERB, and local fire department. Fuel oil (#2 diesel oil) used for heating purposes is the most common substance a printer may be storing in quantities large enough to trigger this requirement.

Also, if a printer stores an extremely hazardous substance in excess of the threshold planning quantity (see **Table 7** above), an MSDS has to be submitted for that substance; this is a one-time submittal only. However, if you routinely store quantities of hazardous chemicals or extremely hazardous substances in excess of these limits, you also have to complete an annual report by March 1 of each year and submit this report to the LEPC, SERB, and local fire department. The annual report, known as a Tier II report, consists of a listing of the chemicals that you store and use at your shop. These forms are available from the Wisconsin Emergency Management at 608-242-3221.

In addition to the Tier II reporting obligation, any printer with more than 10 employees who uses more than 10,000 pounds per year of any one toxic chemical must file a toxic chemical release inventory, (TRI), reporting form (EPA Form R) by July 1 of each year. Form R covers all releases of toxic chemicals, including those releases specifically allowed by permits. Most printers do not have to complete a TRI reporting form. If you are required to complete the form, consider using the approved alternate reporting option. Under this option, a Form R need not be submitted each year; only an annual certification is needed.

Chemicals listed in the Toxic Release Inventory that may be used in the printing industry include:

Ammonia	Cyclohexane	Hydrochloric acid	Silver
Barium	Methylene chloride	Hydroquinone	Sulfuric acid
Cadmium	Ethylbenzene	Lead	Tetrachloroethylene
Chromium	Ethylene glycol	Methanol	Toluene
Copper (except copper phthalocyanine pigments)	Ethylene oxide	Methyl ethyl ketone	Trichloroethylene
Cumene	Formaldehyde	Methyl isobutyl ketone	1,1,1-Trichloroethane
	Freon 113	Phosphoric acid	Xylene

Employee Right-to-Know. OSHA requires all printers to keep a list of hazardous substances used in the shop. Employees need to be provided access to MSDSs for each substance on the list. Employees also need to be provided with training in how to read MSDSs to satisfy their "right to know" about the hazards associated with chemicals used in the shop. Keep records of who attends the training session and what is covered to ensure that all employees are properly trained.

For more information about the Hazard Communication Standard and Employee Right-to-Know program, contact the Safety Consultation Office of the Wisconsin Department of Industry, Labor and Human Relations (DILHR), at 414/521-5063, or OSHA, at 608/264-5388.

SUMMARY

The information in this short Guide is intended to highlight key environmental regulations affecting smaller lithographic print shops in Wisconsin. Although this Guide should help identify most of the environmental regulatory requirements that could affect your operation, there may be additional local or State regulations applicable to your shop. When in doubt, call the appropriate State or local authority to receive a clear interpretation of how the regulations in question apply to your operation. Printing Industries of Wisconsin (PIW) at 414-785-9090 can also help printers understand compliance requirements and strategies. The Solid & Hazardous Waste Education Center (SHWEC) can help you identify practical strategies to reduce the generation of hazardous wastes and emissions. Remember, good environmental practices help protect the future of your business, as well as keep you in compliance.

Additional Waste Reduction Fact Sheets. The following fact sheets, available from the Solid and Hazardous Waste Education Center (SHWEC) can help printers identify ways to reduce the wastes that they generate and as such, save money on raw material purchases and waste disposal costs. To request a copy of any of these fact sheets, call SHWEC at: 608/262-0385.

“Waste Reduction Opportunities for Printers” (425.WP.9408)

“Management of Solvents and Wipes in the Printing Industry” (425.WP.9410)

“Lithographic Ink Wastes: How to Reduce, Reuse, and Recycle ink waste” (425.WP.9508)

“Opportunities for Printers to Reduce Image Processing Costs By Minimizing Waste and Recovering Silver” (425.WP.9604)

RESOURCES:

TABLE 8

SPILL AND RELEASE REPORTABLE QUANTITIES, (RQ)

Note: Spills in excess of the RQ need to be reported to the National Response Center (NRC) at: 1-800-424-8802. All spills/releases, regardless of size, need to be reported to the DNR by calling the Division of Emergency Government's 24-hour hotline: **1-800-943-0003**.

RQs (lbs) for Chemicals that Printers Might Use:

Acetone, 5000	Ethyl acetate, 5000	Methyl isobutyl ketone, 5000
Ammonia, 100	Ethylbenzene, 1000	Perchloroethylene, 100
Benzene, 10	Formaldehyde, 100	Phosphoric acid, 5000
Cadmium & compounds, 1	Hydrochloric acid, 5000	Propylene oxide, 100
Carbon tetrachloride, 10	Hydroquinone, 1	Sulfuric acid, 1000
Chloroform, 10	Isophorone, 5000	Toluene, 1000
Chromium & compounds, 1	Lead and compounds, 1	2,4-Toluene diisocyanate, 100
Cumene, 5000	Methyl chloroform, 1000	1,1,1-Trichloroethane, 1000
Cyclohexane, 1000	Methylene chloride, 1000	1,1,2-Trichloroethane, 100
Dibutyl phthalate, 10	Methanol, 5000	Trichloroethylene, 100
Ethanol, 2-ethoxy, 1000	Methyl ethyl ketone, 5000	Vinyl chloride, 1

If you have Internet access to the World-Wide Web, check out the extensive information available from the Printers' National Environmental Assistance Center (PNEAC) by directing your browser to <http://www.pneac.org>

"Federal Environmental Regulations Potentially Affecting the Commercial Printing Industry", EPA 744B-94-01, March 1994.

"Wisconsin Department of Natural Resources Hazardous Waste Generator Requirements," Publ.-SW-290-12/95.

"Managing Your Hazardous Wastes: A Guide For Wisconsin Small Quantity Generators" Third Edition Revised 1993; PUBL-SW-071 93REV.

"Managing Towels, Wipes and Sorbents." By Minnesota Pollution Control Agency; MPCA Hazardous Waste Division Fact Sheet (03/95).

"Evaluating Paint & Ink Waste." By Minnesota Pollution Control Agency; A Fact Sheet For Minnesota Businesses, April 1994.

"Multimedia Compliance/Pollution Prevention Assessment Guidance For Lithographic Printing Facilities." -- OECA, August 1995.

"Federal Environmental Regulations Potentially Affecting The Commercial Printing Industry" -- Design for the Environment, EPA744B-94-001.

Wisconsin's Air Pollution Regulations can be accessed through the World-Wide Web from the DNR's home page at "<http://www.dnr.state.wi.us/eq/air/regs.htm>".

"Permit Primer." Wisconsin Department of Natural Resources.

"Environmental Management Program" Developed by Printing Industries of America for the Graphic Communications Industry, 1992.

"EnviroPrint" - A Self-Help Guide To Environmentally Sound Printing Operations by Printing Industries of Ohio, 1995.

"DNR Requires Storm Water Pollution Prevention Planning for Businesses" - SHWEC Fact Sheet, 450.DL.9212.

"The Recycling Law: Implications for Businesses" - SHWEC Fact Sheet, 605.GK.9411.

"Code of Management Practices", The Silver Council, 1996, www.silvercouncil.org

L For More Information, Contact Your County Extension Agent or SHWEC 7

UW-Green Bay

University of
Wisconsin
Environmental
Science 317
2420 Nicolet Drive
Green Bay, WI 54311
414/465-2707
Fax: 414/465-2143

UW-Madison

Lowell Hall
610 Langdon Street,
Rm. 528
Madison, WI 53703
608/262-0385
Fax: 608/262-6250

UW-Stevens Point

College of Natural
Resources
University of
Wisconsin
Stevens Point, WI
54481
715/346-2793
Fax: 715/346-3624

UW-Stout

Northwest Wisconsin
Manufacturing
Outreach Center
(NWMOC)
278 Jarvis Hall
Menomonie, WI
54757
715/232-5031
Fax: 715/232-1105

Authors of this or previous revisions of this Guide include: W. Pferdehirt, (SHWEC Waste Management and Minimization Specialist), R. Gifford, (SHWEC Graduate Assistant), and D. Boehm (previous SHWEC Graduate Assistant). Editorial and layout assistance provided by Marilyn McDole. This revision June 1997.