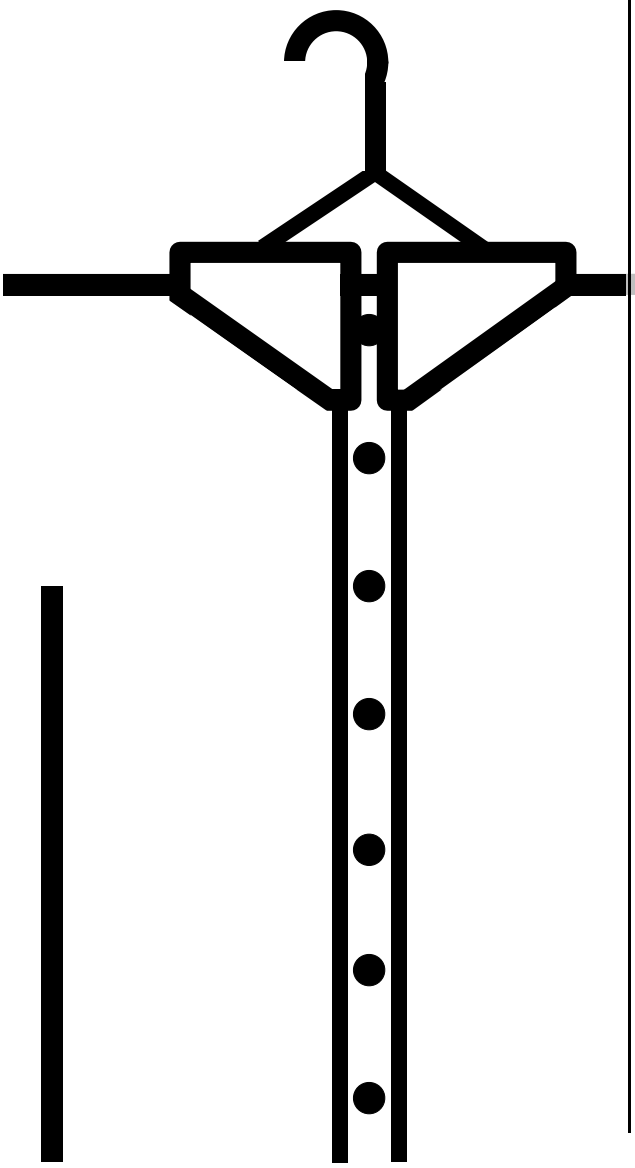
Environmental Guide for Ohio Dry Cleaners



Introduction

Dry cleaning establishments provide an important cleaning service in Ohio, with almost four percent of the nation's dry cleaners located in this state. However, this service is often accompanied by the generation of hazardous waste and air emissions, and the potential release of contaminated water to surface or ground water.

This fact sheet will provide an overview of the environmental regulations relevant to Ohio dry cleaners. It will also discuss ways to potentially reduce environmental risk and regulatory burden by reducing the generation of wastes and emissions at the source and through recycling.

Background

Process overview

The dry cleaning industry provides garment and other apparel cleaning services, and related services such as clothes pressing and finishing. The types of establishments that make up this industry include:

Retail dry cleaning stores;
Industrial and linen supply plants with dry cleaning operations;
Leather and fur cleaning plants; and
Self-service laundromats with dry cleaning equipment.

Dry cleaners typically use either perchloroethylene (perc, tetrachloroethylene) or petroleum solvents (stoddard, quick-dry, low-odor or 140 degrees F) as cleaning solvents. The dry cleaning process consists of three principal steps: cleaning or washing the garments; extracting used solvent; and "drying" the garment.

In the cleaning stage, garments are pre-treated for stains and then machine washed in a solution of a solvent, soap and detergent. The extrac-

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tion process, essential for any dry cleaning operation, removes solvents by draining and spinning the clothes. This reduces solvent loss, eliminates waste and dripping of solvents, and reduces the weight of wet garments. The drying process removes any solvent remaining in the garments by tumbling them in a stream of warm air. When the removal of solvents is complete, the clothes often are treated with a stream of fresh air, a process called deodorizing or aerating. Finally, a garment may be finished by pressing or a similar operation.

Four basic types of dry cleaning machinery have evolved over time, each representing a higher level of technology. However, all are still in use today.

Transfer or wet-to-dry: This cleaning equipment uses separate washers and dryers, with clothes manually transferred between the two. These systems release solvent vapors to the atmosphere during transfer and expose workers to the solvent.

Dry-to-dry: This equipment combines washing and drying in a single machine. Since clothing is no longer transferred to another machine, solvent air emissions are reduced, which in turn reduces solvent use. Some vent residual vapors to the atmosphere or to an external control device. Others, described below, use internal control devices.

Closed loop dry-to-dry with refrigerated condensers: This equipment modifies the previous equipment by adding control technology, built in refrigerated condensers, to reduce vapor emissions. These machines do not vent air to the atmosphere, but recycle it continuously through the dry cleaning cycle.

Closed loop dry-to-dry with additional vapor recovery device: This equipment modifies the previous equipment by adding additional internal vapor recovery devices. These machines use refrigerated condensers and carbon adsorbers. These are the most efficient machines, with the least amount of solvent air emissions, and subsequently the lowest use of solvent. (U.S. EPA, 1995; Ohio EPA, 1993).

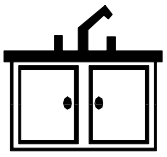
Figure 1- Wastes and emissions from dry cleaning operations

The following are examples of the wastes and emissions resulting from dry cleaning operations. The specific materials produced will differ from dry cleaner to dry cleaner, and will be based on operations and equipment.

Hazardous waste:
- Spent solvents;
- Spent carbon and cartridges from carbon adsorbers;
- Still residues (sludge);
- Filter powder (muck);
- Filters;
- Filter media;
- Rags;
- Surplus chemicals; and
- Drums.

Air emissions:
- Solvent spills;
- Fugitive leaks from piping;
- Vapor released with transferring or removing clothes from machines;
- Vapor release from clothes dryers; and
- Residual vapor release from clothes after they are released from driers.

Wastewater:
Water from separators (routed from condensers, carbon adsorbers, cartridge strippers, stills and muck cookers).



Waste streams

Dry cleaning can be responsible for the generation of hazardous waste, air emissions and wastewater (Figure 1). These wastes and emissions must be managed according to environmental regulations.

Hazardous waste can include materials such as spent solvents, spent carbon and carbon cartridges from carbon adsorbers, still residues from solvent distillation (still bottoms), cooked powder residues (muck) and drums.

Solvent emissions can be directly released into the air during washing, aeration, still and other equipment operation, and door openings at the end of cycles. Fugitive releases can occur during clothes transfer and because of equipment leaks, losses during solvent transfer and evaporation from spent filters and distillation wastes.

The recovery of solvent from vapors routed to water separators from condensers, carbon adsorbers, cartridge strippers, stills and muck cookers can yield water-contaminated solvent. The volume of water is often increased by the water present in the garments that are laundered. The solvent can be recovered in a water separator, however, the water drained from the top of the separator will still be contaminated with solvent. This wastewater is often referred to as separator water. (CIS, no date: U.S. EPA, 1995; Ohio EPA, 1993).

Environmental regulations

The hazardous waste, air emissions and wastewater generated by dry cleaners can pose a threat to the environment and to public health and safety. Environmental regulations have been developed to reduce that risk. Dry cleaning operations may be subject to regulations for hazardous waste, air emissions, and wastewater, whether you discharge to a wastewater treatment plant, directly to a body of water, or to an underground injection well (septic system) or storage tank.

The following sections discuss these environmental regulations. Each section contains a reference for who to contact for more information. Telephone numbers and addresses for these contacts are listed at the end of this document in a section titled, ***Who to Call.***

Hazardous waste

Most dry cleaners generate hazardous waste. Hazardous wastes are classified into two types: **listed and characteristic**.

Listed hazardous wastes are listed by name or process in the Code of Federal Regulations Chapter 261, and in Ohio's Hazardous Waste Management Rules, Ohio Administrative Code Chapter 3745-51. For example, perc used in dry cleaning is a listed hazardous waste with a hazardous waste code of F002 when spent. Perc has the waste code U210 as a pure commercial chemical product if discarded prior to use. Spill residues from the cleanup of perc product spills are also considered to be U210 hazardous waste. Any other waste coming in contact with a listed waste also becomes a listed waste by virtue of the "mixture rule." This includes wastes such as filters, filter media, still residue (sludge), and filter powder (muck) containing perc.

A characteristic waste exhibits one or more of the four hazardous characteristics (ignitability, reactivity, corrosivity and toxicity). For example, a waste solvent exhibits the characteristic of ignitability if it has a flashpoint below 140 degrees F.

The characteristic of toxicity is determined by use of the Toxicity Characteristic Leaching Procedure (TCLP). The TCLP simulates the acidic conditions found in a landfill and determines how much of certain regulated substances would leach from the waste if placed in a landfill. Regulatory levels are set for 39 hazardous constituents in terms of parts per million, and any waste exceeding these levels is a toxic hazardous waste. Perc, for example, is one of the 39 hazardous constituents. Any waste which contains 0.7 parts per million or more of perc is considered to be a D039 toxic hazardous waste.

Who is a generator?

Every dry cleaning facility that produces hazardous waste is considered a generator.

What steps are required to properly dispose of hazardous waste?

☛ **Step 1: Evaluate the facility's waste**

- ❑ Consider all waste generated at the facility.
- ❑ Consider all objects that come in contact with perc (e.g. maintenance residue and spill clean up material).

☛ **Step 2: Determine the facility's generator status**

There are three categories of hazardous waste generators. These categories are determined by the amount of hazardous waste that is generated by a business each calendar month. The hazardous waste requirements differ for these three sizes of generators.

❑ **Conditionally Exempt Small Quantity Generator (CESQG)** - generates less than 100 kg of hazardous waste in a calendar month (220 pounds).

CESQGs are required to:

1. *Evaluate their waste (as detailed in step one below);*
2. *Ensure delivery of hazardous wastes to an off-site permitted hazardous waste facility; and*
3. *Limit quantities accumulated on-site to less than 1000 kg (2200 pounds).*

The requirements in Steps three through six are recommended for CESQGs, but are not required by rule.

❑ **Small Quantity Generator (SQG)** - generates between 100 and 1000 kg of hazardous waste per month (220 to 2200 lbs).

SQGs must follow steps three through six as detailed below.

❑ **Large Quantity Generator (LQG)** - generates more than 1000 kg (more than 2200 lbs.) of hazardous waste per month.

Most dry cleaners in Ohio are SQGs or CESQGs. LQGs must comply with additional requirements. Additional guidance for LQGs is available by calling Ohio EPA, Division of Hazardous Waste Management at (614) 644-2934.

☛ Step 3: Comply with hazardous waste accumulation requirements

Hazardous waste must be stored in containers that are:

❑ marked with the date upon which each period of accumulation begins;
❑ labeled or clearly marked with the words *hazardous waste*;
❑ in good condition and made of or lined with materials compatible with the waste;
❑ closed during storage except when waste is being added or removed;
❑ not opened, handled or stored in a manner which may rupture them or cause them to leak; and
❑ inspected weekly for evidence of leaks or deterioration, and the inspections documented in a log.

SQGs may accumulate hazardous waste for up to 180 days.

❑ This may be extended up to 270 days if waste must be transported at least 200 miles to a treatment, storage and disposal (TSD) facility.
❑ Accumulation must not exceed 6,000 kg (13,200 lbs.).

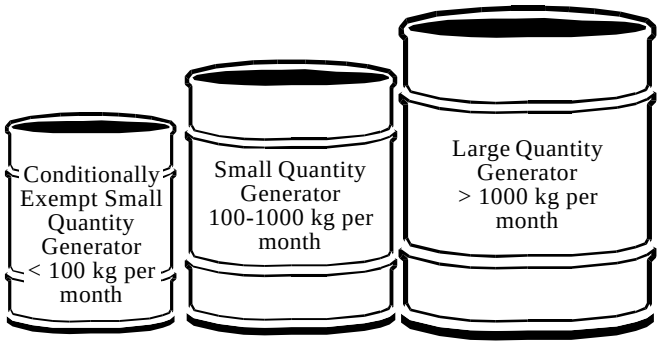
☛ Step 4: Transportation and disposal of hazardous waste

Use of manifests

A hazardous waste manifest is a shipping form, completed by the generator, that accompanies each shipment of hazardous waste when it is transported off-site. Manifests are required of all SQGs and LQGs sending waste off-site. Manifests are not required for SQGs who are reclaiming their waste under a contractual agreement if all of the following conditions are met:

❑ The types of waste and frequency of shipments are specified in the agreement.
❑ The vehicle used to transport the waste to the recycling facility is owned and operated by the reclaimer of the waste.
❑ The generator maintains a copy of the reclamation agreement for at least three years after termination or expiration of the agreement.

When managing hazardous waste and determining generator status, the generator must look at the total of



all hazardous waste produced, not just the waste that is managed under a contractual agreement. A SQG should receive a copy of the manifest with the signature of the owner or operator of the designated facility within 60 days of the date the waste was accepted by the initial transporter. If a manifest is not received within 60 days, the generator must submit a legible copy of the manifest, with some indication that the generator has not received confirmation of delivery, to Ohio EPA, Division of Hazardous Waste Management. The submission to Ohio EPA need only be a legible handwritten or typed note on the manifest itself, or on an attached sheet of paper, stating that the return copy was not received.

All manifest copies must be kept for a period of three years from the date the waste was accepted by the initial transport.

Land Disposal Restrictions (LDRs)
A Land Disposal Restriction (LDR) form must accompany hazardous waste to the disposal facility. Hazardous waste cannot be landfilled without first meeting certain treatment standards. An LDR form notifies the disposal facility that waste meets treatment standards or does not meet treatment standards. An LDR form must be completed even if the waste is to be recycled. The disposal facility will treat the waste prior to land disposal, if necessary. The generator must identify on an LDR form what constituents are present in the waste - this can be done by generator knowledge and/or analytical testing. All LDR forms must be kept on file for a period of five years after the date the waste was sent to the treatment, storage and disposal facility.

Liability
Although a waste disposal or recycling firm is often hired to manage the hazardous waste generated at a dry cleaning facility, liability for the waste does not end when it leaves the cleaner's site. It is still the cleaner's responsibility to ensure that the hazardous waste is properly managed.

Identification numbers
U.S. EPA ID numbers are required of all LQGs and SQGs. They are voluntary for CESQGs, although some commercial treatment, storage and disposal facilities require all customers to obtain them, independent of size. Notification forms and booklets may be obtained by calling Ohio EPA, Division of Hazardous Waste Management.

Transportation Department requirements
Before sending hazardous waste off-site, dry cleaners must label, package, mark and placard containers in accordance with Transportation Department regulations. Please call the Public Utilities Commission of Ohio, Transportation Department, if you have any questions regarding these requirements.

☛ Step 5: Develop a personnel training program
Dry cleaners that are SQGs must ensure that their employees are thoroughly familiar with proper waste handling and emergency procedures relevant to their job duties.

☛ Step 6: Emergency Procedures
A SQG must have at least one employee either on the premises or on call at all times designated as the emergency coordinator. The emergency coordinator or his designee must respond to any emergencies that arise.

The following information must be posted next to a telephone which is available to all employees who

Figure 2 - Frequently found hazardous waste violations

- ❑ Failure to evaluate wastes;
- ❑ Failure to label and date containers;
- ❑ Failure to keep containers closed and in good condition;
- ❑ Failure to maintain manifest and LDR documents;
- ❑ Failure to conduct inspections of hazardous waste containers and emergency equipment, and/or failure to keep logs of these inspections;
- ❑ Failure to designate an emergency coordinator;
- ❑ Failure to post emergency information by the phone. *(refer to Step six)*

Figure 3 - Serious hazardous waste violations

- ❑ Disposing of dry cleaning wastes improperly (for example, throwing wastes in the trash);
- ❑ Drying out dry cleaning filters;
- ❑ Storing dry cleaning wastes in containers that are leaking or in poor condition;
- ❑ Keeping wastes on-site for longer than the law allows - *180 days for SQGs; CESQGs can not accumulate more than 1000 kg (2200 lbs.).*

handle hazardous waste and which is capable of contacting outside assistance:

- ❑ the name and telephone number of the emergency coordinator;
- ❑ the location of fire extinguishers and spill control material, and, if present, fire alarm(s); and
- ❑ the telephone number of the fire department, unless the facility has a direct alarm.

Emergency equipment, such as portable fire extinguishers and spill control equipment, must be immediately available to employees in the event of an emergency. Emergency equipment must be tested/inspected weekly and maintained as necessary. An emergency equipment testing log must be kept by the facility.

For more information, contact Ohio EPA, Division of Hazardous Waste Management.

Air emissions

All dry cleaners that use perc are required to obtain air permits.

In September 1993, U.S. EPA issued national regulations (National Emission Standards for Hazardous Air Pollutants, or NESHAPs) to control air emissions of perc from dry cleaners. This regulation affects all dry cleaners that use perc, in both transfer and dry-to-dry machines.

☛ Step 1: Determine classification

How a particular dry cleaner is affected depends on the type of machinery used and the amount of perc used. Figure 4 shows how dry cleaners are classified.

☛ Step 2: Requirements

How dry cleaners are affected by the regulation is also based on when dry cleaning machines were installed. Machines installed before December 9, 1991, are considered "existing"; any brand new machines installed on or after December 9, 1991, are considered "new." Any dry cleaning machine or facility that was originally installed before December 9, 1991 and has undergone either a transfer of ownership or a change of location is considered "existing." Figure 5 shows how perc dry cleaners are affected by the regulation.

Any dry cleaning facility that installs a "new" machine must install a dry-to-dry machine with a refrigerated condenser. In addition, facilities that purchase large quantities of perc (over 1,800 gallons perc/year) are required to use a carbon adsorber with a refrigerated condenser on the new dry-to-dry machine.

"New" transfer machines that use perc cannot be installed. New carbon adsorbers cannot be used without

Figure 4 - Classification of dry cleaners based on perc usage

Dry cleaners with:	Small Area Source consuming less than:	Large Area Source consuming between:	Major Sources consuming more than:
only dry-to-dry machines	140 gallons perc/year	140-2,100 gallons perc/year	2,100 gallons perc/year
only transfer machines	200 gallons perc/year	200-1,800 gallons perc/year	1,800 gallons perc/year
both dry-to-dry and transfer machines	140 gallons perc/year	140-1,800 gallons perc/year	1,800 gallons perc/year

Figure 5 - Requirements for Dry Cleaning Facilities

Applicability	Small Area Source	Large Area Source	Major Sources
Process vent controls			
Existing facilities	None	Refrigerated condenser, existing carbon adsorbers can remain in place	
New facilities	Refrigerated condenser	Refrigerated condenser followed by a small carbon adsorber	
Fugitive controls			
Existing facilities	Sealed containers, leak detection/repair		Room enclosure, sealed containers, leak detection/repair
New facilities	No new transfer systems, sealed containers, leak detection/repair		
Monitoring			
Existing facilities	None	Meet parameters set for refrigerated condensers and carbon adsorbers	
New facilities	Meet parameters set for refrigerated condensers and carbon adsorbers		
Inspections			
All facilities	Biweekly	Weekly	

a refrigerated condenser for required perc vapor recovery.

Small dry cleaners do not need to install perc vapor recovery systems on "existing" machines, but must comply with the following regulations:

- ❑ keep perc purchase receipts for determining consumption amounts;
- ❑ on the first business day of every month, record the amount of perc bought in the prior month and the total amount of perc bought in the prior 12 months;
- ❑ keep all perc in closed, non-leaking containers;
- ❑ drain cartridge filters in their housing or sealed containers for a minimum of 24 hours;
- ❑ keep machine doors closed except when loading and unloading;
- ❑ operate and maintain equipment according to the manufacturer's instructions, and keep owner's manuals and design specs on-site;
- ❑ conduct a biweekly leak detection and repair program and keep a written log. Leak detection can be performed by sight, smell, feel or air flow.
- ❑ If any leaks are found:
  - ❑ they must be repaired within 24 hours;
  - ❑ if repair parts have to be ordered, they must be ordered within two days;
  - ❑ parts must be installed within five days of receipt;
  - ❑ keep a written log of repair work; and
- ❑ keep all records for a minimum of five years.

At larger dry cleaners, "existing" dry cleaning machines must be equipped with a refrigerated condenser (or a carbon adsorber if it was in place before September 22, 1993). Existing large sources must comply with all of the above requirements in addition to the following:

- ❑ leak detection must be conducted weekly;
- ❑ if a refrigerated condenser is being used on a dry-to-dry machine, reclaimer or dryer: Once a week,

measure and record the temperature of the washer exhaust on the inlet and outlet side of the refrigerated condensers and log the difference. The temperature difference must be 20 degrees F or greater. If the temperature difference is less than this, dry cleaners should make repairs and record actions.

IMPORTANT: Dry cleaners with transfer systems must use separate condenser coils for controlling the perc air streams from the dryer/reclaimer and washer.

❑ If a carbon adsorber is being used: Once a week, measure and record the concentration of perc in the carbon adsorber exhaust using a colorimetric detector tube. The measurement must be taken while the machine is venting to the carbon adsorber at the end of the last dry cleaning cycle prior to desorption.

Major source dry cleaners that have a transfer machine must install a room enclosure around each transfer machine and vent the room enclosure to a carbon adsorber. Room enclosures cannot be vented to refrigerated condensers.

☛ Step 3: Pollution prevention

The regulation requires all perc dry cleaners, regardless of size, to incorporate the following pollution prevention steps:

- ❑ Inspect all dry cleaning equipment biweekly for leaks that are obvious according to sight, smell or touch. For example, leaks are where drops of perc are visible on the outside of a machine or where a stream of air can be felt coming from a machine. Larger dry cleaners (those required to install control equipment under the regulation) must inspect equipment every week.
- ❑ Repair all leaks.
- ❑ Keep a log of the leak detection and repairs.
- ❑ Follow good housekeeping practices, which include:
  - ❑ keeping all perc and wastes containing perc in covered containers with no leaks;
  - ❑ draining cartridge filters in closed containers;
  - ❑ keeping machine doors shut when clothing is not being transferred;
  - ❑ operating and maintaining all dry cleaning equipment according to manufacturer's instructions;
  - ❑ keeping a log of the amount of perc purchased for the past 12 months.

Reporting and compliance

All perc dry cleaners must comply with the pollution prevention requirements now.

Each facilities was to submit a report to U.S. EPA by June 18, 1994, stating how it is complying with the U.S. EPA pollution prevention requirements (forms are available from Ohio EPA, Division of Air Pollution Control). All new facilities must comply upon start-up with all requirements and submit a compliance report within 30 days after start-up. This compliance report is submitted to U.S. EPA one time, and it is not required annually. However, a report must be submitted to U.S. EPA whenever any facility undergoes a change, such as an increase in the amount of perc purchased annually or the purchase of new equipment.

Perc vapor recovery systems (refrigerated condensers and carbon adsorbers) are not required until September 22, 1996, for existing machines. However, all new machines must be equipped with these systems upon start-up.

Refrigerated condensers must cool the perc vapor in the machine down to 45 degrees F or less at the end of the dry cleaning cycle. Any carbon adsorbers must not release perc in amounts over 100 parts per million of perc from a stack. Carbon adsorber test kits are available through dry cleaning trade associations and vendors. The carbon adsorber test is not required for existing machines until September 22, 1996. However, if a facility chooses to submit a compliance report to U.S. EPA before this date, it is required to start testing immediately. This test is required weekly for facilities that use carbon adsorbers for control requirement compliance.

For more information, contact Ohio EPA, Division of Air Pollution Control.

Surface water

Dry cleaners can generate wastewater, such as the solvent-contaminated wastewater from water separators. Dry cleaners may have to respond to certain wastewater regulations and requirements, based on factors specific to their operations. Wastewater requirements include:

- ❑ Wastewater (such as separator water) that is discharged to a sanitary sewer requires a permit or written confirmation that no permit is required from the operator of the local treatment plant or from Ohio EPA.

- ❑ Wastewater that is discharged directly to a storm sewer, river, stream, lake or ditch requires a permit from Ohio EPA.
- ❑ Wastewater that is discharged to a septic tank system or disposal well requires a permit from Ohio EPA (see the section of this document titled, ***Ground water***).

In order to determine their permitting requirements, it is important for dry cleaners to determine where their wastewater goes. Most dry cleaners with water supplied by a local water utility will discharge their sanitary wastewater from toilets and sinks, and process wastewater such as separator water, to a sanitary sewer system. This wastewater flows to a treatment plant. After treating the wastewater, the treatment plant discharges the treated water into a river, lake, stream or other water body.

Sources of wastewater can be determined by a walk-through of the dry cleaning facility. Special attention should be given to equipment and processes that use water or generate wastewater. A master plumbing diagram will show sanitary sewer lines and storm sewer piping. Additionally, evidence of flowing water may be seen outside the building. Dry cleaners should look for water flowing directly onto the ground from a pipe or other structure, or water flowing from a pipe into a creek, stream, river, pond or other water body.

Wastewater discharged to a treatment plant

Dry cleaners that discharge non-sanitary wastewater (separator water or other process-related wastewater from sources other than toilets and bathroom sinks) are required to obtain a discharge permit or authorization (written or verbal) from the local treatment plant or from Ohio EPA. This notification is required even if the volume of water or contamination is very low.

☛ Step 1: Determine wastewaters generated
Identify the amount (gallons per day) of each of the various wastewaters generated and develop a brief description of the concentration of pollutants (such as perc) expected to be present in the wastewaters.

Treatment plants cannot effectively treat all types of wastewater, and are typically designed to treat only sanitary or domestic discharges. Each treatment plant has specific limits on the type and amount of pollutants that it is able to accept. These limits are based on the following:

- ❑ discharges that pose a fire or explosion hazard;
- ❑ discharges with extreme pH values (generally below 5 or above 9);
- ❑ discharges that pose a health hazard to treatment plant personnel;
- ❑ discharges with excessive petroleum or oil and grease concentrations;
- ❑ discharges at elevated temperature (generally above 104 degrees F); and
- ❑ discharges with toxic substances such as cadmium, chromium, lead or synthetic organic compounds which may interfere with treatment plant operations.

☛ Step 2: Notify the local treatment plant
The most efficient method of contacting a local treatment plant is through a letter that identifies a dry cleaning operation and its associated discharge. A dry cleaner can identify the appropriate person to receive this letter by inquiring within the utility that issues its water bill, or by placing a call to the city or town government office, or department of public works.

☛ Step 3: Notify Ohio EPA
Dry cleaners should contact Ohio EPA, Division of Surface Water, Pretreatment Unit, to determine if indirect discharge permits or permit by rule requirements apply. In some communities, the local treatment plant has been given authority by Ohio EPA to issue permits and to directly regulate wastewater discharges. In these situations, dry cleaners should contact the local authority.

Normally, dry cleaners are viewed as small dischargers, and as such are not required to complete extensive discharge applications for indirect discharge permits, which are reserved for "significant industrial users." Significant industrial users are defined as facilities that discharge 25,000 gallons per day or more of process wastewater, or have the potential to disrupt local treatment plant operations, or are specifically regulated as a categorical industry by U.S. EPA. Currently, dry cleaners are not regulated as a categorical industry. However, dry cleaners should contact both Ohio EPA and local treatment plant authorities to determine what requirements may apply to them.

In addition, dry cleaners may be required to obtain a "permit to install" from Ohio EPA or a local delegated authority for dry cleaning equipment with wastewater

discharges. Contact Ohio EPA, Division of Surface Water, Pretreatment Unit, for permit to install requirements.

Wastewater discharged to a creek, river or other body of water

When tracking their wastewaters, dry cleaners should confirm that all wastewater proceeds directly to the treatment plant. If the wastewater is discharged from the facility directly to a ditch, stream, river or other water body, or to a septic system or storage well, additional regulations may apply.

Any wastewater (excluding storm water) from dry cleaning operations that is discharged directly into a storm sewer, creek, river, stream, pond, lake, ditch or other land or water body requires a National Pollutant Discharge Elimination System (NPDES) permit from Ohio EPA. (Note: NPDES permits are not required for water discharges of air conditioner condensate, springs, fire fighting or sprinkler runoff.)

Dry cleaners should attempt to divert wastewater discharges from a river or stream into a local treatment plant system to avoid this permitting requirement. Dry cleaners should do the following to help prevent direct discharges:

- ❑ cap floor drains in the vicinity of hazardous chemicals or otherwise take precautions to prevention accidental spills from reaching a drain;
- ❑ reroute wastewater discharges to the sanitary sewer system and local treatment plant with proper approval;
- ❑ do not discharge any waste other than sanitary waste into a septic tank system.

(Printing Industry of Ohio, 1995)

To discuss obtaining a NPDES permit or for more information, contact Ohio EPA, Division of Surface Water, Industrial Permitting Unit.

Ground water

Not all wastewater drains to a wastewater treatment plant - some dry cleaners may be discharging wastewater to a disposal well or septic system. Dry cleaners using disposal wells or septic systems to discharge waste fluids and residues are actually operating Class V injection wells, which are subject to regulation by Ohio EPA's Division of Drinking and Ground Waters, Underground Injection Control Unit. Industrial Disposal Wells (5W20), one category of Class V injection wells, are defined as wells or septic systems which receive or have the potential to receive industrial or commercial fluids, wastes or wastewater.

☛ Step 1: Determine if well is a Class V injection well

Class V injection wells generally inject fluids into or above an underground source of drinking water and are frequently located in areas not served by a sanitary sewer system, or where sewer systems are inadequate.

Underground Injection Control (UIC) regulations prohibit any underground injection, except as authorized by permit or rule issued under Chapter 3745-34 of the Ohio Administrative Code (OAC).

To protect Ohio's underground sources of drinking water, owners or operators are prohibited from constructing, operating, maintaining, converting, plugging, or abandoning wells, or conducting any other injection activity that allows the movement of fluid containing any contaminant into an underground source of drinking water if the presence of the contaminant may cause a violation of primary drinking water regulation under OAC Chapter 3745-81 or may otherwise adversely affect the health of persons.

If at any time the director of Ohio EPA learns that a Class V well may cause a violation of primary drinking water regulations, he or she shall:

- ❑ require the injector to obtain an individual permit;
- ❑ order the injector to take such actions (including closure of the injection well) as may be necessary to prevent the violation; or
- ❑ take enforcement action.

Dry cleaning process wastewater, contact cooling waters and solvents must not be allowed to enter Class V injection wells. Sinks and floor drains in process or chemical storage areas should be permanently plugged and abandoned to prevent wastes from entering Class V injection wells.

☛ Step 2: Notification

UIC regulations established in 1984 require owners and operators of Class V wells to notify the director of Ohio EPA of the existence of any Class V well and provide the following information no later than November 9, 1985:

- ❑ Facility name and address;
- ❑ Name and address of legal contact;
- ❑ Owner of facility;
- ❑ Nature and type of injection well; and
- ❑ Operating status of the injection well.

Failure to report this information will result in the termination of authorization to operate a Class V well. Facilities installing wells after November 9, 1984 are required to apply for and obtain Class V injection well permits or, permanently plug and abandon the well(s).

☛ Step 3: Best management practices
U.S. EPA has developed fact sheets which identify best management practices for protecting ground water for dry cleaners using shallow industrial waste disposal wells. These address well closure, alternative disposal methods and pollution prevention. These practices are recommendations only. To request copies, for further information, to submit Class V inventory information or to request Class V permit applications, please contact Ohio EPA, Division of Drinking and Ground Waters, UIC Unit.

Case study number one

A dry cleaning facility utilized three transfer cleaning machines and four drying units with a total capacity of 155 pounds. In advance of Clean Air Act deadlines, it replaced all these machines with three new closed-loop dry-to-dry machines with a combined capacity of 160 pounds. All three new machines included improved cartridges and systems for recycling perc. The largest machine utilized a spin disk to enhance its recycling system and reduce the need for disposable cartridges.

With the old machinery, the dry cleaner purchased 500 gallons of perc per month. With the new machinery, the company uses a total of 50 gallons of perc over a four month period, resulting in a monthly savings of over 480 gallons of solvent. This saves $1,950 per month through the reduced purchases of solvent.

The company's hazardous waste generation also has been greatly reduced, since fewer cartridges have to be disposed. Its hazardous waste disposal costs have been reduced by two-thirds, from $1,500 per month to $500 per month.

The capital cost for this project was $150,000. The payback period, based on reduced purchasing and hazardous waste disposal, is four years. In the first three years after the equipment was installed, 75 percent of the investment had already been recouped. The company has also reported a 20 percent increase in quality, measured by fewer returns for re-cleaning. (Delaware Department of Natural Resources and Environmental Control, no date)

Pollution Prevention

It has been estimated that over three quarters of the perc used at a dry cleaning facility can be lost to the atmosphere through emissions. A significant amount of perc also can be lost as hazardous waste (Source Reduction Research Partnership, 1991). These emissions and wastes represent both a considerable loss of valuable raw material and generation of pollutants.

The best way to reduce pollution, wastes or emissions is to prevent them in the first place. Pollution prevention is the use of source reduction techniques to reduce risk to public health, safety, welfare and the environment. It also includes recycling, as a second preference, to achieve these same goals. It avoids the transfer of wastes and/or pollutants across different environmental media (land, air and water), and addresses all types of waste and environmental releases to all of these media.

Source reduction techniques are any efforts to reduce, at the source, the quantity of waste generated, toxic chemical use, or any release into the environment. It includes activities such as process modifications, good operating and management practices, increases in the efficiency of machinery and recycling within a process.

Some pollution prevention activities are required for dry cleaners by the air regulations discussed previously in this document. Others are voluntary activities.
In addition to obvious environmental and human safety

Figure 6 - Examples of pollution prevention opportunities for dry cleaners

Improved operating practices	Conduct transfer of solvent-saturated clothes from washer to dryer as quickly as possible.
	Close dryer door immediately upon completion of transfer.
	Clean the filters that precede carbon filters weekly.
	Clean lint screens to avoid clogging fans and condensers.
	Open button traps and lint baskets only long enough to clean.
	Check baffle assembly in cleaning machine biweekly.
	Use closed, labelled containers for collection and storage of recovered or new solvent.
	Size loads correctly - do not overload or underload machines.
Inventory control	Buy only what you need, and organize shelves so that old materials are used first.
	Inspect materials upon delivery and return any that are unacceptable to suppliers.
Equipment maintenance	For preventive maintenance reasons, inspect the following regularly for leaks: hose connections, unions, couplings and valves; machine door gaskets and seating; filter head gasket and seating; pumps; solvent base tanks and solvent and waste storage containers; water separators; filter sludge recovery; distillation units; diverter valves; and cartridge filters.
	Repair all leaks promptly.
	Clean drying sensors weekly.
	Replace seals regularly on dryer deodorizer and aeration valves.
	Replace door gasket on button trap.
	Replace gaskets around cleaning machine door or tighten enclosure.
	Secure hose connections and couplings.
	Clean lint buildup on cooling condenser coils weekly.
	Use a hamper or room enclosure of impermeable construction to reduce solvent release during transfer.

(Figure 6 continued)

Equipment modification	Place washer and dryer close together to minimize solvent losses during transfer.
	Replace the cartridge filters with spin disk filters that can be cleaned without opening. This would produce fewer fugitive emissions and less hazardous waste.
	Install distillation equipment where the still bottoms can be removed without opening the still to reduce fugitive emissions.
	Use carbon adsorber that is regenerated with hot air stripping rather than steam stripping. This reduces the waste stream.
	Use double carbon wastewater treatment devices to clean up perc-contaminated wastewaters, and recycle the treated wastewater to the process boiler.
Chemical substitutions	Alternative petroleum solvents are being developed with higher flash points to reduce the fire hazard.
	Alternative petroleum solvents are being developed with lower VOC content.
Major equipment upgrades	Add a refrigerated condenser to the machine for primary control, and a carbon adsorber for secondary control, and recycle solvent.
	Replace a transfer machine with a dry-to-dry machine.
	Upgrade a dry-to-dry machine with additional control equipment such as a spill container that will catch and recycle solvent spills from the machine.
	Replace current machine with a dry-to-dry non-vented machine that contains an integral refrigerated condenser and an integral carbon adsorber.
Technological innovation	The majority of the hazardous waste is generated by the carbon adsorbers. Several new technologies are being developed that use a polymer surface for adsorbing the solvent vapor. The surface can be regenerated by heating and, unlike carbon, does not need to be replaced, thus reducing hazardous waste.
	Multiprocess wet cleaning does not use organic solvents as the primary solvent.
	Both ultrasonic cleaning and a cleaning method using liquid carbon dioxide are under development.

(Ohio EPA, 1993; U.S. EPA, 1995; Texas Natural Resource Conservation Commission, no date)

Wet Cleaning Project

On May 11, 1995, The Center for Neighborhood Technology (CNT) opened the "Greener Cleaner," a privately-owned, 100% wet cleaning shop in Chicago, Illinois. The purpose of this project was to gather information to help dry cleaners evaluate: performance, customer satisfaction, labor & equipment, and annual costs of the wet cleaning process.

In the 29 weeks between May 11, 1995 and November 30, 1995, the Greener Cleaner wet cleaned 16,055 garments. Of those garments, 61% were of fabric types often labeled "dry clean only"--wool, silk, rayon, and linen. Of the first 13,000 garments, only 18 were refused for cleaning, all due to testing that revealed a potential dye bleeding problem.

Total start-up costs (equipment purchase and installation, furniture, and leasehold improvements) for the Greener Cleaner was $105,437. The shop began realizing a profit 5 months after start-up of operations.

The project recently ended on May 11, 1996 and a final report with detailed information and project results is due to be released in September, 1996. Final reports may be obtained by contacting CNT at (312) 278-4800 ext. 299 or by visiting CNT's internet homepage (address listed below).

Detailed information on wet cleaning including equipment, economics, case studies, and performance measurements may be obtained by calling the Ohio EPA, Office of Pollution Prevention at (614) 644-3469; or information can be downloaded directly from the internet at the following WWW locations:

CNT
http://www.cnt.org/sus_man/wet_cln.html
U.S. EPA
http://es.inel.gov/dfe/dfe_dcl.html
Ohio EPA
http://www.epa.ohio.gov/opp/oppmain.html

benefits, pollution prevention can also potentially reduce liability and enhance a company's image. Economic incentives can be significant, depending on the nature of the processes and the competitiveness of the business environment.

Perhaps most important, in light of the previous discussion of the environmental regulations facing dry cleaners, pollution prevention may help reduce a dry cleaner's regulatory burden. For example, a dry cleaner that is classified as a LQG may be able to reduce its hazardous waste generation enough to be able to reclassify itself as a SQG or a CESQG. Among other things, this would allow the dry cleaner to increase the amount of time hazardous waste is stored on-site, and release it from the requirement to prepare annual hazardous waste generator reports.

Pollution prevention at dry cleaning facilities involves good housekeeping practices to minimize losses of solvents in liquid and vapor form, and also modifications to processes, equipment and operating practices. Options range from easily implemented, low cost improvements to more significant changes to equipment and operations. See Figure 6 for examples of pollution prevention activities.

Some of the more easily implemented changes include improved operating practices, inventory control and equipment maintenance. The most significant changes obtainable through readily available technology include equipment upgrades, such as changing from a transfer machine to a dry-to-dry or closed-loop dry-to-dry machine. These machines are described earlier in this document.

A dry cleaner can strategically address pollution prevention by first identifying all waste streams and emissions, determining their sources, and then investigating which changes will be most feasible and effective. For more information regarding the development of a pollution prevention program for all facility operations, contact Ohio EPA, Office of Pollution Prevention, for a copy of the four-page fact sheet, "Pollution Prevention - Getting Started," or the longer document, the "Ohio Pollution Prevention and Waste Minimization Planning Guidance Manual."

The most advanced pollution prevention options preclude the use of organic solvents as the primary cleaning agent. One such technology is multi-process wet cleaning. This uses labor-intensive cleaning tech-

niques and high-tech washing and drying machines that use soap and water to clean clothes.

This cleaning customizes cleaning for each garment, beginning with an inspection of each garment for fabric type, construction, dirt and stains. A garment may be spot cleaned, steamed, and washed, or some combination of those processes, or cleaned in a washing machine that carefully regulates water temperature and agitation. Drying can be accomplished by drying cabinets, computer-controlled dryers or other similar means. Finally, garments are pressed or otherwise finished with techniques similar to those used by dry cleaners (Center for Neighborhood Technology, no date).

One common misperception is that wet cleaning does not actually clean the garments, but simply removes isolated spots. Wet cleaning actually includes a variety of cleaning technologies, and is specifically tailored for each garment, providing varying levels of cleanliness based upon the requirements of each particular garment.

Preliminary testing indicates that owners of garments cleaned by both wet cleaning and dry cleaning rate wet cleaned clothes as equal to or better than dry cleaned clothes. Tests have also shown that wet cleaning can give owners of dry cleaning establishments a slight economic advantage, due to lowered costs of start-up capital, supplies, equipment and hazardous waste disposal (Center for Neighborhood Technology, no date).

Who to Call

At Ohio EPA:

Division of Air Pollution Control
(614) 644-2270
Small Business Assistance Program
(614) 644-4830

Division of Drinking and Ground Waters
Underground Injection Control Unit
(614) 644-2752

Division of Hazardous Waste Management
Technical Support Unit
(614) 644-2934

Division of Surface Water
Industrial Permitting Unit
(614) 644-2037

Division of Surface Water
Pretreatment Unit
(614) 644-2021

Office of Pollution Prevention
(614) 644-3469

At the Public Utilities Commission of Ohio:

Transportation Department
(614) 466-0409

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This brochure was created by the Office of Pollution Prevention, in cooperation with the Divisions of Air Pollution Control, Drinking and Ground Waters, Hazardous Waste Management and Surface Water. It is a summary of environmental regulations affecting dry cleaners in Ohio, and does not necessarily constitute a complete discussion of all environmental requirements for all dry cleaners.

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