

## Chapter 3: Wastewater

Printing facilities will generate sanitary and, in most instances, some industrial wastewater discharges. Industrial wastewater sources may include: air compressor condensate and blowdown, film and plate processing; spent fountain solution; and water-based inks, coatings, adhesives, and cleaning solutions.

### Wastewater Types

The two types of wastewater generated by printing operations are as follows:

- **Sanitary wastewater** is wastewater from restrooms, break rooms, and sinks used for hand washing and similar activities. Sanitary wastewater does *not* include wastes from printing processes or waste fluids poured down drains. Sanitary wastewater is also referred to as domestic wastewater.
- **Industrial wastewater** is wastewater resulting from business activities. This wastewater might contain one or more pollutants. Industrial wastewater is a type of non-sanitary wastewater. It is also referred to as non-domestic, industrial, or commercial wastewater. Examples of industrial wastewater include:
  - wastewater from printing processes
  - wastewater discharged through floor drains or catch basins
  - condenser and blowdown wastewater from air compressors
  - condensate from air conditioning systems
  - non-contact cooling water (NCCW)

### **Section A: Discharge Requirements**

#### My facility discharges wastewater. What requirements must be met?

Printing facilities discharge wastewater to three common locations:

- a **septic system**
- a municipal sewer or **Publicly Owned Treatment Works (POTW)**
  - a wastewater system, owned by a municipality, state, or tribe that is used for the collection, treatment, and/or disposal of sewage
- **surface water** or **groundwater**
  - **surface water** is water that sits or flows above the earth, including lakes, oceans, rivers, and streams
  - **groundwater** is the water beneath the earth's surface that flows through soil and rock openings in an aquifer, and often serves as a primary source of drinking water

<b>Question WW.1</b>	Are you on a septic system?	<input type="checkbox"/> Yes. Continue on with the next section. <input type="checkbox"/> No. Skip to section A2.
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#### **Section A.1: Can industrial wastewater be discharged to a septic system?**

Only sanitary industrial wastewater can be discharged to an on-site septic system. Other wastewater needs to be collected in a holding tank and then hauled away to a disposal facility or rerouted to a municipal sewer system. More information on holding tanks can be found at DNR's webpage at: <http://dnr.wi.gov/topic/wastewater/HoldingTanks.html>. Use DNR Form 3400-185, found on that

webpage, to obtain DNR concurrence for each holding tank to be constructed or installed for non-domestic wastewater storage. Completing the form and being able to answer “Yes” to all the indicated questions is your DNR approval for construction of the tank. The holding tank approval does not apply to any other wastewater permits that may be required.

Liquid Industrial Waste must not be discharged into any septic system. Examples of Liquid Industrial Waste include: process chemicals; solvents; waste inks; and/or hazardous wastes in liquid form.

The following types of wastewater also may not be discharged to a septic system and must be shipped off-site:

- photo-processing wastewater
- waste fountain solution
- process cleaning solutions
- other water-based waste streams from pre-press, press, and post-press operations

<b>Question WW.2</b>	Do you discharge industrial wastewater to a septic system?	<input type="checkbox"/> Yes. Cease discharge. <input type="checkbox"/> No. Continue on with the next section.
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If industrial wastewater is tested and determined not to be hazardous waste, it may be properly disposed off-site by a septage hauler. A list of licensed septic haulers can be found at: <http://dnr.wi.gov/topic/waste/licenses.html>. For additional questions on haulers call the DNR waste program at 608-266-8948.

### **Section A.2: Can industrial wastewater be discharged to a municipal sewer system?**

Discharge of sanitary wastewater from an industrial facility to a municipal sewer system is allowed. Industrial wastewater from the same facility may be discharged to municipal sewer systems and/or POTW provided it meets local sewer authority standards and requirements.

Printers should note:

- standards vary with locality
- requirements may include wastewater analysis by a laboratory
- a discharge permit might be required
- an Industrial Discharge Survey may have to be completed

Printers are responsible for knowing and meeting local requirements. Contact your local sewer authority to evaluate wastewater discharge and review all requirements.

In most circumstances, when printers meet the requirements and standards of local POTW, no additional requirements must be met for environmentally-safe discharge of industrial wastewater. General prohibitions regarding industrial wastewater discharge are included in the next section.

<b>Question WW.3</b>	Do you discharge industrial wastewater to a POTW?	<input type="checkbox"/> Yes. Continue on with the next section. <input type="checkbox"/> No. Skip to section A.4.
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### Section A.3: General Prohibitions

You are not allowed to discharge pollutants with the following characteristics:

- pollutants that create a fire or explosion hazard in the sewer or treatment plant
- pollutants that cause corrosive structural damage to the sewer or treatment plant
- pollutants with a *pH* lower than 5.0 (check with your local POTW for the upper pH limit)
- pollutants that cause obstructions in the sewer or treatment plant
- petroleum oil, cutting oil, or mineral oil in amounts that will cause interference or pass-through
- pollutants resulting in the presence of gases, vapors, or fumes in the sewer or at the treatment plant which may cause worker health or safety problems.
- trucked or hauled pollutants, except at the discharge points designated by the treatment plant
- discolored wastewater (i.e. waterbased inks), unless an ink water separator is used and the solids are landfilled

**pH:** describes a characteristic of wastewater. A pH of 7 is neutral, less than 7 is acidic, greater than 7 is alkaline/basic.

<b>Question WW.4</b>	Are you in compliance with the POTW's sewer use code and requirements?	<input type="checkbox"/> Yes. Continue on with the next section. <input type="checkbox"/> No. Work with POTW to make corrections.
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### Section A.4: Can Industrial wastewater be discharged to Surface Water or Groundwater?

Liquid industrial waste and industrial wastewater may **not** be discharged to any surface water body (e.g. streams, lakes, rivers, wetlands), to groundwater, or directly on the ground, without a **Wastewater Discharge Permit** from DNR. Wastewater discharge permits are issued under the *Wisconsin Pollutant Discharge and Elimination Standards or WPDES*.

Printers discharging industrial wastewater to surface or groundwater must contact the DNR or an environmental professional immediately to discuss acceptable options for collection, storage, and/or treatment of printing process and other industrial wastewater.

Follow these steps to meet requirements for discharging wastewater to surface water or groundwater:

- obtain a WPDES Permit before discharging any wastewater to surface waters
- ensure floor drains are not connected to a storm sewer that empties to a ditch, river, stream, or other body of water
- plug any floor drain (e.g., with concrete) that does not discharge to a POTW or a **holding tank**

### Section A.5: Non-Contact Cooling Water

Non-Contact Cooling Water (NCCW) is water that has no physical contact with equipment, operations, products, or materials, and which is used to cool equipment, operations, products, or materials.

Generally, discharging NCCW requires a permit. The following questions will help you understand permitting requirements for NCCW.

#### Does your facility discharge NCCW to surface water or groundwater?

If NCCW is discharged to surface water or groundwater, you must obtain a permit from the DNR. If a

facility cannot meet the criteria under the general permit, an individual WPDES permit must be obtained.

Does your facility discharge NCCW from a system requiring chemical treatment, such as a closed system flush?

Printing facilities discharging NCCW to surface water or groundwater from a system requiring chemical treatment must obtain a Wastewater Discharge Permit from the DNR. This includes any additives or biocides added to NCCW to prevent fouling.

**Section A.6: Vehicle Wash Water Discharge**

Washing vehicles produces wastewater. Wastewater from vehicle washing that is not discharged to a POTW or holding tank for off-site disposal *must* be discharged in a manner meeting the requirements of the General Permit for vehicle washing (Outside Washing of Vehicles, Equipment and Other Objects #WI-0059153-3). If you wash any vehicles on your property, even occasionally, you must review these requirements to determine if you need a permit. Information about the general permit for vehicle washing can be found here: <http://dnr.wi.gov/topic/wastewater/GeneralPermits.html>.

Listed below are some of the requirements related to vehicle wash water:

- use only biodegradable detergents (in minimal amounts producing no visible foam to surface water)
- control suspended solids (maximize infiltration of wash water or effectively remove suspended solids with appropriate settling treatment)
- control oil and grease (no visible oil sheen)
- do not use degreasers (unless non-petroleum based)
- do not discharge to any Outstanding or Exceptional Resource Waters (i.e., trout streams) in Wisconsin - discharge to such waters is prohibited
- direct wastewater to grass, soil, or gravel, rather than a storm sewer, if discharged outdoors
  - grass, soil, or gravel will filter contaminants from the wastewater
  - storm sewers may lead directly or indirectly to surface water without filtering or other treatment

Go to: <http://dnr.wi.gov/topic/surfacewater/orwerw.html> for information on Outstanding or Exceptional Resource Waters.

<b>Question WW.5</b>	Do you discharge industrial wastewater to the ground, or surface water without a permit?	<input type="checkbox"/> Yes. Cease unpermitted discharge and apply for appropriate permit.  <input type="checkbox"/> No. Continue on with the next section.
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## Section B: Non-Hazardous Industrial Wastewater Storage

### Can non-hazardous wastewater be stored in a drum, container, or holding tank?

Yes. Storage of non-hazardous wastewater in tanks, drums, or containers is allowed. However, if the wastewater is tested and determined to be hazardous waste, it must be stored according to the hazardous waste requirements in Chapter 3 of this workbook.

<b>Question WW.6</b>	Do you store non-hazardous wastes in tanks, drums, or containers?	<input type="checkbox"/> Yes. Continue on with this section.  <input type="checkbox"/> No. Skip to section D in this chapter.
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Even if wastewater is non-hazardous, there are certain requirements that **must** be met when storing in *drums or containers*, including the following:

- Ensure materials are not subject to United States Department of Transportation (US DOT) shipping requirements.
- Use containers that meet US DOT shipping requirements for the materials disposed. Containers meeting US DOT shipping requirements:
  - have greater than 5 gallons capacity only
  - are stamped or printed with the UN symbol and an 18-22 character alphanumeric code
- Label containers indicating the contents are non-hazardous.

When storing wastewater in *drums or containers*, you **should**:

- Keep records for each shipment. Include the following information: volume shipped; transporter's name and address; dates of shipment; and destination(s). Retain records for three years.
- Check with your transporter to make sure you comply with any US DOT shipping requirements.

When storing wastewater in **holding tanks**, you **must**:

- Use a watertight tank constructed of material compatible with the wastewater contents. The tank must have a manhole, vent, and high-level alarm.
- Obtain DNR approval for any new tank by completing DNR Form 3400-185, found at <http://dnr.wi.gov/topic/wastewater/HoldingTanks.html>. Refer back to Section A1 for details on the holding tank approval.
- Use a licensed DNR hauler to pump and haul wastewater from holding tanks.
- Prevent spillage during filling or emptying. Report any spill of wastewater to the environment to the DNR.

*Holding tanks* are waterproof containment vessels (usually less than 5,000 gallons) made of steel, concrete or other material.

When storing wastewater in **holding tanks**, you **should**:

- Locate above-ground tanks within buildings in a secured area with an impervious floor to contain leaks and spills.
- Surround holding tank(s) with a secondary containment structure capable of retaining 110% of the total volume of all aboveground tanks.
- Apply odor control.
- Label tank(s) indicating that the contents are non-hazardous.
- Install a bell and alarm system for remotely or automatically filled tanks.
  - The alarm should activate when liquid level reaches 75% of tank capacity.
  - The alarm should transmit to a staffed location.

- Provide visual or sight glass level measurement for manually filled tanks.

<b>Question WW.7</b>	Are you in compliance with the requirements for storing non-hazardous wastes in tanks, drums, or containers?	<input type="checkbox"/> Yes. Continue on with the next section. <input type="checkbox"/> No. Make corrections.
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### **Section C: Disposing of Hazardous and Non-Hazardous Industrial Wastewater**

#### Can an Evaporator be used to reduce wastewater volume before disposal?

Facilities can use an evaporator to reduce the volume of *non-hazardous* wastewater before shipping off-site. No wastewater permit is required for this process. However, other permits may be need to be evaluated, such as an air pollution permit.

Evaporator sludge must be tested to determine if it is a hazardous waste that requires proper off-site shipment. All test results should be kept on file. If your wastewater is determined to be hazardous, you must comply with the hazardous waste handling requirements found in Chapter 2.

#### How can wastewater be shipped off-site?

*Non-hazardous wastewater* may be hauled to a wastewater treatment plant by a septage hauler. Written approval from your local sewer authority or treatment plant is required before shipping your wastewater to their site.

*Hazardous wastewater* **must** be shipped by a licensed transporter. That includes shipping to precious metal recyclers. Silver-bearing wastewater with more than 5 ppm silver concentration is considered hazardous waste. Check your local yellow pages for recycling or precious metal recyclers.

When shipping wastewater off-site, note the following:

- Silver-bearing wastewater may be shipped using a precious metals transporter.
- Non-hazardous developer and rinse water may also be shipped by a precious metals transporter.

<b>Question WW.8</b>	Are you meeting all proper shipping requirements for your untreated silver bearing waste?	<input type="checkbox"/> Yes. Continue with the next section. <input type="checkbox"/> No. Work with the recycler or waste hauler to correct.
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### Section D: Signs in Your Facility

#### What signs must be posted in printing facilities?

The DNR recommends that a warning sign be posted at every sink in the prepress, press, and postpress areas.

Two sample warning signs are provided in the Magenta Ink Room section of this workbook. One sign is for use in shops on septic systems and the other sign is for use in shops on sewer systems. Copy the signs as many times as needed. Place each sign in a sheet protector and post above the sink to remind employees that process chemicals, solvents, waste inks, and/or hazardous wastes **must not** be poured down the sink or drain.



<b>Question WW.9</b>	Do you have warning signs posted at every sink in the prepress, press and post press areas warning employees not to put hazardous wastes, process chemicals, solvents, and waste inks down the drain?	<input type="checkbox"/> Yes. Continue on with the next section. <input type="checkbox"/> No. Post appropriate signs.
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### Section E: Silver Recovery Units

#### What is a Silver Recovery Unit (SRU)?

A Silver Recovery Unit (SRU) is a system that removes silver from the printing waste stream.

<b>Question WW.10</b>	Do you do perform photo processing, plate imaging or other operations that generate a silver bearing wastewater?	<input type="checkbox"/> Yes. Continue on with this section. <input type="checkbox"/> No. Skip to Section F.
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Although film processing is not as common, it is still performed in the industry, and results in silver in the printing waste stream. In addition, some small format direct-to-plate systems use silver halide coating plates, which results in silver waste.

Photoprocessing wastewater that contains silver may be discharged to a municipal sewer if it has been pre-treated to remove silver to meet the local **sewer code** or permit limit.

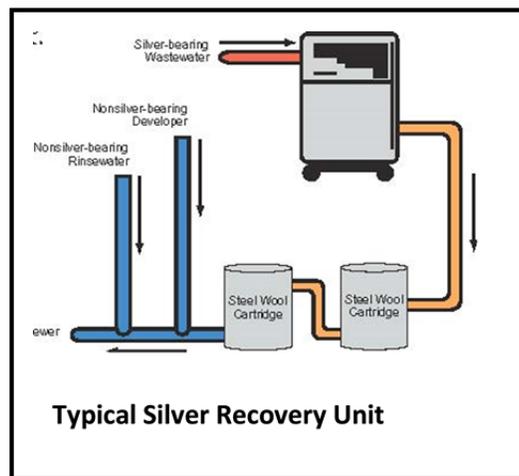
**Photoprocessing wastewater may not be discharged to any septic system.**

Local sewer code may limit silver discharge amounts.

If your facility is required by local sewer code to meet a silver discharge limit, the best option is to install an SRU.

Printers should consider the following when choosing and installing an SRU:

- Choose an SRU designed to handle the volume of wastewater you must treat.
- Common types of SRUs are electrolytic, steel wool cartridge, and ion exchange.
- Different types of units may be combined or used separately.
- Depending on the silver discharge limits in your area, an electrolytic SRU alone may not be adequate.



Typical Silver Recovery Unit

- Manufacturers can assist printers with choosing SRUs that will handle wastewater volume and meet silver removal limits.

SRUs must be operated, serviced, and maintained according to manufacturer's specifications.

Printers should consider the following questions:

- How will operation, service, and maintenance of the SRU be done?
- Which employees will be responsible? Although SRU operators are not required to be certified, it is recommended that employees responsible for the operation of SRUs be *trained by the manufacturer or supplier*. Your local sewer authority may require you to document this training.

<b>Question WW.11</b>	If you have a SRU, are you operating it according to manufacturer's specifications?	<input type="checkbox"/> Yes. Continue with the next section. <input type="checkbox"/> No. Work with manufacturer to correct. <input type="checkbox"/> NA - we do not have a SRU. Continue with the next section.
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### Section F: Computer-to-Plate Systems

In recent years, **Computer-to-Plate** (CTP) imaging systems have become common. A Computer-to-Plate system allows for the direct imaging of printing plates from digital files. This enables the printer to work in a completely digital workflow.

Because CTP uses digital technology, it eliminates film processing and the environmental compliance challenges associated with film, effluents, and silver. As a result, many printers assume CTP is environmentally safe and "green," but this is not the case.

CTP systems are either "liquid" or "dry," depending on how the plates are developed after being imaged. Both systems use lasers to produce images on printing plates. Printers should be aware that there are environmental issues, compliance concerns, and other impacts associated with CTP systems that must be addressed.

<b>Question WW.12</b>	Do you generate CTP wastes?	<input type="checkbox"/> Yes. Continue on with this section. <input type="checkbox"/> No. Skip to section G.
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### CTP Processes, Issues, or Compliance Concerns, and Solutions

#### Liquid Systems

Liquid systems use thermal (heat) lasers or visible (white) light lasers to create images on plates. Liquid used in these processes produces effluent (waste liquid) with a high pH. In some systems, the pH is very high (greater than 12.5), which means the effluent would be considered hazardous waste. The effluent must be neutralized to lower the pH level prior to discharge. The process of neutralization will allow the waste to be classified as non-hazardous. If neutralization does not occur, the effluent has to be managed as a hazardous waste. See Chapter 2 for more information on how to manage hazardous waste. The following table provides suggested solutions for liquid CTP system issues a printer may encounter.

CTP System	Environmental Issue, Compliance Concern	Solutions for Liquid Systems
Liquid: Thermal Liquid: Visible Light	pH of effluent can be > 12.5	<b>Neutralization</b> Neutralize effluent prior to discharge or sending off-site to avoid being classified as hazardous waste.
Liquid: Visible Light	Silver halide used in process leaves silver in effluent	<b>Silver recovery</b> Use particulate filters to remove silver from effluent. Check with sewer authority to determine local silver discharge limits.  <b>Evaporation</b> Silver recovery cartridges for evaporators must be back flushed <i>three times</i> prior to shipping off-site.

### Dry Systems

Dry systems use thermal lasers to remove the coating on a printing plate, thereby creating an image. This process is called *ablation*. As the coating is removed, particulates and vapor are discharged into the air, causing a potential health hazard. The following table provides suggested solutions for dry CTP system issues a printer may encounter.

The dry system information is included as an alternative CTP system. While the dry system doesn't generate wastewater, the air pollution generated is not vented outside and therefore would not be regulated under air pollution rules.

CTP System	Environmental Issue, Compliance Concern	Solutions for Dry Systems
Dry System: Ablation	Airborne particulates and vapor from coating can be a health hazard.	Filter air during ablation process.  Imaging unit must be vented and emissions filtered to capture by-products.  If plates are wiped with alcohol prior to mounting plate to press, rags or wipes used for this purpose must be managed and disposed of properly. See Chapter 2, section C.2, of this workbook for wipe disposal requirements.

***Below are some commonly asked questions that may be helpful to you.***

#### What are my options for disposing of non-hazardous wastewater?

*Discharge of industrial wastewater to any septic system is forbidden under any circumstances.* The only option is to send the waste off-site for disposal.

If waste with a pH of 12.5 or higher is neutralized (the pH is lowered) prior to sending off-site, it can be shipped as a non-hazardous waste. Waste with a pH greater than 12.5 is considered hazardous waste and disposal must comply with all appropriate hazardous waste requirements.

If effluent contains silver, the concentration must be reduced to less than 5 parts per million (ppm) to be shipped off-site as a non-hazardous waste.

If waste is shipped off-site for disposal, can the volume and resulting costs be reduced?

Yes. Neutralized effluent may be reduced using an evaporation unit. This will reduce the volume of waste and result in lower disposal costs. All neutralization and silver recovery must be done prior to volume reduction.

Does a CTP system require a Wastewater Discharge Permit?

Prior to installing a CTP system, the local sewer authority should be contacted to determine if any local permits are required.

Does neutralization and silver recovery for CTP System waste require a DNR Hazardous Waste Treatment Permit?

No. Under the current Federal EPA hazardous waste rules and Wisconsin DNR regulations, elementary neutralization and silver recovery are exempt from hazardous waste permitting requirements. No notification is required.

Local municipalities or POTWs may regulate or require permits for silver recovery or neutralized effluent. Check with your local POTW for any requirements.

When managing silver recovery cartridges, printers must ensure that recovery cartridges are back-flushed *three times* prior to being shipped off-site. Otherwise, solution remaining in the recovery cartridges could be classified as a hazardous waste because it could contain more than 5 ppm of silver. For more information on why silver is classified as a hazardous waste, refer to Section B.2 of Chapter 2 of this workbook.

<b>Question WW.13</b>	Are you meeting the CTP requirements?	<input type="checkbox"/> Yes. Continue on with the next section. <input type="checkbox"/> No. Make corrections.
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### Section G: Best Management Practices

The following best management practices are not required, but are highly recommended. ERP printers are expected to adopt best management practices consistent with the highest “green” printing standards.

Use the chart below to indicate where you have taken action as recommended (Done), where you might want to take action (Needs Attention), or if the area doesn’t apply to your shop or operations (Not Applicable).

Best Management Practices for Wastewater	Done	Needs Attention	Not Applicable
Keep your facility clean. Prevent spills and leaks that might contaminate floor rinse waters.			
Pre-clean equipment, such as water-based ink, coating, and adhesive application units, by wiping excess materials off prior to washing.			
Train staff in good housekeeping skills. Schedule time to clean-up materials at the end of each day.			
Minimize water usage. Using less water means less wastewater to manage.			
Recover silver from photo-developing wastewater, waste fixer, and computer-to-plate chemistry, if applicable, and save some money!			
Run a dry shop. A dry shop uses little to no water to clean floors. Do not wash the floors or use wet mops to clean up spills. Clean up small spills with rags. Do not saturate rags. For solvent spills, use appropriate absorbents to clean up spills and dispose of the absorbents as hazardous waste.			

<b>Question WW.14</b>	Have you adopted any of the recommended BMPs?	<input type="checkbox"/> Yes <input type="checkbox"/> No. Recommended.
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