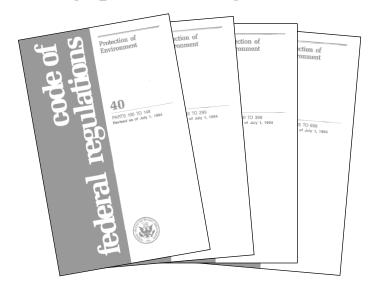


The Regulation of Silver in Photographic Processing Facilities



You will find regulations that apply to silver and silver-bearing materials in many of the environmental laws that are administered by the United States Environmental Protection Agency (USEPA). These laws are designed to protect air, water, and land resources, and to provide information about the chemicals used, stored, and released to the environment. Most state and local agencies also regulate silver. In some cases, state or local regulations may be more stringent or include additional requirements not found in federal regulations.

The following is a review of USEPA regulations that apply to silver and silver-bearing materials found in photographic processing facilities. Check with your state or local agencies to determine if additional requirements apply to your facility.

Silver and silver-bearing materials in a photographic processing facility are typically regulated by the USEPA under the following federal laws:

- Resource Conservation and Recovery Act (RCRA)
- Clean Water Act (CWA)
- Safe Drinking Water Act (SDWA)
- Comprehensive Environmental Response Compensation and Liability Act (CERCLA or Superfund)
- Emergency Planning and Community Right-to-Know Act (EPCRA or SARA Title III)

Understanding how silver and silver-bearing materials are regulated by each of these laws will help you determine how these laws affect your facility. How you manage J-214 \$18.00

Kodak's health, safety, and environmental publications are available to help you manage your photographic processing operations in a safe, environmentally sound and cost-effective manner. This publication is part of a series of publications on silver management designed to help you optimize silver recovery. It will help you understand how silver is regulated and how those regulations apply to your facility.



silver-bearing materials will establish your specific regulatory compliance requirements. These requirements can range from fairly simple and inexpensive activities such as maintaining records, to more costly and complex activities such as analytical testing and hazardous waste manifesting.

SILVER AND THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)

The Resource Conservation and Recovery Act (RCRA) protects human health and the environment by making sure that hazardous waste management practices are conducted in a sound manner. RCRA is a cradle-to-grave system for tracking and regulating hazardous waste from the time it is generated to its ultimate disposal.

A material must be defined as a "solid" waste before it can be defined as a hazardous waste. As defined by RCRA, a solid waste can be a liquid, semi-solid, sludge, or contained gas. Solid wastes are generally those materials that have been used and discarded. However, recycled materials can also be solid wastes depending upon the nature of the materials and the manner in which they are recycled.

Once a material is defined as a solid waste, it can further be classified as either a listed or characteristic hazardous waste. There are *no* listed silver-bearing wastes generated by a typical photographic processing facility. Solid wastes that possess certain characteristics, such as containing greater than or equal to 5 ppm of *leachable* silver, are considered hazardous wastes due to their toxicity characteristic (TC). Leachability is determined for solid

materials using the Toxicity Characteristic Leaching Procedure (TCLP) which subjects the material to a dilute acid solution. Liquid wastes that contain greater than or equal to 5 ppm of silver are also classified as characteristic hazardous wastes (EPA Hazardous Waste Number D011).

Facilities that generate hazardous waste are divided into different categories depending on the amount of hazardous waste that is generated. These categories are determined by "counting" the amount of hazardous waste that is generated at a facility in one month. Some silver-bearing hazardous wastes are *not* counted because they are managed in a wastewater treatment unit or they are not stored or accumulated.

Facilities that generate hazardous waste are subject to a number of requirements for the management of their wastes depending on their generator category. Silver-bearing hazardous wastes that are reclaimed to recover economically significant amounts of silver are regulated under specific provisions of RCRA. These provisions include a limited number of generator requirements and an exemption from needing a RCRA permit for the treatment of those hazardous wastes.

Many states have been approved by USEPA to operate their own RCRA program. Most states regulate the management of silverbearing hazardous wastes in the same manner as USEPA; however, some states may have more stringent requirements. For example, some states may have different generator categories, or may include different management requirements for reclaiming silver from a hazardous waste.

Compliance Requirements

To determine the compliance requirements for your photographic processing facility, you must identify those materials at your facility that could be classified as a hazardous waste. Once you have identified those materials, you must determine which of them should be "counted" to determine your generator category. Certain silver-bearing materials may be exempt or excluded based on how they are generated or how they are managed. Once you have determined your generator category, then you can identify those compliance requirements that apply to silver-bearing hazardous wastes at vour facility.

While this section describes the requirements for managing silverbearing hazardous wastes from photographic processing facilities, it is important to note that your generator category is determined by counting the total amount of hazardous waste generated at your facility. This total quantity also includes other hazardous wastes such as solvents from maintenance operations or corrosive cleaning liquids. The following federal requirements apply only to the silver-bearing hazardous wastes. However, you should also be familiar with regulations that apply to other hazardous wastes generated at your facility.

Identifying Silver-Bearing Hazardous Wastes

Material	Hazardous Waste Determination
Photographic Films and Papers	Representative samples of processed and unprocessed Kodak photographic films and papers were tested using the TCLP. These samples did not leach silver at greater than or equal to 5 ppm. Therefore, these materials would not be classified as a hazardous waste for silver under RCRA by USEPA.
Photographic Processing Solutions	Unused photographic processing solutions do not contain silver and would therefore not be regulated as a silver-bearing hazardous waste when discarded or recycled.
	Used photographic processing solutions that typically contain greater than 5 ppm of silver include fixers, bleach-fixes, activators and low flow washes, as well as bleaches and stabilizers from washless processes. Developers generally do not contain greater than 5 ppm of silver; however in processes that have very high volume or employ regeneration of developers, concentrations of silver can reach levels greater than 5 ppm. Washwaters can also develop concentrations of silver at levels greater than 5 ppm. This silver is usually the result of carry-over from the preceding tank.
Regenerated or Recycled Photographic Processing Solutions	Materials can be excluded from being a hazardous waste by being managed in a certain way, such as being reclaimed and returned to a process in a closed system. This exclusion requires that the recovery process and associated storage be in fixed tanks and that the materials be transferred to the recovery process using fixed piping. Materials that are collected and transferred in portable containers do <i>not</i> qualify for this exemption. Typical in-line electrolytic silver-recovery, ion-exchange washwater treatment, and bleach-fix regeneration systems are examples of where the materials in the recovery loop are not considered hazardous wastes unless they are removed from the recovery process and contain ≥5 ppm silver.
Silver-Bearing Materials From Recovery	High-purity flake silver from electrolytic silver-recovery units is considered to be a product by the USEPA and is not regulated as a hazardous waste under RCRA when sent for refining.
	Other technologies used to recover silver, such as metallic replacement or precipitation, are wastewater treatment units and result in the generation of silver-bearing materials which are "sludges." These materials are sludges because they are residues from pollution-control processes. Characteristic sludges being reclaimed are exempt from the definition of solid waste and therefore cannot be a hazardous waste. Silver-bearing materials such as Metallic Replacement Cartridge (MRC) sludge or KODAK Silver-Recovery Agent precipitate that are sent to a silver refiner to complete the silver-recovery process are exempt from being classified as hazardous waste.
Photographic Processor Filters	Filters used in photographic processors to remove particulate from processing solutions can be a hazardous waste when disposed. Typically, the filters used for silver-bearing solutions, such as fixers or bleach-fixes, leach greater than 5 ppm silver when subjected to the TCLP. These materials can be rinsed prior to disposal or sent to an off-site hazardous waste treatment facility. The rinse water should be collected and treated in your silver-recovery system.

Hazardous Waste Counting

If your photographic processing facility generates hazardous waste, the waste must be "counted" to determine your generator category. Your generator category is determined by the amount of hazardous waste that is generated at your facility each month. Some silver-bearing hazardous wastes are *not included* in the quantity determination because of the way they are managed.

Silver-Bearing Hazardous Wastes Not Included in the Quantity Determination

Description	Example	
Hazardous wastes that are not stored or accumulated at your facility.	Wastes which are directly discharged, without storage or accumulation, to a municipal sewer system. This could include developers or washwaters that contained >5 ppm silver but are not collected or managed prior to discharge.	
Hazardous wastes that are: • directly transferred to silver recovery through fixed piping • stored only in fixed tanks • discharged to a Publicly Owned Treatment Works (POTW) after recovery (Wastewater Treatment Unit).	Used fixer treated in flow-through terminal silver recovery.	
Hazardous wastes that are generated from treating a waste that has already been counted.	Rinse water from processor filters would not be counted if the filters had already been counted.	

Silver-Bearing Hazardous Wastes Included in the Quantity Determination

Description	Example	
Hazardous wastes that are stored or transported in portable containers prior to on-site silver recovery.	Silver-bearing solutions that are collected in containers and transported to the silver-recovery system in those containers. This is the typical configuration in a minilab.	
Hazardous wastes that are transported off-site.	Used fixer that is transported to another facility to be de-silvered.	
Processor filters that are hazardous wastes.	Processor filters from fixer tanks.	

Determining Your Generator Category

Once you have identified all hazardous wastes, and the appropriate wastes have been counted in the quantity determination, you can determine your generator status. USEPA currently identifies three categories of generator status. These categories are based on the amount of hazardous waste generated (counted) at a facility per month.

Once you exceed a monthly threshold in a category, the entire amount of hazardous waste at your facility becomes subject to the requirements of the next level of generator (unless, of course, you already qualify for the large quantity generator). Make sure you include all hazardous wastes generated at your facility that are subject to counting, and that the determination is for a calendar month and is not an average over several months. If the quantity of hazardous waste

generated at your facility varies from month to month, your generator category may also change from month to month. In those cases, the highest status should be assumed to ensure compliance at all times.

There may also be limitations on the amount of hazardous wastes and the duration of storage for each generator category. If you exceed the maximum amount of storage or accumulation time in a category, your facility would be regulated as the next highest generator category.

Hazardous Waste Generators

Generator Category	Amount Generated per Month
Conditionally Exempt Small Quantity Generator (CESQG)	<100 kg/month (~27 gallons)
Small Quantity Generator (SQG)	100–1000 kg/month (~27–270 gallons)
Large Quantity Generator (LQG)	> 1000 kg/month (~270 gallons)

Hazardous Waste Storage Restrictions

Generator Category	Maximum Amount Stored On-Site	Maximum On-Site Accumulation Time
Conditionally Exempt Small Quantity Generator (CESQG)	1000 kg (~270 gallons)	No Limit
Small Quantity Generator (SQG)*	6000 kg (~ 1620 gallons)	180 Days (270 days if treatment facility is more than 200 miles away)
Large Quantity Generator (LQG)*	No Limit	90 Days (without RCRA permit)

^{*}Silver-bearing hazardous wastes that are reclaimed to recover economically significant amounts of silver generated by SQG and LQG are not subject to on-site storage limits and can be stored on-site for up to one year.

Generator Requirements

Once you have determined your generator category, you can identify the compliance requirements for managing silver-bearing hazardous wastes at your photographic processing facility. Large Quantity Generators (LQG's) and Small Quantity Generators (SQG's) of silver-bearing hazardous wastes that are reclaimed to recover economically significant amounts of silver are subject to specific provisions under RCRA. Conditionally Exempt Small Quantity Generators (CESQG's) are not subject to those provisions; rather they are subject to fewer requirements based on their smaller size.

Conditionally Exempt Small Quantity Generators

If you qualify as a Conditionally Exempt Small Quantity Generator (CESQG), you may treat hazardous wastes on-site or you must ensure delivery to an appropriate facility for treatment or disposal. CESQG's are not required by USEPA to have an EPA ID number, use a hazardous waste manifest for the transportation of their wastes to an off-site treatment or disposal facility, or to keep records of waste management activities.

Small Quantity Generators and Large Quantity Generators

Hazardous wastes—generated by SQG's and LQG's—that are reclaimed to recover silver are subject to a specific set of regulations. The requirements include notification, use of manifests, and recordkeeping. Hazardous waste treatment permits are not required by USEPA for silver-recovery operations. Non-silver-bearing hazardous wastes and silver-bearing hazardous wastes that are not reclaimed would be subject to full regulation under RCRA.

Generator Requirements for Silver-Bearing Hazardous Wastes That are Reclaimed

Requirement	CESQG	SQG	LQG	
EPA ID Number	Not Required	Notify USEPA or your state agency of your hazardous waste management activities by completing EPA Form #8700-12. Upon receipt, the agency will assign your facility an EPA ID Number.		
Manifests*	Not Required	Required for all off-site transportation of silver-bearing hazardous wastes performed without a contractual agreement to recycle and return the material.	Required for all off-site transportation of silver-bearing hazardous wastes.	
		SQG's are not required to use manifests for the transportation of silver-bearing hazardous wastes to a recycling facility if the waste is reclaimed under a contractual agreement that specifies waste type and frequency of shipments. The vehicle used to transport the waste to the recycling facility must be owned and operated by the reclaimer. The recycled material must be returned to the SQG for reuse. The SQG must maintain a copy of the reclamation agreement for a period of three years after termination or expiration of the contract.		
		SQG's/LQG's who perform their own transportation must also us transporter's signature must be on the manifest prior to shipping manifests must be retained for a period of three years. A copy of manifest should be returned to the SQG within thirty days of received in the square or disposal facility.		
Recordkeeping	Not Required	SQG's/LQG's who store silver-bearing hazardous wastes prior to reclamation must keep records to document that they are not speculatively accumulating by accumulating more than 25% of the materials in a calendar year without reclaiming the silver. Most silver-recovery operations are performed shortly after materials are generated and, therefore, no materials would accumulate during the calendar year. Records must show volume of materials on-site at the beginning of the year (January 1), volume of materials generated during the calendar year, and volume of material on-site at the end of the calendar year. These records must be kept for a period of three years.		
On-Site Storage Up to 1000 kg may be		No on-site quantity limitations.		
Restrictions	accumulated on-site with no time limitations.	Land Disposal Restrictions require on-site storage of silver-bearing hazardous wastes be limited to less than one year.		
Land Disposal	Not Required	SQG's/LQG's must keep a one-time notice on file that states:		
Restrictions Notice		This facility generates a hazardous waste that is restricted under the Land Disposal Restrictions (LDR). Silver from these wastes is reclaimed under 40 CFR, Part 266, Subpart F. All silver-bearing restricted wastes are reclaimed on-site or sent for off-site treatment.		

SILVER AND THE CLEAN WATER ACT (CWA)

The goal of the Clean Water Act (CWA) is to minimize the discharge of pollutants to surface waters. This Act prohibits the discharge of pollutants directly into surface waters except in compliance with a National Pollution Discharge Elimination System (NPDES) permit. Wastewater treatment facilities or Publicly Owned Treatment Works (POTW) must have NPDES permits that establish discharge limits for the POTW's effluent quality. A photographic processing facility that discharges directly to surface water must also have a NPDES permit.

Silver is classified as a "priority pollutant" under the CWA, and the discharge of silver is regulated by many NPDES permits. The discharge limitation of silver in a NPDES permit is often based on state water quality standards for silver. Water quality standards can vary greatly depending on the stringency of the state's standards and the use of the water. These differences, coupled with design and wastewater loading variations at each POTW, result in the need for site-specific silver limitations in each NPDES permit. These limits for silver are typically well below concentrations achievable using the best available silver-recovery technologies, making it virtually impossible for a photographic processing facility to directly discharge photographic processing effluents to surface waters.

Most photographic processing facilities discharge their wastewater to a municipal sewer collection system that conveys the material to the POTW for further treatment. The POTW must limit the chemical constituents in the incoming wastewater to ensure that the treatment plant will be able to maintain compliance with their NPDES permit. These limitations are referred to as pretreatment standards or sewer use codes. Each POTW has its own pretreatment standards or sewer use codes that are unique to its regulatory situation. Silver is usually regulated in discharges from photographic processing facilities at concentrations that require silver recovery prior to discharge.

Compliance Requirements

To determine your sewer discharge compliance requirements, you must identify all materials that your photographic processing facility discharges to a POTW. You may need a discharge (pretreatment) permit or approval from the POTW. Specific compliance requirements, such as analytical testing or reporting, may also be included in the permit or authorization.

Discharge Permits

If your facility does *not* have a wastewater discharge permit or you are unsure if a permit is required, you should contact the wastewater treatment authority that manages the POTW. Some states also have their own pretreatment permitting program in conjunction with the wastewater treatment authority.

The POTW will need to know that your facility performs photographic processing and the volume of wastewater that you are discharging. You should also request a copy of the local sewer use code that applies to your facility.

Some wastewater treatment authorities will require you to complete a discharge survey or application before they will issue a permit. If your facility is not required to obtain a wastewater discharge permit, request a letter that specifically states that no permit is required. Ask the authority to notify you when a change is proposed to the wastewater discharge requirements for your facility.

Silver Discharge Limits

In addition to understanding your POTW's permitting requirements, you should also determine what pretreatment limits in the local sewer code apply to your photographic processing facility. Silver is commonly regulated with restrictive discharge limits.

If the POTW regulates silver in the pretreatment program, you may be required to demonstrate compliance by periodically collecting samples of the photoprocessing effluents for analysis. Sample collection points for photoprocessing effluent will often be specified in your wastewater pretreatment discharge code or permit. If no sampling point is specified, sample at a point where all the facility's wastewater is collected and discharged. This point will result in a sample that is representative of the total discharge from the entire facility.

Wastewater Sampling

The type of sample required is also important. A grab sample is a single one-time sample. This type of sample can be a good indicator of the character of the wastewater. For processes that are not continuous. such as batch silver recovery, this sampling technique may not be representative of the actual total discharge. A composite sample is the accumulation of a series of grab samples collected at regular intervals over a long period of time, usually 24 hours. The interval of sampling can be either proportional to time or flow. Most photographic processing facilities do not run a 24-hour continuous business, therefore a flowproportional composite sample will result in a sample that most accurately characterizes the discharge.

Silver Analysis

Silver can be measured in several ways. The most common is through an analytical method known as total recoverable silver. This method measures all silver that is present in a sample. Some POTWs may require dissolved silver to be measured or may include a translator to estimate the portion of dissolved silver from a total measurement. It is important that you determine which analysis is required and request the appropriate analysis from your analytical laboratory.

Keep records of all monitoring and sampling results for three years.

Analytical Laboratories

Because of the complexity of analyzing silver, you must be careful when selecting an analytical laboratory to perform silver analysis. The laboratory you select should have a good understanding of, and experience in, analyzing silver. Some states require certification of laboratories that perform analysis for regulatory compliance. Make sure you are using a certified laboratory if your state requires certification.

Environmental Analytical Services from Kodak make the testing and analysis process simple, economical, and accurate. You can benefit from Kodak's extensive expertise in analyzing complex photographic processing solutions and effluents. Strict adherence to EPA-approved testing methods and laboratory certification yield accurate analytical results that you can submit for regulatory compliance demonstration purposes in most states.

For more information about Environmental Analytical Services from Kodak, call 1-800-283-4173.

Discharges of Hazardous Wastes

If the wastewater you are discharging to your local POTW has a concentration greater than or equal to 5 ppm of silver at the point where it leaves your facility and enters the sewer system, *and* you are discharging more than 15 kilograms/month of hazardous waste, you must submit a

one-time written notification to your local POTW, the USEPA, and your state hazardous waste authority. This notification must include:

- Hazardous waste name (i.e. silver)
- EPA hazardous waste number (i.e. D011)
- Type of discharge (e.g. continuous, batch), and
- Certification that a waste minimization program exists, to the extent
 that it is economically practical, to
 reduce the volume and toxicity of
 hazardous wastes generated.

If the discharge is greater than 100 kg/month, the notification must also include:

- Identification of the hazardous constituents in the waste
- An estimate of the mass and concentration of the hazardous constituents discharged, and
- An estimate of the mass of the constituents in the waste stream expected to be discharged during the course of the following year.

SILVER AND THE SAFE DRINKING WATER ACT (SDWA)

The Safe Drinking Water Act (SDWA) establishes standards for drinking water quality and regulates the underground injection of wastes and other substances that could contaminate underground drinking water sources. Discharges to septic tanks are regulated under the SDWA's Underground Injection Control Program (UIC). An UIC permit is required for discharges to a septic system from commercial establishments. Effluents from photographic processing facilities are not typically allowed to be discharged to septic tanks under an UIC permit.

In addition, some states regulate groundwaters also under their CWA laws. Discharges to a septic system in those states may also be regulated through NPDES permits.

Compliance Requirements

If your photographic processing facility uses septic tanks for disposal of silver-bearing wastes, contact your state or local environmental agency to determine the specific permitting and compliance requirements.

If your photographic processing facility is *not* allowed to use a septic tank system for disposal, you should have your photographic effluents transported off-site for treatment or disposal.

SILVER AND THE COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA OR SUPERFUND)

The Comprehensive Environmental Response Compensation and Liability Act (CERCLA) was created to control and regulate the cleanup of environmental contamination. This includes cleanup of existing contamination from past disposal practices and a system of reporting and management of environmental releases as they occur. CERCLA has been called "Superfund" because of the large amounts of money appropriated by Congress to clean up abandoned landfills.

Under CERCLA, silver-bearing hazardous wastes are designated as *hazardous substances* with a reportable quantity (RQ) equal to 1 pound (0.454 kg). You must report a release that exceeds the RQ in a 24-hour period.

Compliance Requirements

If your photographic processing facility spills or releases one pound or more of a silver-bearing hazardous waste solution into the environment over a 24-hour period, you must immediately notify the National Response Center (NRC) at 800-424-8802. The NRC or the designated response agency will also require cleanup of the release and a follow-up report.

You are not required to report releases to permitted facilities, such as POTW's, under CERCLA. However, you should check with your local POTW to determine when and at what quantity they recommend notification for spills of silver-bearing photographic processing solutions. Some local sewer discharge regulations may also contain spill reporting and prevention requirements.

SILVER AND THE EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT (EPCRA OR SARA TITLE III)

The Emergency Planning and Community Right-to-Know Act (EPCRA) is often referred to as SARA Title III. Although EPCRA is a free-standing law, it is commonly called SARA Title III because it was the third title (or section) of the Superfund Amendments and Reauthorization Act (SARA). EPCRA was created to make information available to the public so that local communities could plan for an emergency in the event of a release of a toxic chemical. Silver and silver compounds are designated as toxic chemicals under this law.

Certain facilities are currently required to report information about releases of toxic chemicals. Printing and publishing facilities (SIC Codes 2711-2796) are the only photographic processing facilities that are currently required to report annually about chemical releases.

The storage of extremely hazardous substances can also trigger notification requirements for photographic processing facilities. Silver or silver compounds are not identified as extremely hazardous substances.

Compliance Requirements

Most photographic processing facilities *do not* have compliance requirements under EPCRA. Printing and publishing facilities should include any storage of silverbearing materials in determining reporting requirements.

MORE INFORMATION

If you have environmental questions about Kodak products or services, or for more information about Kodak off-site waste management or refining services, contact Kodak Environmental Services at 1-716-477-3194, between 8 a.m. and 5 p.m. (Eastern time).

Kodak also maintains a 24-hour health and safety hotline to answer questions about handling photographic chemicals. If you spill a chemical or come into contact with chemicals, call 1-716-722-5151. In countries other than the U.S. and Canada, contact Kodak in your country.

Kodak has many publications to assist you with information on Kodak products, equipment, and methods. To obtain a list of Kodak publications, send your request for a copy of KODAK Publication No. L-1, KODAK Index to Photographic

Information, with \$1 to Eastman Kodak Company, Department 412-L, Rochester, New York 14650-0532.

The following publications are available from dealers who sell Kodak products, or you can order them directly from Kodak through the order form in KODAK Publication No. L-1.

- J-210 Sources of Silver in Photographic Processing Facilities
- J-211 Measuring Silver in Photographic Processing Facilities
- J-212 The Technology of Silver Recovery for Photographic Processing Facilities
- J-213 Refining Silver Recovered from Photographic Processing Facilities

Kodak Information Center's Faxback System —Available 24 hours a day, 7 days a week—

Many technical support publications for Kodak products can be sent to your fax machine from the Kodak Information Center. Call:

1-800-242-2424, Ext. 33

If you have questions about Kodak products, call Kodak.

In the U.S.A.: 1-800-242-2424, Ext. 60, Monday—Friday, 8 a.m.—8 p.m. (Eastern time)

In Canada: 1-800-465-6325, Monday-Friday, 8:30 a.m.-5 p.m. (Eastern time)

Or contact Kodak on-line at: http://www.kodak.com/



This publication is a guide to the Federal Environmental Regulations that apply to a typical photographic processing facility. Local or state requirements may also apply. Verify the specific requirements for your facility with your legal counsel.

This publication is printed on recycled paper that contains 50 percent recycled fiber and 10 percent post-consumer material.



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