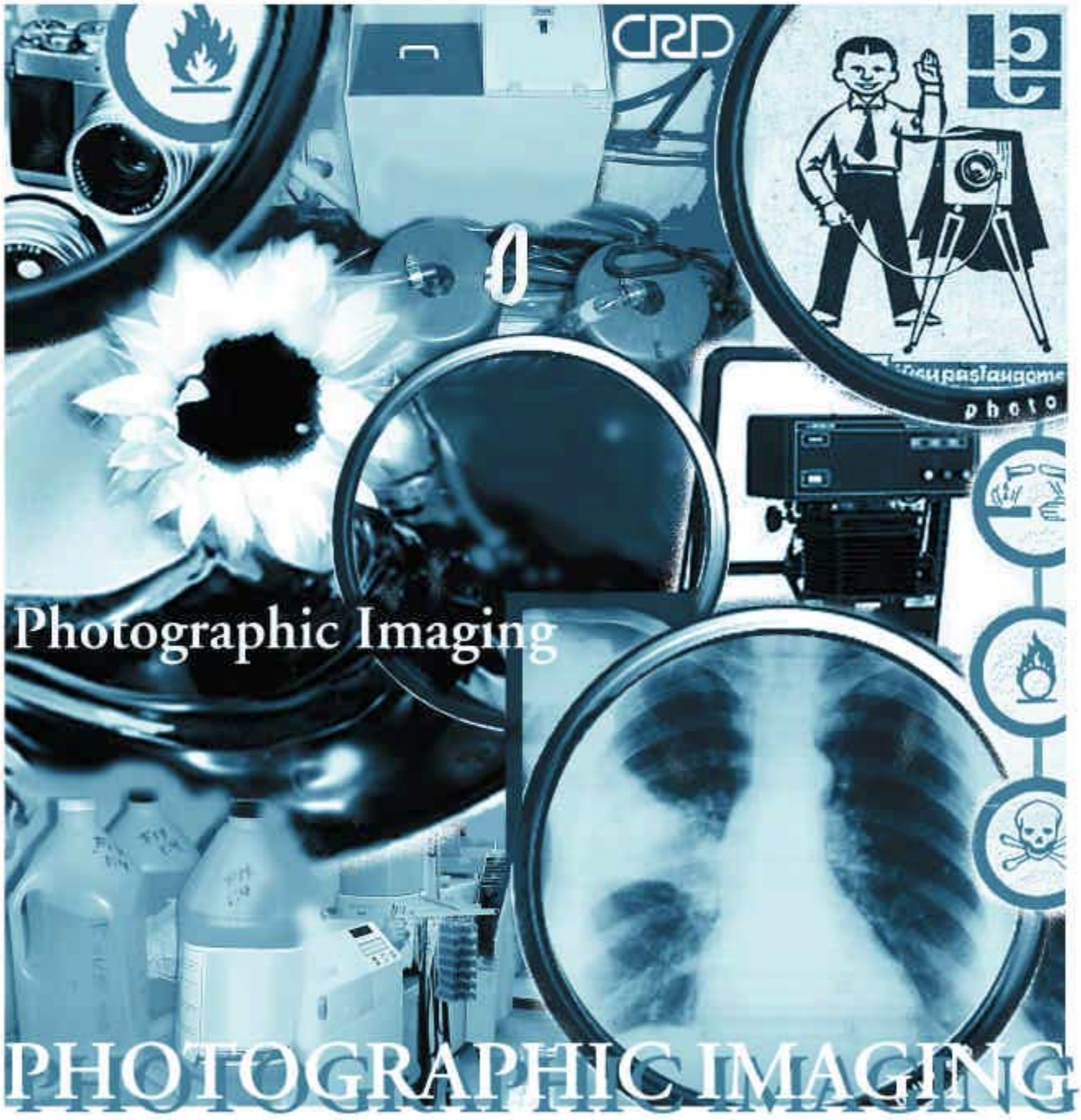
Environmental Regulations & Best Management Practices



PHOTOGRAPHIC IMAGING

Photographic Imaging Operations in the Capital Regional District

ENVIRONMENTAL REGULATIONS & BEST MANAGEMENT PRACTICES

Photographic Imaging Operations in the Capital Regional District

This manual is published by the Regional Source Control Program
For more information please call (250) 360-3256 or visit the CRD web site at http://www.crd.bc.ca

Regional Source Control Program
524 Yates Street, PO Box 1000
Victoria, BC V8W 2S6
(250) 360-3256

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1.0 INTRODUCTION

Photographic films and paper are used to document, record and transfer information for a wide variety of purposes including recording of personal events, diagnosis of medical problems and analysis of structural defects. While the manufacture of photographic film and paper occurs at only a few sites around the world, the processing of these materials occurs at numerous facilities. The majority of photographic imaging operations, representing approximately 90% of this industry, are small size facilities with less than 20 employees.

Photographic processes can generate a variety of by-products and recoverable materials in their operations including some hazardous wastes such as silver. Medical imaging operations such as x-ray and ultrasound that use photographic processes for image development also generate these by-products.

The Capital Regional District (CRD) Regional Source Control program has developed this document in cooperation with representatives from the Photo Marketing Association, BC Environment, material suppliers, businesses and institutions. This document serves as a guide to the environmental regulations that apply to photographic imaging operations within the regional district and provides information on best management practices and services that will assist operations in meeting these regulations and improving their overall environmental performance.

1.1 Why is Photographic Imaging Effluent a Concern?

- Effluent from photographic imaging operations may contain contaminants such as silver, iron, sulphate, biochemical oxygen demand (BOD) and chemical oxygen demand (COD) at concentrations above the levels specified in municipal sewer use bylaws.
- Studies from other jurisdictions show that silver from photoprocessors contributes significantly to the total silver loading in municipal sewage, whereas the loading of other contaminants from photoprocessors does not warrant control. Silver accumulation in soils to which sewage sludge (or biosolids) has been applied may, over time, exceed levels specified under provincial contaminated site regulations.
- Silver is a necessary component in image forming. Free silver ions are very toxic to aquatic organisms. The silver in effluent from photographic imaging operations is mostly in the form of complexes of silver thiosulphate, which are less toxic than ionic silver. However, most regulations do not differentiate between species of silver. Although photographic imaging industries have significantly reduced the amount of process chemicals being discharged to sanitary sewers over the past 20 years, silver recovery remains an important step in waste reduction programs in order to conserve a valuable and non-renewable resource and to control silver loadings in sanitary sewage.
- Some constituents of photographic imaging wastes are corrosive and may contribute to leaks in sewer pipes downstream of the discharge point if not properly managed.

1.2 Summary of Regulatory Requirements

1.2.1 Federal Government

The Canadian Government has no specific requirements for the management of photographic imaging waste, however regulations adopted under federal enactments such as the Transportation of *Dangerous Goods Act* and the *Workers Compensation Act* contain provisions that apply to the general transportation and handling of hazardous materials. For more information regarding these requirements, please refer to Section 5.

1.2.2 Provincial Government

The BC Ministry of Environment, Lands and Parks regulates the storage, use, treatment and disposal of special wastes to the environment through the ***BC Special Waste Regulation*** (BCSWR) under the *BC Waste Management Act.*

For more details regarding the BCSWR, please refer to Sections 2.1 and 5.

1.2.3 Regional Government

1.2.3.1 CRD Sewer Use Bylaw

The CRD is empowered, under the provincial *Waste Management Act*, to regulate the discharge of waste into its own sewers and into sewers owned and operated by member municipalities.

On August 10, 1994, the Board of the CRD passed Bylaw No. 2231, A Bylaw To Regulate The Discharge Of Waste Into Sewers Connected To A Sewage Facility Operated by the Capital Regional District. This bylaw has been recently updated as C*RD Sewer Use Bylaw No. 3, 1999*, and is generally referred to as the sewer use bylaw. The main intentions of the sewer use bylaw are to protect:

- the marine receiving environment
- public health and safety
- sewerage works
- wastewater treatment processes
- wastewater sludge (biosolids) quality

and to ensure:

- consistent discharge requirements throughout the Capital Region
- fair and balanced use of the CRD's sewage facilities
- promotion of responsible waste management practices

In many cases, companies will require a waste discharge permit to discharge industrial or commercial wastes into the sewers. However, the sewer use bylaw also provides for the discharge of certain types of waste under industry-specific ***Codes of Practice***.

A Code of Practice is a regulatory document, developed by the District, which contains mandatory sanitary sewer discharge standards for specific industrial, institutional or commercial sectors. Codes of Practice set out minimum effluent treatment, equipment maintenance and record keeping requirements for various sector operations. **A business or organization operating under an approved Code of Practice will not require a waste discharge permit.**

1.2.3.2 Other Regional or Municipal Regulations

Other regional or municipal regulations that may apply to the handling and disposal of wastes from photographic imaging operations within the CRD include:

- *Hartland Landfill Tipping Fee and Regulation Bylaw* (CRD): Regulates the Disposal of Wastes at the CRD's Hartland Road Sanitary Landfill.
- *CRD Septage Disposal Bylaw*: Regulates the Discharge of Septic Tank Contents into CRD Septage Disposal Facilities.
- Municipal Storm Sewer Bylaws: regulate the discharge of wastes into municipal storm drains and watercourses.

2.0 MANDATORY REQUIREMENTS

2.1 Provincial Government Requirements – Special Waste Handling

The BC Ministry of Environment, Lands and Parks (BCMELP) regulates the management of ***special waste*** through application of the ***BC Special Waste Regulation*** (BCSWR) under the *BC Waste Management Act.* The following information is provided for guidance only. If there is any discrepancy between this information and the BCSWR, the BCSWR will take precedence.

Photographic Imaging Waste and the BC Special Waste Regulation

Wastes containing silver which, when subjected to the leachate extraction procedure described in Schedule 4 of the BCSWR, produce a leachate with a concentration of greater than 5 mg/L of silver, classify as special waste (leachable hazardous waste containing silver) under the BCSWR.

Other wastes produced by Photographic Imaging operations may also classify as special waste under the BCSWR.

2.1.1 Storage and Transport

Special Waste must be stored, transported and disposed of in accordance with the requirements of the BCSWR. In particular:

- If more than 5 L of untreated silver-bearing special waste is to be transported to an off-site treatment facility, a manifest is required and the waste must be hauled by a licensed hauler in accordance with Section 45 of the Special Waste Regulation. Requests to change these requirements can be made under Section 51 of the regulation.
- If more than 1,000 L of silver-bearing special waste is stored prior to shipping for treatment, it must be stored in accordance with the requirements of Part 2, Part 3 and Part 4, Division (2) of the Special Waste Regulation.
- If more than 1,000 L of untreated silver-bearing special waste is generated over any 30-day period or stored on-site at any time, the waste must be registered in accordance with Section 43 of the Special Waste Regulation.
- If more than 10,000 L of silver-bearing special waste will be stored on-site prior to shipping for treatment, a permit under the *Waste Management Act* is required prior to commencement of storage of the waste.

2.1.2 Disposal

Section 39 of the BCSWR restricts the deposit or discharge of Special Waste into any waste disposal system operated by a municipality or other public authority. Such waste disposal systems include:

- sanitary sewers
- storm sewers or watercourses
- septage disposal facilities
- solid waste landfills

2.2 Capital Regional District Requirements – Code of Practice for Photographic Imaging Operations

This section is a summary of the regulatory requirements contained in the CRD sewer use bylaw (the bylaw) that apply to photographic imaging operations. It is intended for information and guidance purposes only. If there is any discrepancy between this information and the bylaw, the bylaw will take precedence.

Photographic Imaging operations that follow the ***Code of Practice for Photographic Imaging Operations*** (Schedule "K" of the Sewer Use Bylaw) are authorized to discharge certain Restricted Wastes into a sanitary sewer without a waste discharge permit. The CRD reserves the right to require any photographic imaging operation to obtain a waste discharge permit if deemed necessary by the sewage control manager. All other terms and conditions of the sewer use bylaw apply to the discharge to the sanitary sewer.

2.2.1 Application

- This code of practice applies to all photographic imaging operations in the CRD that discharge waste into a sewer connected to a sewage facility operated by the CRD.
- Photographic imaging operations include any retail, commercial, institutional or corporate photographic film processing and/or printing facilities that use silver in image forming or create wastewater containing silver. Examples of photographic imaging operations include, but are not limited to:
  - mini-labs, professional and commercial photoprocessors, portrait and commercial studios
  - commercial printers, publishers and newspapers
  - photographic imaging for law enforcement
  - photographic imaging at schools, colleges universities and military facilities (including electrophoresis and non-destructive testing facilities)
  - photographic imaging at public and private laboratories (including electrophoresis and non-destructive testing facilities)

- medical imaging operations (X-rays, mammograms, ultrasounds) at hospitals, clinics, dental offices, veterinarian clinics and chiropractors

2.2.2 Registration

All photographic imaging operations operating under this code of practice must register with the CRD and report any subsequent change in the status of their operation to the CRD.

2.2.3 Discharge Regulations

General

An operator of a photographic imaging operation must not discharge waste which, at the point of discharge into a sewer, contains:

- silver in a concentration that is in excess of 5 milligrams per litre (mg/L) as analyzed in a grab sample.
- prohibited waste, restricted waste, special waste, storm water, or uncontaminated water other than the following restricted wastes: iron, BOD, COD, chloride and sulphate.

Effective June 1, 2000 all photographic imaging operations that produce liquid waste containing silver must either:

- collect and transport the waste from the photographic imaging operation for **off-site waste management**; or
- **treat** the wastewater at the photographic imaging operation site prior to discharge to the sanitary sewer using **one** of the following silver recovery technologies:
  - ♦ Two chemical recovery cartridges connected in series; or
  - ♦ Electrolytic recovery followed by two chemical recovery cartridges connected in series; or
  - ♦ Any other silver recovery technology, or combination of technologies, capable of reducing the concentration of silver in the wastewater to 5 mg/L or less.

Silver Recovery Technology

An owner of a photographic imaging operation must:

- Install and maintain the silver recovery technology according to the manufacturer's or supplier's recommendations.
- Collect all wastewater containing silver in a holding tank and deliver this wastewater to the chemical recovery cartridges using a metering pump.
- Calibrate the metering pump at least once per year.

- Locate the silver recovery system in such a manner that an accidental spill, leak or container failure will not result in wastewater containing silver entering any sanitary sewer or storm sewer. If such a location is not available, one of the following actions must be taken:
    - ♦ installation of secondary containment to contain spills or leaks from the silver recovery system; or
    - ♦ all floor drains, into which liquid spilled from the silver recovery system would normally flow, must be capped.

Chemical Recovery Cartridge Testing

- Where two separate chemical recovery cartridges are connected in series, the discharge from the first cartridge must be tested for silver content at least once per month using silver test paper or a silver test kit.
- When the discharge from the first chemical recovery cartridge cannot be sampled, an owner of a photographic imaging operation must:
    - ♦ install a cumulative flow meter on the silver recovery system; and
    - ♦ test the discharge from the second chemical recovery cartridge once per week using silver test paper or a silver test kit.

Chemical Recovery Cartridge Replacement

- Chemical recovery cartridges must be replaced when one of the following has occurred:
    - ♦ the manufacturer's or supplier's recommended expiry date, as shown on each cartridge, has been reached; or
    - ♦ eighty percent (80%) of the manufacturer's or supplier's maximum recommended capacity, or total cumulative flow, for each cartridge has been reached; or
    - ♦ test data, using silver test paper or a portable silver test kit, indicates that the discharge from the first cartridge is greater than 1000 mg/L; or
    - ♦ analytical data, achieved using an approved method, indicates that the concentration of silver in the discharge from the silver recovery system is greater than, or equal to, 5 mg/L.
- If treatment of wastewater with two chemical recovery cartridges connected in series is the only silver recovery technology being used, and cartridge replacement is required, then both chemical recovery cartridges must be replaced at the same time.
- If treatment of wastewater with two chemical recovery cartridges connected in series is used following treatment by an electrolytic recovery unit, and cartridge replacement is required, the second cartridge may replace the used first cartridge and a new second cartridge may be installed.
- When cartridge replacement is required, both chemical recovery cartridges used following an electrolytic recovery unit must be replaced at the same time if this is recommended by the manufacturer or supplier of the cartridges.

Record Keeping and Retention

- Operation and maintenance manuals for all equipment used in a silver recovery system must be kept available for inspection on site.
- Photographic imaging operations that use two chemical recovery cartridges connected in series must keep a record book on site which includes the following information recorded for the previous two years:
    - ♦ serial number of each chemical recovery cartridge used;
    - ♦ installation date of each chemical recovery cartridge used;
    - ♦ expiry date of each chemical recovery cartridge used (where provided by manufacturers or suppliers);
    - ♦ maximum recommended capacity, or total cumulative flow, of each chemical recovery cartridge used;
    - ♦ date of all metering pump calibrations;
    - ♦ monthly silver test results on the discharge from the first chemical recovery cartridge or, where the discharge from the first cartridge cannot be sampled, weekly silver test results on the discharge from the second chemical recovery cartridge and weekly cumulative flows through the silver recovery system;
    - ♦ date and description of all operational problems associated with the chemical recovery cartridges and remedial actions taken.
- Photographic imaging operations that use an electrolytic recovery unit in addition to two chemical recovery cartridges connected in series must keep a record book on site which includes the following information recorded for the previous two years:
    - ♦ all information specified above for two chemical recovery cartridges connected in series;
    - ♦ date of each removal of silver from the electrolytic recovery unit;
    - ♦ date of each maintenance check on the electrolytic recovery unit;
    - ♦ date and description of all operational problems associated with the electrolytic recovery unit and remedial actions taken.

3.0 BEST MANAGEMENT PRACTICES

Best management practices (BMPs) are activities developed to assist operations to reduce the amount of contaminants discharged to the environment, to comply with regulations and to improve overall waste management practices. BMPs are based on the pollution prevention (P2) principle that emphasizes reducing or eliminating pollutants and toxic materials at their source rather than removing them from a mixed waste stream. Preference is given to those practices that are highest in the P2 hierarchy as specified below in decreasing order of priority:

- avoidance, elimination or substitution of polluting products or materials;
- reduction in the use of polluting products or materials;
- elimination and reduction of the generation of polluting by-products;
- reuse and recycling of polluting by-products;
- energy recovery from polluting by-products;
- treatment or containment of polluting residual by-products; and
- remediation of contaminated sites.

A number of BMP documents have been produced for the photographic imaging industry by various agencies since the early 1990s. Many of these were developed to assist photoprocessors to decrease silver discharges to sewers, comply with regulations, improve their operations and save money through application of pollution prevention principles. Operators are also encouraged to influence suppliers by requesting and purchasing less toxic alternative products.

Some examples of these BMPs are listed under "Resource Materials" in Section 5.1. Important elements contained in these BMPs are summarized below.

3.1 Silver Recovery Methods

This section provides further information on the silver recovery methods required under the code of practice for treatment of wastewater containing silver. Photographic imaging solutions that can contribute silver to wastewater include: used fix solution, used bleach-fix solution, used stabilizer rinses and low flow counter-current wash.

3.1.1 Chemical Recovery Cartridges

Chemical recovery cartridges (CRCs) use the principle of metallic replacement to remove silver from a waste solution.

- A chemical recovery cartridge consists of a container filled with iron in the form of steel wool, iron mesh or iron chips. When a silver-bearing solution comes in contact with the iron, the iron reacts with the silver thiosulphate

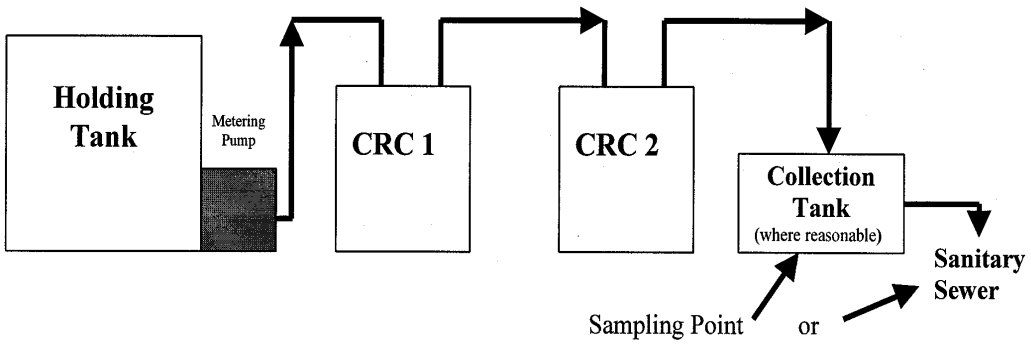
complex. The iron goes into the solution and the silver is deposited onto the solid matrix. The silver sludge in the exhausted cartridge is sent to a silver recovery plant.

- The exchange reaction is rapid but depends on the contact of the silver thiosulphate complex with the iron surface. The contact time (flow rate), iron surface area and solution pH will influence the efficiency of the chemical recovery cartridges. **Lower flow rates through the cartridges at an optimum pH of between 5.5 and 6.5 will result in better silver recovery.**

Two Chemical Recovery Cartridges Connected in Series

- A minimum of two chemical recovery cartridges must be connected in series to treat silver-bearing wastes, even when used after an electrolytic recovery unit. The first cartridge removes the bulk of the silver, while the second cartridge polishes the effluent of the first. The second cartridge also serves as a backup in case the first unit malfunctions or becomes overloaded.
- There are a variety of types and sizes of chemical recovery cartridges available. It is important that they be selected, installed and maintained according to the manufacturer's or supplier's recommendations.
- To control the flow rate, the silver-bearing effluent must be collected in a holding tank and be delivered to the cartridges using a calibrated metering pump as shown in Figure 1. The metering pump should be checked each time the cartridges are replaced. The appropriate flow rate should be provided by the manufacturer or supplier of the installed chemical recovery cartridges.
- Chemical recovery cartridges are replaced on a schedule based on the volume and flow of solution de-silvered as determined by valid analytical test data from lab tests or similar installations. The manufacturer or supplier should provide this data, along with other performance specifications.

Figure 1. Recommended Configuration for Two CRCs Connected in Series



The advantages of chemical recovery cartridges include:

- low capital cost
- easy to install, minimal training required for operation and maintenance
- recyclable
- efficient silver recovery when installed in series with metered flow, pH control and regular replacement

The disadvantages of chemical recovery cartridges include:

- recovered silver content is unknown
- silver more costly to refine compared to silver recovered from electrolytic recovery units
- corrosion of the steel wool packing causes channeling which, over time, can lead to fluctuations in effluent silver concentrations

3.1.2 Electrolytic Recovery

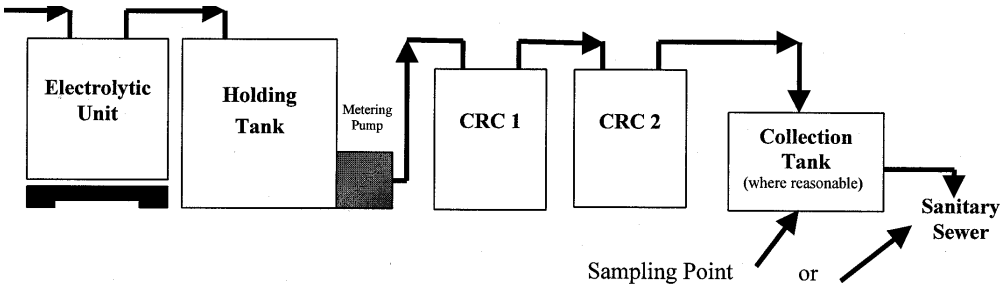
In this method, silver is removed from the waste stream by passing a direct electrical current between two electrodes suspended in the waste solution.

- Metallic silver (silver flake) is deposited on the cathode (negatively charged electrode). The silver flake, which can be 90 - 98% pure, is regularly stripped off the cathode and sent away for refining.
- Large volumes of solution (typical generation rate > 150 L/month) are most efficiently treated using electrolytic recovery. Typically, silver-bearing solutions are treated through electrolytic recovery systems in "batch" operations. The waste solutions are collected in a holding tank and, when a sufficient volume has accumulated, the solution is pumped to the electrolytic unit for silver removal. **The optimum pH range for silver recovery using electrolytic techniques has been reported as being 7.5 - 8.5**. Since the normal pH range of silver-bearing solutions is 5.5 - 7.0, pH adjustment is generally necessary.
- Electrolytic silver recovery systems are usually designed to de-silver solutions with silver concentrations between 3000 - 6000 mg/L. Plating efficiency decreases with lower silver concentrations. Electrolytic silver recovery systems can typically maintain effluent silver concentrations at between 30 - 600 mg/L.

Electrolytic Recovery Followed by Two Chemical Recovery Cartridges Connected in Series.

- Electrolytic recovery is considered to be primary treatment of silver-bearing effluent. Therefore, the effluent must subsequently be passed through a secondary treatment process, such as two chemical recovery cartridges in series (see Figure 2).
- The same information regarding flow control and cartridge replacement, as outlined above under "Two Chemical Recovery Cartridges Connected in Series", applies to this configuration.

Figure 2. Recommended Configuration of Electrolytic Recovery Unit and Two CRCs



The advantages of electrolytic recovery include:

- cost effective for treatment of larger volumes of waste
- higher purity silver recovered (lower silver refining costs)
- reusable
- extends life of chemical recovery cartridges connected downstream

The disadvantages of electrolytic recovery include:

- higher capital and operating costs
- must be followed by two chemical recovery cartridges in order to reduce silver to less than 5 mg/L
- wastes typically require pH adjustment before treatment
- increased maintenance and training requirements

3.1.3 Other Treatment Technologies

Other available silver recovery technologies include ion exchange and chemical precipitation. Silver concentration technologies include evaporation, distillation and reverse osmosis. Acceptance of other treatment technologies, or combinations of technologies, as silver recovery systems requires submission of valid analytical test data to the deputy sewage control manager. Further information on these technologies is available through the resources and references provided in Section 5.

3.2 Off-Site Waste Management

Photographic imaging operations may choose to collect and store their silver-bearing wastes and transport them to an off-site waste management facility.

- All silver-bearing waste should be stored in sealed, leak-proof containers in a secure location in such a manner that an accidental spill, leak or container failure will not result in silver-bearing solutions entering any sanitary sewer, septic system or storm drain. If such a location is not available, adequately sized

secondary containment should be provided for this equipment or all floor drains in the area must be capped.

- Under the provincial Special Waste Regulation, any liquid waste containing more than 5 mg/L of silver is classified as a "leachable hazardous waste" and therefore, must be stored and transported in accordance with the requirements in the provincial Special Waste Regulation. Most untreated silver-bearing liquid waste will contain more than 5 mg/L of silver. The mandatory provincial requirements for storage and transport are outlined in Section 2.1.1.
- Every photographic imaging operation using off-site waste management must maintain organized records as required under the Special Waste Regulation and make them available for inspection on request.

3.3 Non-Silver Bearing Wastes

Some non-silver bearing chemicals and cleaning solutions used in photographic imaging procedures may be classified as ***special waste*** under the *BC Special Waste Regulation.* Special waste cannot be disposed of in the sanitary sewer, storm sewer or septic systems. Check the product's Material Safety Data Sheet (MSDS) or contact the supplier to determine if a waste solution could be classified as a special waste.

If classified as special waste, used cleaning solutions or other non-silver bearing wastes should be stored in labeled, sealed, leak-proof containers in a secure location in such a manner than an accidental spill, leak or container failure will not result in chemicals entering any sanitary sewer, septic system or storm drain. If such a location is not available, adequately sized secondary containment should be provided for this equipment or all floor drains in the area should be capped.

Hazardous waste disposal vendors can provide pick-up services for special wastes or flammable wastes.

If not classified as special waste or restricted waste, small quantities of cleaning solutions and non-silver bearing wastes may be discharged to sanitary sewers (but <u>not</u> to storm sewers or septic systems).

Used developer, if <u>not</u> mixed with fixer or classified as special waste or restricted waste, may be discharged to the sanitary sewer (but <u>not</u> to storm sewers or septic systems).

3.4 Record Keeping for Special Wastes

The following records should be kept by each photographic imaging operation if quantities of **special waste** greater than five litres or five kilograms are stored on site:

- list of special wastes and monthly volume generated;
- dates of shipment off-site and volume of waste shipped; and
- name of waste disposal vendor contracted to remove wastes.
- all other records required under the *BC Special Waste Regulation.*

3.5 Non-Hazardous Office Wastes

The following procedures are suggested to help operators improve their overall environmental performance:

- choose products with the least packaging and the highest recyclable material content;
- regular office waste generated by photographic imaging operations should be recycled whenever possible;
- waste paper, aluminum cans, newspaper, glass, cardboard and plastic containers should be recycled; and
- check with the building manager to find out if any recycling programs are already established in the building.

More resources on solid waste reduction and recycling are available in Section 5.

4.0 CODE OF PRACTICE IMPLEMENTATION PLAN

The implementation plan for CRD Codes of Practice includes the following components: education, inspection, monitoring, enforcement, administration and review. Regional Source Control program staff will carry out activities related to each component in partnership with each code sector.

4.1 Inspection, Monitoring and Enforcement

Regional Source Control program staff may carry out inspections, examine records or other documents and take samples of effluent for analysis as specified under the Sewer Use Bylaw. Compliance sampling may also be conducted at any time on the effluent from operations regulated under a Code of Practice. Repeat sampling may be necessary if non-compliance with the Code is suspected or high contaminant concentrations are detected in previous samples.

A cooperative, gradually escalating, approach to enforcement will be used for all CRD Codes of Practice. This approach is established in an enforcement policy that has been approved by the CRD Board.

Where cooperative efforts to achieve compliance using the enforcement policy have failed, warnings and tickets of between $50 and $200 per offence may be issued under the *CRD Ticket Information Authorization Bylaw*. For more serious or continuing offences, fines up to $10,000 per offence per day may be issued under the Sewer Use Bylaw.

5.0 FOR MORE INFORMATION

- For more information on the ***Code of Practice for Photographic Imaging Operations***, or CRD Liquid Waste Control Bylaws, please contact the Regional Source Control program at (250) 360-3256 or visit the CRD web site at: http://www.crd.bc.ca
- For more information on the ***BC Special Waste Regulation or on special waste handling and disposal*** contact the BC Ministry of Environment, Lands and Parks at (250) 387-3648 or visit their web site at: http://www.env.gov.bc.ca. ***Special Waste Transport licences*** can be viewed at http://www.eav.gov.bc.ca/epd/epdpa/sw/swtl.html
- To report hazardous waste or chemical spills, call the **Provincial Emergency Program (PEP)** at 1-800-663-3456.
- For information on the ***Transportation of Dangerous Goods Act*** and Regulations contact Transport Canada at:

  (604) 666-2955 (for transport by rail and highway)

  (604) 666-5655 (for transport by air)

  (250) 363-0394 (for transport by sea)

  To obtain copies of regulations and associated materials call: 613-991-3135

  Further information is available through the Transport Canada web site: http://www.tc.gc.ca

- For information on the ***Workers Compensation Act*** and Regulations contact the Workers Compensation Board of British Columbia (WCB) at 1-888-621-7233 (toll free) or visit the WCB web site at: http://www.wcb.bc.ca

To obtain copies of regulations, user guides and education materials call the **WCB Films and Posters Section** at 1-800-661-2112.

- Additional information on photographic imaging can be obtained from chemical and equipment suppliers. **The Photo Marketing Association** can also provide assistance at 1-800-461-4350.

- For information on **Hazardous Waste Disposal Vendors**:

  - obtain a copy of the CRD Recycling Directory by calling the CRD Recycling Hotline at 360-3030; or

- check the Telus Yellow pages under "Waste Reduction and Disposal Services – Industrial".

For general inquiries regarding recycling, call either:

The **CRD Recycling Hotline** at (250) 360-3030; or

The **BC Recycling Hotline** at 1-800-667-4321.

5.1 Resource Materials

1. Photo Marketing Association International (PMAI), 1994. "Environmental Code of Management Practice for Minilabs". Prepared by PMAI, November 1994.

Available on the internet at: http://www.envisioncompliance.com/html/canada.htm

2. Washington State Department of Ecology (WSDOE), 1996. "Environmental Management and Pollution Prevention: A Guide for Photo Processors". Prepared by WSDOE, May 1996. Publication 94-138R.

3. The Silver Council, 1997 "Code of Management Practice for Silver Dischargers: Recommendations on Technology, Equipment, and Management Practices for Controlling Silver Discharges from Facilities that Process Photographic Materials". Prepared by the Silver Council, 1997.

Available on the internet at: http://www.silvercouncil.org.

4. U.S. Environmental Protection Agency (USEPA), 1991. "Guides to Pollution Prevention: The Photoprocessing Industry". Prepared by USEPA, October 1991. Publication EPA/625/7-91/012.

Available on the internet at: http://es.epa.gov/program/epaorgs/ord/photoind.html

6.0 GLOSSARY OF TERMS

Biochemical oxygen demand (BOD) means a test used to determine the organic content in wastewater. BOD is a measurement of the amount of dissolved oxygen used by microorganisms in the biochemical breakdown of organic matter in wastewater.

Chemical oxygen demand (COD) means a test used to determine the organic content in wastewater. COD is a measurement of the oxygen equivalent of the organic matter in wastewater as determined by a strong chemical oxidation procedure.

Chemical recovery cartridge (CRC) means a cartridge filled with steel wool, iron mesh, iron particles or iron-impregnated resin capable of removing silver from silver-bearing wastewater through the principle of metallic replacement. This type of cartridge is also known as a silver recovery cartridge (SRC).

Contaminant means a substance that is not naturally present in the environment or is present in elevated amounts, which if in sufficient concentration, can adversely affect an environment.

Code of Practice means a regulatory document developed by the District that contains mandatory sanitary sewer discharge standards for specific industrial, institutional or commercial sectors.

Cumulative flow means the total flow through a silver recovery system over a known period of time.

Cumulative flow meter means a commercially available device used for measuring cumulative flow through a silver recovery system.

Effluent means the liquid flowing out of a facility or household into a sewer system or water body.

Electrolytic recovery means a method of recovering silver from silver-bearing wastewater by passing a direct electrical current between two electrodes suspended in the wastewater.

Heavy metals means metallic elements with high atomic weights, such as silver, iron, zinc, copper, lead, mercury, cadmium and arsenic. They are generally persistent in the environment, have the potential to accumulate in the food chain and sewage treatment plant sludges and can cause health effects in organisms.

Medical imaging operations means photoprocessing operations, such as x-ray, ultrasound and mammography procedures conducted at hospitals, medical clinics, veterinarian clinics, chiropractors and dental offices.

Metallic replacement means a method of recovering silver from silver-bearing solutions. Metallic replacement occurs when a solution containing dissolved ions of an active metal such as silver contacts a more active solid metal such as iron. The more active metal goes into solution as an ion and is replaced by an atom of the less active metal in the solid matrix.

Metering pump means a pump designed to deliver wastewater at a calibrated flow rate through chemical recovery cartridges within a silver recovery system.

Milligrams per litre (mg/L) means the weight of a substance (in milligrams) in one litre of wastewater (may also be referred to as parts per million, or ppm).

Mini-lab means an establishment having a combined colour printer and processor, capable of offering one-hour on-site photographic film processing and printing services to the general public.

Off-site waste management means removal of wastewater containing silver from a photographic imaging operation by a provincially licensed carrier to a provincially licensed facility where it is treated and disposed of in accordance with applicable provincial regulations.

Photographic Imaging Operation means any retail, commercial, institutional or corporate photographic film processing and/or printing facility that uses silver in image forming or creates wastewater containing silver.

Pollution Prevention means the use of processes, practices, materials and energy that avoid or minimize the creation of processing and other wastes.

Sanitary sewer means a collection system for domestic, commercial, institutional and industrial wastewater or any combination thereof.

Secondary containment means any impervious structure with a capacity equal to, or greater than, the capacity of the silver recovery system that surrounds the system and is capable of storing any liquid spilled from it.

Special waste means any chemical, compound, mixture, substance or article as defined in the Special Waste Regulation, pursuant to the *Waste Management Act* of British Columbia. This includes liquid wastes containing more than 5 mg/L of silver.

Silver recovery system means the combination of holding tanks, metering pumps, plumbing and silver recovery technology which is used to treat wastewater containing silver produced by photographic imaging operations.

Silver recovery technology means equipment that is designed to recover silver from wastewater produced by photographic imaging operations using such methods as metallic replacement, electrolysis, ion exchange or chemical precipitation. Silver recovery

technology includes, but is not limited to, the following types of equipment, electrolytic units, chemical recovery cartridges, chemical precipitation units and ion exchange units.

Silver test kit means a test kit that is capable of measuring the silver concentration in wastewater to a minimum concentration of 100 mg/L.

Silver test paper means test paper that is capable of indicating the presence of silver in wastewater to a minimum concentration of 500 mg/L.

Standard Methods means the latest edition of "Standard Methods for the Examination of Water and Wastewater" jointly prepared and published from time to time by the American Public Health Association, the American Waterworks Association and the Water Environment Federation.

Wastewater means the spent or used water of a community or an industry.