LE FLEUVE

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ST. LAWRENCE VISION 2000

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Pollution Prevention, a Key Part of Industrial and Urban Component Activities

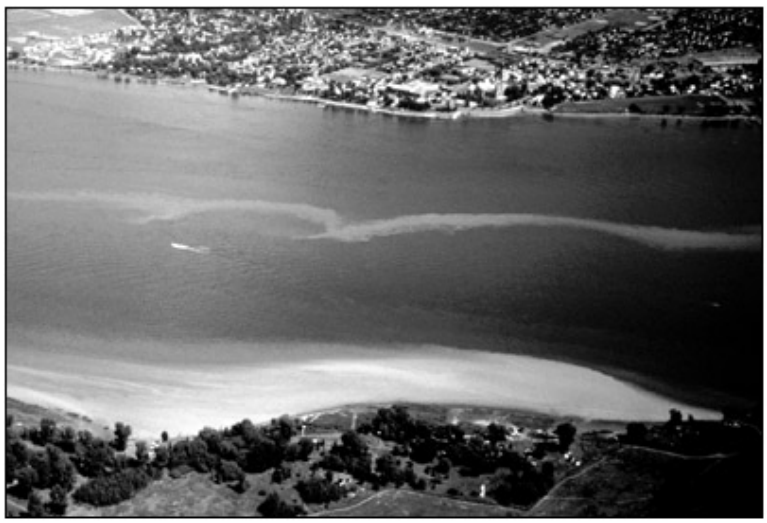

Photo : R. Carignan, CSL

During the first two phases of the St. Lawrence Vision 2000 Action Plan (SLV 2000), considerable progress was made in reducing contaminants from industrial effluents entering the St. Lawrence. Buoyed by these results, the Industrial and Urban Component partners are launching a new program to prevent pollution by Quebec's small and medium-sized enterprises. The Co-operation Committee is also about to complete a study measuring the toxicity of effluents from municipal wastewater treatment stations. All of these activities are aimed at reducing contaminant discharges entering the St. Lawrence.

IN TUNE

Pollution Prevention, a Key Part of Industrial and Urban Component Activities

A pollution prevention program initiated by SMEs in Quebec was launched by the SLV 2000 Industrial and Urban Intervention Committee, which is responsible for the implementation of prevention projects in 60 small and medium-sized businesses in Quebec.

The Environmental Recognition Program for Industrial Plants

A certificate of environmental recognition was awarded to 72 industrial establishments that contributed during phases I and II to the achievement of SLV 2000's goal of reducing toxic effluent discharges in the St. Lawrence and its tributaries. The Industrial and Urban Committee was in charge of this environmental recognition program.

ZIP Chronicle

The Ville Marie ZIP Committee presented the findings of studies conducted in co-operation with several partners on contamination of the MUC's waterways by runoff.

SUMMARY

Canada

Saint-Laurent Vision 2000

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The St. Lawrence River and its tributaries receive a number of contaminants that alter the quality of the aquatic environment and may have harmful short- and long-term effects on animal and plant species and habitats and on human health.

Reduction at source of contaminant discharges entering the St. Lawrence and its tributaries is central to the concerns of the Industrial and Urban Co-operation Committee. Between 1988 and 1998, 106 industrial plants invested hundreds of millions of dollars to clean up liquid effluents and modify industrial processes. At the same time, new environmental technologies have been developed to support pollution reduction targets. Efforts by Quebec industrial plants over the past ten years have certainly helped to improve the health of the St. Lawrence ecosystem.

Pollution Prevention, an Important Shift in Focus

In the first two phases of SLV 2000, industrial plants were mainly encouraged to introduce clean-up measures in the form of treatment systems that eliminated pollutants from production processes. The emphasis under the Industrial and Urban component of Phase III of the Action Plan is now on preventing pollution at source rather than reacting to it after the fact.

Just as industrial clean-up has produced significant environmental benefits over the past decade, there is also a considerable environmental pay-off to be gained by improving pollution prevention measures. For industrial plants, pollution can be prevented by adopting processes, forms of energy and practices that prevent or minimize the production of pollutants and waste, and reduce waste of resources. The SLV 2000 approach leaves ample room for voluntary involvement and fosters changes that will cut production costs and improve the efficiency of operations, in addition to reducing human health and environmental risks.

SMEs, New SLV 2000 Partners

In order to begin shifting the focus toward pollution prevention, while at the same time continuing efforts to reduce contaminant discharges entering the St. Lawrence, the partners under the Industrial and Urban component recently launched a Pollution Prevention Program. Based on an innovative approach, the program is aimed at SMEs, which are asked to voluntarily reduce discharges of contaminants into the environment and adopt better environmental management practices.

Three sectors are being targeted: metallurgy, chemicals and surface treatment of metals. These are dynamic sectors with respect to pollution prevention. A study conducted last year as part of the Committee's activities revealed more than one hundred pollution prevention tools in these sectors, reflecting concern on the part of many enterprises with innovating to eliminate pollution sources.

At the outset, the program targeted ten priority substances. However, the list was re-evaluated and eight more were added in order to include more organic substances. Reduction of discharges of any of the 18 priority substances will be one of the environmental objectives of participating SMEs. To be eligible for the program, facilities must be connected to the St. Lawrence, one of its tributaries or a municipal sewer system that empties into the river.

Priority Substances

Metals:

Arsenic
Cadmium
Chromium
Copper
Mercury
Nickel
Lead
Zinc

Organic substances:

Polychlorinated biphenyls (PCBs)
Dioxins and furans
Polycyclic aromatic hydrocarbons (PAHs)
Acetaldehyde
Formaldehyde
1,3-butadiene
1,2-dichloroethane
Dichloromethane
Hexachlorobenzene (HCB)
Bis(2-ethylhexyl) phthalate (DEHP)

A Beneficial Program in Many Respects

A technical resource person will conduct an environmental diagnosis of each industrial plant's processes as a starting point from which to select a pollution prevention project aimed at reducing water or atmospheric contaminant discharges or waste production. "A wide range of projects will be eligible, including adoption of clean technologies, process modification, substitution of less polluting products for materials or raw materials, reuse and recycling," explains Gérald Girouard, Co-Chair for Canada of the Industrial and Urban Co-operation Committee. "The cost/benefit ratio is considered when projects are selected, and participating industrial plants receive a free environmental diagnosis, as well as financial support from the government partners at the development and subsequent stages of the project."

"By March 2003, we expect sixty industrial plants to have completed a project under the Pollution Prevention Program," says Francine Richard, Co-Chair for Quebec of the Industrial and Urban Co-operation Committee. "Participating SMEs stand to benefit from substantial spin-offs in the form of reduced production costs, lower clean-up costs, reduced health risks for workers, etc. These firms will provide environmental models for their sectors, encouraging other industrial plants to adopt similar practices."

So far, three plants, representing the three target sectors, have agreed to conduct pilot projects in order to test and perfect the program's approach. If necessary, the program will be adapted to ensure that participating SMEs receive the best possible support. The pilot projects will also test a tool designed by the Industrial and Urban Co-operation Committee partners to support the consultants in establishing environmental diagnoses and selecting pollution prevention projects.

Like the partnerships established in the first two phases of the Action Plan, the Pollution Prevention Program provides an opportunity for Quebec firms to improve their environmental protection performance in keeping with a sustainable development perspective.

Municipal Effluents under Scrutiny

Another activity of the Industrial and Urban component partners is the characterization of the toxicity of effluent from municipal wastewater treatment plants. An initial municipal effluent characterization campaign was carried out during Phase II of the Action Plan. Wastewater from fifteen municipal treatment plants in Quebec was sampled during winter.

The results of the preliminary characterization pointed to the need for a complementary study, which was done at the beginning of Phase III. Samples were taken in the treatment plants of the Montreal, Quebec City and Outaouais urban communities as well as those of nine other municipalities, this time in summer.

The data are now being analysed, and the conclusions should be announced in the fall. The Committee hopes to formulate recommendations regarding effluent toxicity based on these conclusions. The study deals with the main wastewater treatment processes used in Quebec, under different operating conditions (for example, chemical phosphate removal with industrial effluent in a given season). The results will provide an excellent data source to be used by the Quebec Department of the Environment to pinpoint measures for controlling the toxicity of municipal wastewater treatment plant effluent.

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The Environmental Recognition Program for Industrial Plants

Photo : Claude Audet, Environnement Québec

During the first two phases of the St. Lawrence Action Plan, more than one hundred industrial plants were invited to help reduce toxic effluent discharges into the St. Lawrence River and its tributaries. Of this number, 72 have received certificates in recognition of their efforts. The purpose of this article is to highlight the commitment of these industrial plants to protecting the St. Lawrence.

Under Phase I of the St. Lawrence Action Plan, 50 industrial plants that had been discharging their effluent directly into the St. Lawrence River were the first to be designated to take part in the plan to reduce toxic effluent discharges. An additional 56 plants came on board under Phase II. At the same time, the program was expanded to include plants along the St. Lawrence's main tributaries—the Assomption, Boyer, Chaudière, Richelieu, Saguenay, St. Maurice and Yamaska rivers.

A Variety of Activities to Achieve a Common Goal

The participating industrial plants were divided into four separate groups, each one having very specific reduction objectives.

An environmental profile and effluent characterization were established for each plant in order to identify the contaminants being discharged. Then environmental objectives, that is, acceptable discharge limits for protecting the receiving environment, were set. Finally, discharge standards were drawn up and negotiated with the plants, taking into account the prevention and clean-up technologies that could be used and the related economic considerations.

Environmental Objectives for Priority Industrial Plants

50 plants under the St. Lawrence Action Plan (1988-1993)

Reduce toxic effluent discharges by 90% in the 50 industrial plants discharging inadequately treated wastewater.

56 plants under St. Lawrence Vision 2000 (1993-1998)

Reduce toxic effluent discharges by 90% in the 11 industrial plants discharging inadequately treated wastewater.

Ensure maximum reduction of toxic effluent in the 22 industrial plants that had already installed treatment technologies and were likely to discharge toxic effluent.

Assess the toxic discharges of 23 regulated industrial plants (pulp and paper mills) according to environmental objectives and develop the solutions required to reduce their impact on the receiving environment as much as possible.

Data on these industrial plants are available on the SLV 2000 Web site at the following address: *www.slv2000.qc.ec.gc.ca/slv2000/english/library/doc_center/protection/list.htm*

Some of the industrial plants were required to carry out clean-up work, implement remedial measures or change their internal procedures or practices in order to reduce their toxic effluent discharges. "With the program, we were able to see that some of the industrial plants had already maximized the reduction of their toxic effluent discharges,"

explained Francine Richard, Co-Chair for Quebec of the Industrial and Urban Co-operation Committee, adding that monitoring mechanisms made it possible to ensure that the objectives were achieved in all cases.

A Publicly Recognized Contribution

In an effort to recognize their participation in the program and their achievement of the reduction objectives, the Canadian and Quebec governments awarded environmental recognition certificates to 72 industrial plants.

"The industrial plants designated under Phase I reduced their overall toxic effluent discharges by 96%, exceeding the initial objective of 90%," explained Gérald Girouard, Co-Chair for Canada of the Industrial and Urban Co-operation Committee. "As for the plants under Phase II, the monitoring carried out shows that the plants that have received a certificate achieved their objectives and that the deficiencies initially identified were corrected." All of the plants that received a recognition certificate had to comply with the regulations in force.

Of the 106 designated priority industrial plants (now 107 since two of the concerns formerly operated under the same company name), 35 did not receive a recognition certificate. Ten of the plants in this group are now closed; of the remaining 25, some are currently completing their clean-up work while others still have to characterize their effluent to demonstrate the results of the measures implemented. They have until March 31, 2001 to wind up their activities under the program and achieve their reduction objectives; once they do so, they will also receive recognition certificates.

By working together to decrease toxic effluent discharges into the St. Lawrence, 72 industrial plants have helped to reduce the amount of contaminants that end up in the river, in keeping with a sustainable development perspective. The environmental recognition program underscores their efforts to integrate industrial activities along the banks of the St. Lawrence River and its main tributaries in a more harmonious manner.

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Chronicle
ZIP Committees in the Heat of the Action

Ville Marie ZIP Committee

Pollution of MUC waterways by runoff

While interest in recreational activities on the waterways surrounding the Island of Montreal is on the increase, there is mounting citizen concern about water quality. Despite a clear improvement, thanks in part to sewage treatment, some pollution problems persist, especially following heavy rain. This article presents the findings of a study conducted by the Ville Marie ZIP Committee, in co-operation with several partners, the purpose of which is to inform the population and the decision makers about the runoff problem and possible solutions.

Construction of treatment plants on Montreal Urban Community (MUC) territory has been going on for more than 20 years, necessitating a total investment of $1.4 billion. Yet it seems that these plants are unable to treat all wastewater, which limits the recreational potential of several rivers surrounding the Island of Montreal after rainfalls. Activities affected include swimming, wind surfing, water skiing, pleasure boating and canoeing. The appearance of the rivers as seen from parks, hiking trails and bike paths is also affected.

Various types of drainage networks in the territory

The MUC has two types of drainage networks: combined sewer systems and separate sewer systems. Combined sewer systems have one collecting sewer that intercepts all wastewater (domestic sewage and rainwater) from a given territory. The wastewater is then directed to the treatment plant by intercepting sewers, which are water pipes with bigger diameters. Before treatment plants were built, wastewater flowed directly into the rivers.

Separate sewer systems have two distinct sewers. The rainwater collecting or storm sewer takes in all surface water, which then flows into the waterways without being treated. The domestic sewer collects only domestic sewage, which is transported to the sewage treatment plant.

Significant pollution during rainfalls . . . and even in dry weather

The problem of river contamination by urban waste in the MUC is particularly bad following heavy rain. The wastewater flow in combined sewer systems can then be as much as 50 times greater than it is in dry weather. Because intercepting sewers were not designed to handle such a flow, the excess, a mix of domestic sewage and rainwater, runs directly into the waterways, without being treated. Not only is the sewage contaminated, but so is the surface water that mixes with it, because it sweeps the contaminants that have accumulated on the ground into the sewer.

The waterways can be polluted even in dry weather. In the case of separate sewer systems, the sewage pipes in some buildings on the Island of Montreal are sometimes found to be connected to the storm sewer rather than the domestic sewer (cross-connection). Consequently, wastewater, which may be highly contaminated, is continuously flowing through the storm sewers.

Defective septic tanks are another cause of pollution because wastewater from those tanks sometimes seeps into ditches that flow directly into the rivers.

Impact of wastewater disposal on rivers

Runoff is full of pollutants, such as fecal micro-organisms, organic matter, nutrients, industrial wastewater and suspended particulate matter (SPM). Water that is discharged into rivers through storm sewers contains mainly SPM, although there are also significant concentrations of metals and hydrocarbons.

Given its high level of contamination, runoff and water discharged by storm sewers can pollute the rivers receiving it and cause serious trouble for shoreline residents, users, and marine life.

Consequences of contamination caused by wastewater disposal:

- high turbidity of the water;
- presence of floating debris and unpleasant odours;
- contamination by fecal micro-organisms, which are a serious public health hazard;
- presence of fertilizers, which stimulate the growth of marine flora;
- presence of toxic substances that accumulate in the food chain;

• presence of suspended particulate matter, which causes the silting of spawning grounds.

Under the *Réseau de suivi du milieu aquatique* (aquatic environment monitoring program) *www.cum.qc.ca/rsma*, the MUC samples water near the shoreline to determine its bacteriological quality. The findings of the 1998 and 1999 campaigns confirmed that contamination near the shoreline increased after rain and that cross-connections and septic tanks caused water pollution, even in dry weather.

Possible solutions

Although residents of the Island of Montreal have been dealing with the consequences of wastewater runoff for many years, the problem is fairly complicated for many people. This is why the Ville Marie ZIP Committee, in co-operation with the Jacques Cartier ZIP Committee and the standing committee for monitoring wastewater on MUC territory, conducted a study in order to describe the situation and present feasible solutions.

“A certain number of interventions are within citizens’ reach, whether it be refraining from disposing of oil and other toxic waste in the street or sewer, or avoiding cross-connections when new sanitary fixtures are being installed in homes,” explained Luc Bergeron, Co-ordinator of the Ville Marie ZIP Committee. “However, short-, medium- and long-term solutions will have to be implemented to reduce the frequency of overflow in the rainy season to enable the public to reclaim the rivers surrounding Montreal. One of the most effective solutions would be to build retention ponds,” he added, mentioning that investments from all levels of government would be required. “Furthermore, when designing new development projects, municipalities ought to calculate the flow of storm water to avoid additional runoff.”

Until then, the Ville Marie ZIP Committee and its partners intend to continue in their effort to increase public awareness through a brochure they are now working on. “Citizens have the power to influence and support elected officials regarding the kind of society that is capable of bringing about lasting improvement to our environment,” concluded Luc Bergeron.

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News in BRiEF

The results of various SLV 2000 studies have just been published

Diagnostic agro-environnemental de la tête du bassin versant du ruisseau Corbin. (Agricultural Environmental Diagnosis of the Head of the Corbin Stream Watershed.) The diagnosis was made between April 1996 and March 1998 in the context of a pilot project involving farmers in this subbasin of the Yamaska River. There are three main parts to the diagnosis: the description of the watershed, an evaluation of agricultural pressure on the watershed and the state of the watershed's environment.

Écologie du corème de Conrad (Corema conradii) aux Îles-de-la-Madeleine, Québec. (Ecology of the Broom Crowberry (Corema conradii) on the Magdalen Islands, Quebec.) This is a species that, in Quebec, is found only on the Magdalen Islands. The purpose of this study is to assess the relative importance of various ecophysiologic, demographic and ecosystem-based processes on the spatio-temporal dynamics of broom crowberry populations in Quebec.

Maladies des poissons d'eau douce du Québec – Guide de diagnostic. (Quebec Freshwater Fish Diseases – Diagnostic Guide.) For the last few years, information on diseases and pathological conditions of Quebec freshwater fish has been tracked and inventoried, leading to the creation of this unique diagnostic tool. The guide was written mainly for biologists, veterinarians and other professionals who study lesions and diseases in fish.

Contenu en nutriments des poissons de pêche sportive du lac Saint-Pierre. (Nutrient content of sportfishing catches in Lake St Pierre.) For the last few years, research groups, including the Public Health Research Unit of Quebec, measured potential health risks caused by contaminants and the nutritional benefits of a regular diet of fish, and many of them concluded that the benefits required further study. The object of this study was to determine the nutritional content of 18 species of fish found in Lake St Pierre and potentially eaten by fishers and to check their contribution to Canada's recommended nutrient intake.

LE FLEUVE

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