

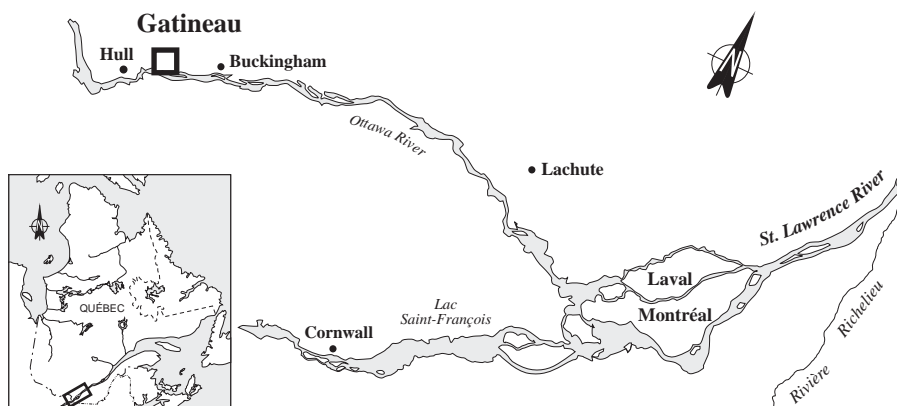
## FACT SHEET 84

### Avenor Inc., Gatineau Mill

79 Main St.

Gatineau, Quebec

J8P 4X6



*A list of 106 industrial plants has been established under St. Lawrence Vision 2000 (SLV 2000), the second phase of the St. Lawrence Action Plan, launched in 1988. The overall objective is to reduce toxic effluent and virtually eliminate discharges of persistent toxic substances.*

*The 106 industrial plants designated under SLV 2000 are divided into four groups, each with a specific objective. The AVENOR INC., GATINEAU MILL, is part of Group 3, comprising the regulated industrial plants.*

*The objectives for Group 3 are to assess the toxic waste of regulated plants in terms of environmental objectives and establish corrective measures for optimum reduction of any harmful impact on the receiving environment.*

## INDUSTRIAL PLANT

### Newsprint plant

The AVENOR INC., GATINEAU MILL produces newsprint from thermomechanical pulp, waste paper (de-inked) pulp and bleached commercial pulp. The thermomechanical pulp is obtained from softwood and hard wood chips, which are washed and steam-preheated before being loaded into the plate refiners. The pulp is screened, cleaned, hydro-sulphite-bleached and then sent to the paper machines. The waste paper pulp is obtained by slushing in tanks along with soap, caustic soda and hydrogen peroxide. The pulp is strained, de-inked in two flotation units and then cleaned. De-inking sludge is thickened, compacted and burned in a biomass combuster that produces steam used in the process; the combuster burns bark, wood waste, natural gas and oil. Commercial bleached pulp is purchased in bales on the Canadian market, pulped and added to the machine mixture. The plant, which currently has three paper machines, has a production capacity of 557 724 t/yr. In 1995, the plant operates at 79% capacity and employs 703 workers.

## PRODUCTION

### PRINCIPAL RAW MATERIALS

- Wood chips (softwood and hard wood)
- Waste paper
- Various chemicals
- Fuel (natural gas, oil, bark)

### FINISHED PRODUCT

- Newsprint of various grammages

# TREATMENT MEASURES

## INITIAL EFFLUENT VALUES

*Mainly BOD<sub>5</sub>*

Based on company data, in 1993 the plant had an effluent discharge of 89 353 m<sup>3</sup>/d, containing notably:

- 16 900 kg/d of biochemical oxygen demand (BOD<sub>5</sub>)
- 5800 kg/d of suspended solids (ss)

## RESOURCES AND USES TO PRESERVE

*A remarkable location*

Effluent from the AVENOR INC., GATINEAU MILL is discharged into the Ottawa river. Over twenty fish species feed, spawn and raise their young in the river section downstream of the plant. The area contains spawning grounds for brown bullhead, northern pike, carp and perch. There are about a dozen commercial and bait fishers, while sport fishing is practised all year long. Duck hunting is also popular. The area covering Clement, McLaurin and Lochaber bays, lying halfway along the Atlantic Flyway, is a staging area for hundreds of thousands of snow geese. The area is classified as a priority habitat under the *Act respecting the conservation and development of wildlife* and is considered a remarkable site by the Canadian Wildlife Service protection plan. It is a priority under the Five-Year Plan for Protection and Management of Wildlife Habitats for Quebec. The area contains vulnerable plant and animal species. The first water intakes downstream from the plant are in the Lac des Deux Montagnes and supply the towns of Vaudreuil and Deux-Montagnes.

## ENVIRONMENTAL DISCHARGE OBJECTIVES

*Environmental protection*

Environmental discharge objectives are established to preserve local resources and uses. These guidelines, expressed as maximum permissible loads and concentrations for effluent released into the environment, are used in choosing treatment methods which best promote environmental protection. The water quality based objectives for the AVENOR INC., GATINEAU MILL will be available by 1997.

## EFFLUENT TREATMENT

*Secondary treatment system*

Prior to December 1994, the effluent treatment system consisted of settling followed by filtration using drum filters. Sludge from the primary clarifier was dried in presses. Since that time, the primary treatment system has been adapted to the secondary biological system that came on stream in August 1995. The old settling basin was replaced by a peripheral-drive sedimentation tank. The clarifier sludge is pressed, then mixed with the de-inking sludge and burned. Treated effluent is discharged into the Ottawa river. The plant has a whitewater recirculation system. Cooling water is either recycled in the cold-water circuit or treated with process water. Domestic sewage is treated at the municipal sewage treatment plant.

## PREVENTION AND CLEANUP MEASURES IMPLEMENTED

*Many changes*

Since 1990, many changes have been made, both to the process itself and to the treatment system. Since the inception of SLV 2000, the company ceased production of refiner mechanical pulp in January 1993 and production of chemical-mechanical pulp in March 1993. It also shut down two paper machines in September 1993. Other process changes have been made, including the use of commercial fatty acids in the de-inking mill (November 1993) and the installation of a hydrosulphite unit (November 1994).

The present treatment system was adapted to the secondary treatment system during 1995. In addition to replacing the primary clarifier and pumping station, an effluent neutralization tank was installed in December 1994. Closure of some shops and other modifications resulted in a remarkable reduction in BOD<sub>5</sub>, SS and effluent discharge. The oxygen-activated sludge treatment system and secondary biomass pressing system came on stream in the fall of 1995. The company invested over \$40 million in these works.

## REGULATORY COMPLIANCE - WATER COMPONENT

*Effluent meets standards*

The AVENOR INC., GATINEAU MILL is subject to the provincial and federal regulations governing pulp and paper mills. With the implementation of environmental measures, the company has complied with the latest provincial standards, which came into force on September 30, 1995.

# POLLUTION ABATEMENT

## CHIMIOTOX INDEX ABATEMENT OF TOXIC POLLUTION

### *Significant reduction in Chimiotox Index*

The Chimiotox index gauges the load of all toxic substances present in industrial effluent, using the toxicity factors assigned to each contaminant. It is used, among other things, to monitor discharge trends over the years (Figure 1) and determine the toxic contribution of each pollutant (see Table I).

Table 1 shows monthly company data for the last three months of 1995 under the provincial regulation governing pulp and paper mills, along with Chimiotox index values estimated from them assuming an effluent flowrate of 71 704 m<sup>3</sup>/d. Based on these data, the main toxic substance in the treated effluent is copper. Total copper makes up 44% of the Chimiotox index, followed by total aluminum with 27%, and total zinc with 16%.

Figure 1 is based on 1994 industrial effluent abatement program (PRRI) characterization data, along with monthly company data for the months of October, November and December 1995. The Chimiotox index calculated from the 1994 PRRI characterization data was used as is for 1993. Forecasts for 1996, 1997 and 1998 are based on company data for the last three months of 1995. The reduction in effluent toxicity is mainly due to the efficiency of the secondary treatment system put in place in the fall of 1995.

Table 1 *Chimiotox Index (1995) - Avenor Inc., Gatineau Mill\**

Substance	Load (kg/d)	Toxic Weighting Factor	Chimiotox Units (CU)
Total copper	1.204	451	543
Total aluminum	30.988	11	341
Total zinc	20.905	9.4	197
Dehydroabietic acid	1.258	77	97
Abietic acid	2.436	19	46
Total nickel	0.513	10	5
Linoleic acid	0.184	19	3
Oleic acid	0.184	19	3
Levopimaric acid	0.161	19	3
Isopimaric acid	0.115	19	2
Palustric acid	0.092	19	2
Pimaric acid	0.115	19	2
Stearic acid	0.069	19	1
Neobetic acid	0.046	19	1
Sandaracopimaric acid	0.046	19	1
<b>CHIMIOTOX INDEX</b>			<b>1247</b>

\* For an effluent flowrate of 71 704 m<sup>3</sup>/d.

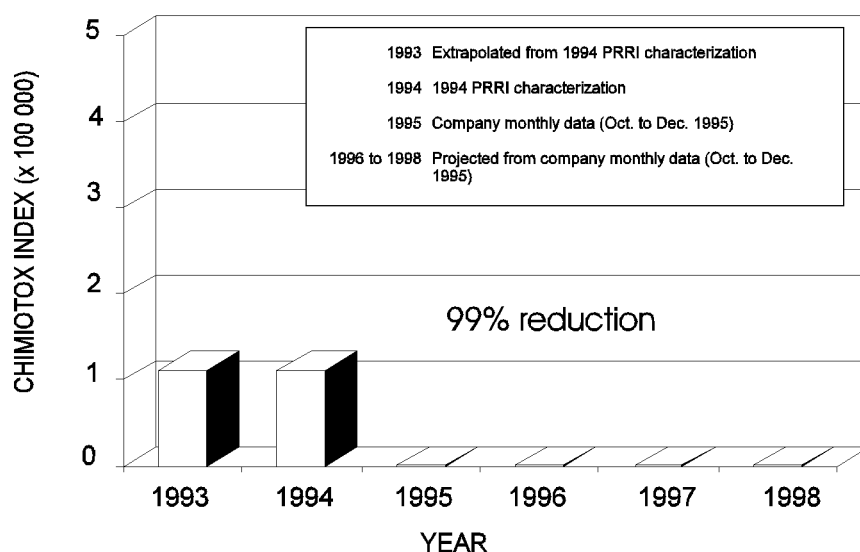


Figure 1 *Chimiotox Index Trends, 1993 to 1998  
Avenor Inc., Gatineau Mill*

## VIRTUAL ELIMINATION OF PERSISTENT TOXIC SUBSTANCES

One long-range objective of SLV 2000 is the virtual elimination of eleven persistent and bioaccumulative toxic substances from the effluent of the 106 targeted plants along the St. Lawrence and its tributaries. The targeted substances are those designated by the International Joint Commission in August 1993: PCBs, DDT, dieldrin, toxaphene, dioxins, furans, mirex, mercury, lead alkyls, benzo(a)pyrene and hexachlorobenzene. To reach this objective, Protection has fixed the environmental discharge objectives set for applicable substances as its target by the end of SLV 2000 in 1998, thereby ensuring that all uses of the receiving environment are protected.

Based on data from the self-regulating effluent monitoring program activities for the last three months of 1995, none of the eleven persistent and bioaccumulative toxic substances were detected in the company's effluent.

## EFFLUENT TOXICITY

### *Non-toxic effluent*

Since September 30, 1995, it has been illegal under the Quebec pulp and paper and regulation to release into the environment or a storm sewer a final effluent that is acutely lethal to rainbow trout, as demonstrated by bioassays. For the AVENOR INC., GATINEAU MILL, implementation of new cleanup measures has helped reduce effluent toxicity. Data for October to December 1995 show that final effluent is not toxic.

## REDUCTION IN SUBSTANCES MONITORED

### *Reduction of ss and BOD<sub>5</sub>*

Based on monthly company data for the last four months of 1995, effluent discharge was 71 726 m<sup>3</sup>/d, containing notably:

- 1891 kg/d of suspended solids (ss)
- 1062 kg/d of biochemical oxygen demand (BOD<sub>5</sub>)

From 1993 to 1995, the biochemical oxygen demand load decreased by 94%, and the suspended solids load by 67%. The reductions were mainly due to the secondary effluent treatment system.

## KEY POINTS

- **Chimiotox index reduced by 99%**
- **Primary effluent treatment system modified in 1994 and oxygen activated-sludge secondary treatment system installed in 1995: investment of over \$40 million**
- **Non-toxic effluent**

Based on December 1995 inventory

## ADDITIONAL INFORMATION

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