

## FACT SHEET No. 35

# Alliance Forest Products Inc.

(formerly known as Domtar Inc., Donnacona Mill)

1 Notre-Dame Street  
Donnacona, Quebec  
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*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 liquid toxic waste and virtually eliminate discharges of persistent toxic substances.*

*The 106 industrial plants designated under SLV 2000 are divided into four groups, each of which has been given a specific objective. The ALLIANCE FOREST PRODUCTS INC. mill in Donnacona is part of Group 4, comprising the 50 plants targeted under the St. Lawrence Action Plan.*

*The objective set for Group 4 is to pursue cleanup efforts and perform environmental monitoring to achieve a 90% reduction in liquid toxic waste. Between 1988 and 1995, the 50 plants reduced their toxic effluent discharges by 96%.*



## INDUSTRIAL PLANT

### *A diversified paper company*

The ALLIANCE FOREST PRODUCTS INC. mill in Donnacona (formerly known as DOMTAR INC., DONNACONA MILL) produces regular newsprint, improved newsprint and specialty paper from thermomechanical pulp. After washing, the wood chips are treated in steaming vessels, then in refiners. The pulp, which has been purified and sifted, is thickened and stored in a common vat for unbleached pulp. The company has two bleaching units where the pulp can be bleached, when necessary, with hydrogen peroxide and sodium hydrogen. The three paper machines are supplied with the intermediate product from the repulping and thermomechanical pulp workshops. A disc filter with a 10 m<sup>3</sup>/min capacity is used for the three machines, each of which has a 1000 m<sup>3</sup> white water reservoir. The sodium sulphite and hydrosulphite used in steaming and bleaching are manufactured in the plant. Its rated production capacity is 174 133 m/yr. In 1995, the capacity utilization rate was 80%. There were 483 employees.

## PRODUCTION

### PRINCIPAL RAW MATERIALS

- Wood chips (high and low density)
- Sulphur dioxide
- Caustic soda
- Borol
- 50% hydrogen peroxide
- DTPA (diethylenetriamine pentaacetic acid)

### FINISHED PRODUCTS

- Ordinary newsprint
- Improved newsprint
- Specialty paper

# TREATMENT MEASURES

## INITIAL EFFLUENT VALUES

### *BOD and ss*

According to company data, in 1988 the average effluent discharge was 33 897 m<sup>3</sup>/d, containing:

- 12 462 kg/d of biochemical oxygen demand (BOD<sub>5</sub>)
- 11 017 kg/d of suspended solids (ss)

At the time the data was collected, the plant did not yet have a primary settling tank and the construction materials workshop was still operational.

## RESOURCES AND USES TO PRESERVE

### *A very busy area*

The ALLIANCE FOREST PRODUCTS INC. mill in Donnacona (formerly known as DOMTAR INC., DONNACONA MILL) is on the north shore of the St. Lawrence approximately 40 km west of Quebec City. The effluent from the industrial plant empties into the river through a 1365 m outlet. Near the discharge point, the banks are straight and a mainly narrow strip of marsh runs their length. There are large rocks in the area that are exposed at low tide. Many Canada geese come here in the spring, and dabbling ducks and diving ducks appear in the autumn. During the fall, the offshore flats of Les Écureuils near Donnacona are a major gathering point for shorebirds.

Between Donnacona and Neuville, the intertidal zone is a favourable spawning ground for the yellow perch, the white perch, the longnose sucker and the white sucker. The Jacques-Cartier river is particularly important: each spring, hundreds of adult Atlantic salmon swim upstream to spawn, and thousands of salmon fry swim downstream on their way to the sea.

This part of the St. Lawrence River is very important for vacationers. There are several beaches (Cap-Santé, Les Écureuils, des Ormes beach). The area is heavily used for water sports and sport fishing.

## WATER QUALITY BASED OBJECTIVES

### *Environmental protection*

Water quality based 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 ALLIANCE FOREST PRODUCTS INC. will be available on request by 1997.

## EFFLUENT TREATMENT

### *Secondary treatment system*

Since the summer of 1995, a primary settling tank and a biological treatment system have been in use for all industrial wastewater, as well as rainwater from the yard, roofs and storage areas. Most domestic water is emptied into the municipal sewerage system. The remaining domestic water is stored in septic tanks that are regularly pumped out by specialized companies.

## PREVENTION AND CLEANUP SYSTEMS IMPLEMENTED

### *\$18 million invested*

In 1994, a method for recycling warm water from the electric motor cooling system cut water intake by 7000 m<sup>3</sup>/d (from 34 000 m<sup>3</sup>/d to 27 000 m<sup>3</sup>/d). During the same year, construction was started on an activated sludge secondary treatment unit, which was completed in August 1995. This unit substantially reduces the quantity of pollutants and the toxicity of the effluent discharge. The cost of this project is estimated at 18 million dollars.

## REGULATORY COMPLIANCE - WATER COMPONENT

### *Compliance with new standards*

The ALLIANCE FOREST PRODUCTS INC. mill in Donnacona is subject to the Quebec Regulations Respecting Pulp and Paper Mills, the Quebec Environment Quality Act, and the federal Pulp and Paper Effluent Regulations. The cleanup measures implemented by the plant ensure full compliance with the new provincial standards, which came into effect September 30, 1995.

# POLLUTION ABATEMENT

## CHIMIOTOX INDEX ABATEMENT OF TOXIC POLLUTION

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

Table 1 gives the data supplied by the company, as required by provincial regulations on pulp and paper mills, for the months of October to December 1995, as well as the Chimiotox values calculated therefrom, for an effluent discharge of 27 292 m<sup>3</sup>/d. The figures show a preponderance of mineral oil and grease in the treated wastewater; these make up 85% of the Chimiotox value, followed by lead (8%), then copper (2%).

Figure 1 is plotted from the Action Plan characterization data for 1990. Since no cleanup measures were implemented between 1989 and 1990, the Chimiotox value remains unchanged for this period. For 1988, the Chimiotox value reflects the figures from the 1990 characterization, adjusted to take into account the period before the installation of the primary settling tank (March 1989). This efficient system could be expected to cut the Chimiotox value by 30%. The figures from 1991 to 1994 are plotted from the characterization data for 1990, taking into account a 2% reduction due to the closure of the construction materials section in August 1991. The 1995 index, which is based on the monthly data supplied by the company, shows a decrease of 86% in comparison with 1988.

Table 1 Chimiotox Index (1995) - Alliance Forest Products Inc.\*

Substance	Load (kg/d)	Toxic Weighting Factor	Chimiotox Units (CU)
Total Oil and Grease	40.492	100	4049
Total Lead	1.215	314	381
Total Copper	0.243	451	110
Total Aluminium	4.859	11	53
Total Zinc	4.373	9.4	41
Linolenic Acid	2.074	19	39
Oleic Acid	1.373	19	26
Stearic Acid	0.854	19	16
Linoleic Acid	0.671	19	13
Total Nickel	1.215	10	12
Dichlorostearic Acid	0.610	19	12
Dehydroabietic Acid	0.153	77	12
Abietic Acid	0.153	19	3
Chlorodehydroabietic Acid	0.034	19	1
Dichlorodehydroabietic Acid	0.034	19	1
Isopimaric Acid	0.034	19	1
Levopimaric Acid	0.034	19	1
Neoabietic Acid	0.034	19	1
Palustric Acid	0.034	19	1
Pimaric Acid	0.034	19	1
Sandaracopimaric Acid	0.034	19	1
<b>CHIMIOTOX INDEX**</b>			<b>4775</b>

\* For effluent discharge of 27 292 m<sup>3</sup>/d.

\*\*October to December 1995.

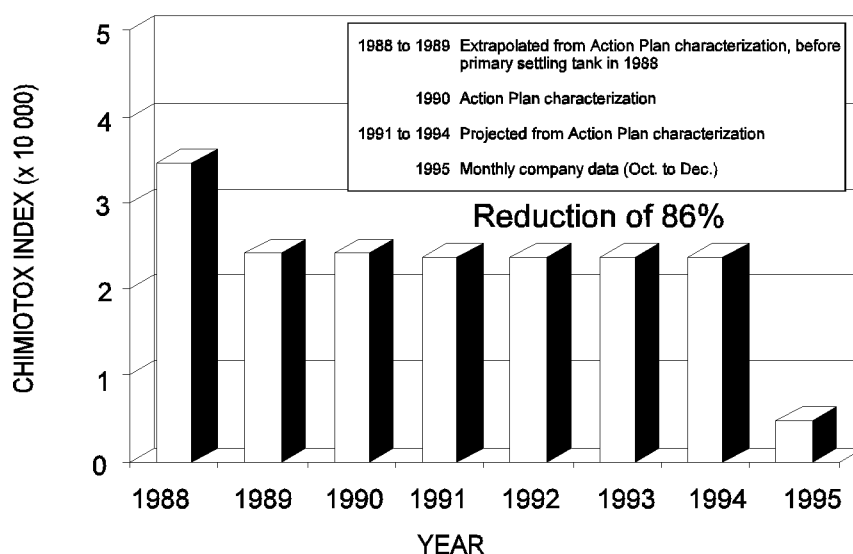


Figure 1 Changes in toxic effluent discharges, 1988 -1995 - Alliance Forest Products Inc.

## VIRTUAL ELIMINATION OF PERSISTENT TOXIC SUBSTANCES

### *No persistent toxic substances*

One long-range objective of SLV 2000 is the virtual elimination of 11 persistent and bioaccumulative toxic substances from 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 alkyl, benzo(a)pyrene and hexachlorobenzene.

The monthly data for October to December 1995 show the final effluent to be non-toxic.

## PEEP TOXICITY REDUCTION

### *Non-toxic effluent*

The Potential Ecotoxic Effects Probe, or PEEP, combines the results of six standardized bioassays measuring the toxic effects of effluent. The results are expressed on a logarithmic scale of increasing toxicity ranging from 1 to 10 and are used to monitor discharge trends over the years. In the case of the ALLIANCE FOREST PRODUCTS INC. mill in Donnacona, one series of bioassays was carried out. The PEEP value in 1990 was 5.8.

Since September 30, 1995, it is prohibited under provincial regulations on pulp and paper mills to discharge a final effluent whose toxicity has reached an acute lethality level (as demonstrated by bioassays with rainbow trout) into a storm sewer or elsewhere into the environment. The implementation of new cleanup measures helped to reduce the toxicity of the effluent from the ALLIANCE FOREST PRODUCTS INC. mill. Since the secondary treatment system went into operation, the final effluent has been non-toxic.

## REDUCTION IN SUBSTANCES MONITORED

### *Significant reduction in ss and BOD<sub>5</sub>*

According to monthly company data for the months of October to December 1995, the effluent discharge was 27 621 m<sup>3</sup>/d, containing:

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

Company data for 1988 to 1995 show a 94% decrease in ss and a 97% decrease in BOD<sub>5</sub>. The decrease in ss is largely attributable to the installation of a primary settling tank in 1989, while the drop in BOD<sub>5</sub> reflects the new secondary treatment that came on stream in 1995.

## TECHNOLOGICAL DEVELOPMENT

### *Developing a treatment method using activated sludge*

The goal of the project was to develop an activated sludge treatment method for combined or separate effluent from a thermomechanical pulp and chemi-thermomechanical pulp (CTMP) plant. Assays carried out in the Centre for Pulp and Paper Research at the University of Quebec in Trois-Rivières (UQTR) made it possible to compare the treatment on concentrated or diluted effluent and evaluate its effectiveness. The project had three components: a review of the literature on the activated sludge treatment of effluent in CTMP plants, a characterization of effluent from two plants, and laboratory assays. The different steps made it possible to define design criteria for activated-sludge treatment systems; the criteria could then be applied to the plants that were being studied. The research was carried out by the DOMTAR INC. RESEARCH CENTRE in cooperation with Environment Canada. The project began in July 1990 and ended in December 1992.

## KEY POINTS

- Implementation of activated-sludge secondary treatment in August 1995
- 94% reduction in ss and 97% reduction in BOD<sub>5</sub> between 1988 and 1995
- Overall toxicity reduction of 86% according to the Chimiotox index

Based on December 1995 inventory.  
Information reviewed by Gilles Legault, SLV 2000.

## ADDITIONAL INFORMATION

**Chimiotox index and PEEP:** Gilles Legault,  
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