

*Living Our Commitment*



**L** Fletcher Challenge Canada Limited  
**Annual Environmental Report**

**1996**



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**On the cover**

Fletcher Challenge Canada is committed to meeting the needs of the present without compromising the ability of future generations to meet their needs. The fathers of the children shown on the cover — Brian Cruise, Scott Curry and Doug Offerhaus — are employees at the Elk Falls mill. From left: Sarah Curry, David Cruise, Graham Cruise, Ross Curry (red shirt), Michelle Offerhaus (red shirt) and Cheryl Offerhaus (back).

**Facilities and Products**

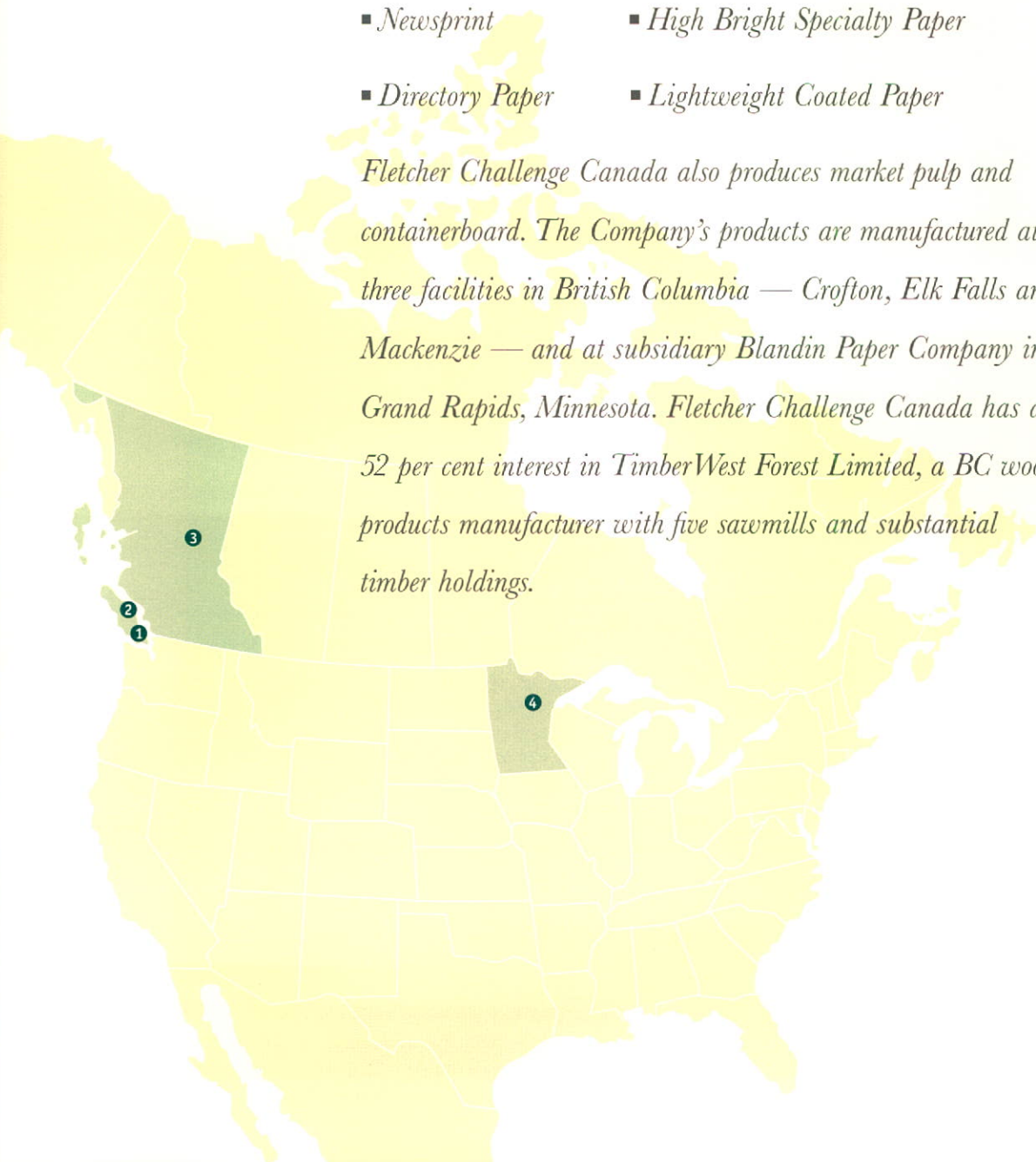
- ❶ Crofton Pulp and Paper  
*Newsprint, directory paper, specialty papers and market pulp*
- ❷ Elk Falls Pulp and Paper  
*Newsprint, specialty papers, containerboard and market pulp*
- ❸ Mackenzie Pulp  
*Market pulp*
- ❹ Blandin Paper Company  
*Lightweight coated paper*

## Corporate Profile

*Fletcher Challenge Canada is an established supplier of printing papers to the publishing and commercial printing industries in western North America and the North Pacific Rim. The Company produces four lines of printing papers:*

- *Newsprint*
- *High Bright Specialty Paper*
- *Directory Paper*
- *Lightweight Coated Paper*

*Fletcher Challenge Canada also produces market pulp and containerboard. The Company's products are manufactured at three facilities in British Columbia — Crofton, Elk Falls and Mackenzie — and at subsidiary Blandin Paper Company in Grand Rapids, Minnesota. Fletcher Challenge Canada has a 52 per cent interest in TimberWest Forest Limited, a BC wood products manufacturer with five sawmills and substantial timber holdings.*





A photograph showing a group of five children and two adults gathered around a glass display case. One child is reaching into the case, which contains a reddish-brown object. The adults are smiling and looking on. The background is dark blue.

*Meeting the needs of the present*

## Environmental Policy

*Fletcher Challenge Canada is committed to sustainable development, which is the use of natural resources in a manner which meets the needs of the present without compromising the ability of future generations to meet their needs. Fletcher Challenge Canada will meet or exceed all government requirements applicable to its operations and will regularly monitor its environmental performance. Fletcher Challenge Canada will communicate with its employees and the public on its environmental performance and the impact of its operations and products on the environment.*

## President's Message

At Fletcher Challenge Canada, we are integrating our environmental responsibility with sound business and marketing strategies. Over the past year, we improved our ability to deliver lightweight runnable newsprint and specialty papers. We are working with customers to improve runnability — the ability of paper to run through a printing press without breaking — by ensuring proper handling and distribution from the mill to the customer's pressroom. A study completed at Elk Falls this year identified major causes of paper damage and a program is now underway to eliminate these. We expect further advancements in runnability will significantly reduce paper waste.

We continue to lead the western North American market in reducing the basis weight of newsprint. Lightweight paper grades — 45 grams per square metre and under — deliver more printing surface per tonne and require less fibre in the production process. We are investing \$31 million at Crofton to increase our production of lightweight newsprint and conducting trials of lighter weight high bright papers. We are also investing \$79 million at Mackenzie and Elk Falls to increase production of mini-chip pulp, a product made from sawdust and wood shavings. Our advances in lighter weight printing papers and the increase in mini-chip pulp production make more efficient use of our valuable fibre resource.

One of the biggest environmental issues faced by large manufacturing operations is the disposal of solid waste. We are working to reduce volumes sent to landfill by increasing recycling efforts and investigating alternative uses for effluent sludge and boiler ash. We are encouraged by preliminary results from experiments at Blandin and Elk Falls that convert these solid wastes into soil additives.

Our corporate values statement highlights environmental integrity as one of the standards by which we measure our success and we are improving that standard with the development of an Environmental Management System. A \$200,000-project is underway to critically examine our existing systems and identify the improvements required to meet a recognized environmental standard such as ISO 14000.



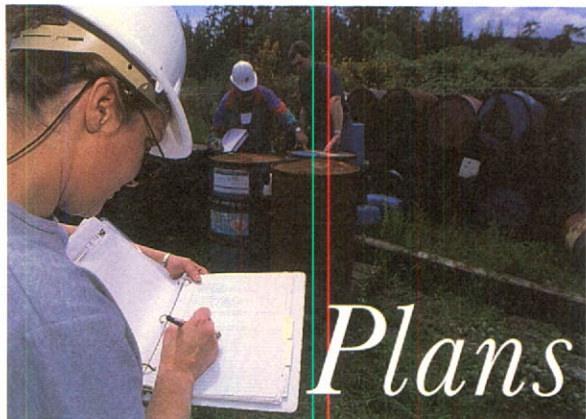
**Douglas W. G. Whitehead**

PRESIDENT, FLETCHER CHALLENGE CANADA LIMITED AND  
CHIEF EXECUTIVE OFFICER, CANADIAN OPERATIONS

JULY 25, 1996

Ross Curry makes paper assisted by Elk Falls tour guide Angie Connaghan and friends (from left) David Cruise, Sarah Curry, Cheryl Offerhaus and Jan Curry. The papermaking demonstration is part of the mill's educational environmental display.





Audit team leader Joanne Petri of Beak Environmental Specialists records findings at the June audit of the Crofton mill, while team members Lee Best (left) of corporate purchasing and Graham Kissack, environmental engineer, inspect barrels containing hazardous wastes.

# Plans & Progress

## 1996 Objectives

### *Environmental Management System*

Develop process and procedures for establishment of an improved environmental management system.

### *Environmental Audits*

Complete actions to correct deficiencies identified in the third (1995) audit round.

Revise procedures and processes in advance of the fourth round of environmental audits.

Conduct environmental risk assessment and evaluation for better spill prevention.

### *Environmental Issues*

#### **Waste**

Establish targets for percentage of waste reduction volumes.

Eliminate remaining PCBs at Crofton.

Begin work at Elk Falls to extend landfill.

Increase recycling efforts at Mackenzie to reduce solid waste disposed of in landfills.

Investigate ways to reduce solid waste sent to landfill.

## Progress

Completed first year of development process.

Consultant selected and interviewing process started to analyze gaps between current and desired systems.

Benchmarking of leading companies scheduled for fall 1996.

Majority of actions completed.

Procedures and processes revised and fourth round of audits started in June 1996.

Risk assessment completed at Crofton and Elk Falls. Mackenzie's risk assessment to be completed in fiscal 1997.

Improved measurement of waste volumes. Targets to be established.

Completed.

Extension to be completed by fall 1996.

Efforts increased.

Ongoing. Progress at Blandin and Elk Falls using biosolids as a soil additive. Recycling efforts expanded at Mackenzie. Mackenzie analyzing sludge to examine alternative disposal options.

## Plans & Progress

### Water

Complete tie-in of storm water sewers to effluent treatment system at Crofton.

Partially completed.

Install new effluent diffuser at Mackenzie to improve effluent dispersion.

Completed.

Continue ongoing improvements to secondary effluent treatment systems.

Blandin Paper and the City of Grand Rapids Publicly Owned Treatment Works developed a five-year plan to modernize the wastewater treatment system.

### Air

Reduce sulphur odour at Elk Falls through a modernization of the NCG system.

Engineering study completed. The mill plans to upgrade the NCG system.

Conduct engineering studies at Crofton to determine plan for reducing mill odour.

Studies completed. A task force was established to reduce TRS discharges.

Reduce sulphur odour and particulate emissions at the three BC mills.

Monitors installed in mill communities to improve ambient air monitoring.

### Plans for 1997

#### *Environmental Management System*

Complete analysis of gaps between current and desired systems at the four operations and begin development of action plans.

#### *Audits*

Complete fourth round of facilities audits.

#### *Forestry*

At Blandin, implement Sustainable Forestry Plan, as part of an overall strategic and operating plan.

#### *Environmental Issues*

#### **Waste**

Continue to investigate ways to reduce solid wastes sent to landfill.

#### **Water**

Continue operator training to further improve performance of secondary effluent treatment systems.

Continue to improve storm water sewer collection at Crofton.

#### **Air**

Reduce sulphur odour and air particulate at the three BC mills.

#### *Reduce Impacts*

Further reduce basis weights of paper. Continue to reduce paper waste through improved product handling and distribution.

Continue to work with MILLWATCH committees at Crofton and Elk Falls.

Continue to develop the Pollution Prevention Demonstration Project at Elk Falls in conjunction with the Ministry of Environment.

**Fletcher Challenge Canada's year end is June 30.**



# *Focus on Printing Papers*

*Over the past year, Fletcher Challenge Canada advanced its business strategy focused on groundwood printing papers in western North America and the North Pacific Rim. These advances are creating a number of environmental benefits, including a more efficient use of fibre. As the Company continues to implement its business strategy, it anticipates further improvements in minimizing impact on the environment.*

## **Lightweight Runnable Printing Papers**

In implementing our printing papers strategy, the Company continues to lead the western North American market in establishing the standard for lightweight newsprint. With basis weights of 45 gsm (grams per square metre) and under, these high-value paper grades provide cost advantages to customers while requiring less fibre to produce. During the year, sales of lightweight grades increased to 60 per cent of newsprint and uncoated specialty printing paper volumes. Over the past two years, the average weight of the Company's newsprint dropped from 48.5 gsm to 46.5. The standard weight of newsprint in North America is 48.8 gsm. Our printing papers strategy aims to create value by delivering a combination of products and services





## Printing Papers

that help our customers gain success and profitability in their own businesses. In particular, we are working to increase production of lightweight papers and to achieve superior runnability — the ability of paper to run through modern high-speed printing presses free of breaks. Improvements in runnability will contribute to less paper waste.

### Perception of Substance

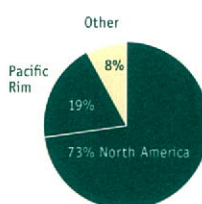
Blandin is developing production methods to give very lightweight paper the appearance and “feel” of greater substance, to meet the needs of customers printing publications with fewer pages. Preserving consumer perceptions of bulk and good value in smaller publications — while retaining the benefits of lightweight paper — is expected to become increasingly important as publishers produce more specialty magazines and catalogues to serve the interests of highly focused readerships.

### Elemental Chlorine Free

Blandin was one of the first companies in North America to provide customers with paper produced with 100 per cent ECF pulp. Blandin's lightweight coated paper is used to produce magazines, catalogues, flyers and newspaper inserts. Both Elk Falls and Mackenzie produce 100 per cent elemental chlorine free (ECF) pulp and approximately 70 per cent of the pulp produced by Crofton is ECF. Eliminating elemental chlorine in the bleaching process effectively prevents the formation of dioxins and furans.

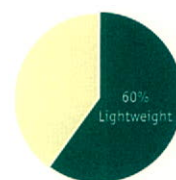
### Recycled Content

The ability of publishers to meet legislated requirements for recycled content in paper has improved over the past few years, reflecting significant increases in consumer recycling and the production of recycled pulp. As major U.S. centres like Chicago and Los Angeles are close to large volumes of recycled magazines and newspapers, they are providing increased volumes of recycled pulp to meet publisher needs. This rationalization makes sense economically and environmentally. The Company continues to use its source of recycled fibre to meet the needs of its printing paper customers. In fiscal 1996 the recycled content requirement for directory paper in the United States increased to 30 per cent.



#### Total Sales of \$2.4 Billion

During the year, 73 per cent of the Company's sales were made to customers within western North America while high growth markets in the Pacific Rim accounted for 19 per cent of sales. These markets are freight logical and use fuel more effectively.



#### Total Newsprint and Specialty Printing Paper Sales of 816,000 Tonnes

Lightweight grades increased to 60 per cent of the year's sales of newsprint and uncoated specialty printing paper. Lightweight paper grades provide cost advantages to customers while requiring less fibre to produce.



# Reducing Waste

*Fletcher Challenge Canada is committed to reducing solid waste sent to landfill. The primary solid waste materials generated at the Company's pulp and paper mills include boiler flyash, lime mud from the recausticizing process, sludge from effluent treatment systems, and unusable wood refuse. Over the past year, the Company investigated alternative uses for sludge and increased recycling of scrap metal.*

## **Biosolids as a Soil Additive**

A study using biosolids as a forest soil additive was expanded with the application of Blandin's biosolids on its forest land. In research conducted last year, the biosolids appeared to work well as a weed suppressant. Previous similar experiments indicate improvement in soil after three years. Biosolids is a term for the solids that result from wastewater treatment. The study is being conducted by Blandin Paper and the City of Grand Rapids with participation by the University of Minnesota. As a result of a previous project with the University, approximately 95 per cent of ash from Blandin's wood fired boilers is distributed to Minnesota farmers for use as a soil additive.

## **Sludge Experiment Expanded**

Elk Falls and the University of British Columbia are achieving encouraging results from an experiment involving the use of boiler flyash and treatment plant sludge as a composted soil additive. Last year this material was used as a soil additive in growing sod; this year a larger experiment is underway. The project is designed to reduce volumes of boiler ash sent to landfill. Elk Falls is investigating a number of other avenues to reduce solid wastes, including the use of lime wastes to neutralize acidic soil. Mackenzie is conducting a study of the constituents of the mill's primary sludge to explore alternative options to landfill disposal. The mill is also designing a new landfill site to meet future requirements for solid waste disposal.

## *Reducing Waste*

### **Study to Improve Combustion**

Crofton and Elk Falls are participating with the Pulp and Paper Research Institute of Canada (Paprican) and a federal government agency in a study aimed at improving combustion of wood fuel. Over the past year, the project focused on controlling the generation of dioxins and furans by adding sulphur to the power boilers. Paprican is currently confirming the experimental work on a commercial boiler. Elk Falls plans to include reduction of boiler flyash in future studies in order to minimize volumes sent to landfill.

### **Recycling Efforts Expanded**

Mackenzie expanded its recycling efforts during the year with the establishment of a formal committee and written procedures. The mill now has a system in place for collection and recycling of metal, cardboard, paper and virtually all wood waste. Next year, the mill plans to add glass and plastic to its recycling program. During the year, the mill consolidated the use of chemicals, following improved procedures for tracking chemical use. Mackenzie has also implemented a process to track waste on a daily basis, providing better information for the reduction of specific waste streams. Crofton and Elk Falls have recycled scrap metal, office waste, oils, filters and antifreeze for a number of years. Crofton also recycles fluorescent tubes and Elk Falls is assessing the recycling of dry cell batteries.

### **Crofton Landfill**

Leachate from Crofton's Swallowfield landfill, decommissioned last year, was found to be toxic and is now trucked to the mill's secondary effluent system for treatment. The mill is investigating ways to effectively treat the leachate at the landfill site. The landfill has an installed system for leachate collection.

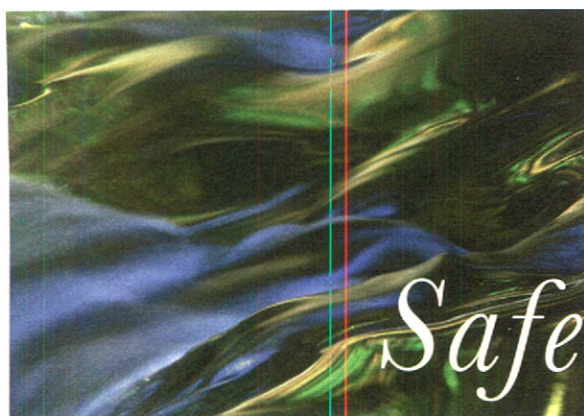
### **Elk Falls Replacing Waste Wood Fuel Presses**

Elk Falls is replacing three waste wood fuel presses with new units that will remove more excess water, resulting in modest combustion improvements. Better combustion should reduce fossil fuel requirements and lower flyash losses. The new presses will be fully operational by December 1996.

### **BC Mills PCB-Free**

During the year Crofton disposed of its remaining PCB-contaminated electrical equipment. The three BC mills are now virtually PCB-free. Blandin Paper has several PCB-containing transformers at the mill.





# Safeguarding Water

*Wastewater from the Company's four mills is treated by primary and secondary effluent treatment systems. Primary treatment reduces suspended solids in effluent while secondary treatment uses bacteria to reduce BOD, AOX and toxicity.*

## **Training Program Launched at Crofton and Elk Falls**

Treatment plant operators at Crofton and Elk Falls are receiving additional training in the complexities of a biological treatment system. The training is aimed at increasing operators' ability to anticipate potential problem situations. Operators at Crofton and Elk Falls have received basic treatment plant operator training and Elk Falls operators also received training in wastewater treatment microbiology. In addition, treatment personnel from BC's coastal pulp and paper industry meet regularly to share ideas and information on effective treatment plant operation.

## **Environmental Effects Monitoring**

The three BC mills completed the first phase of Environmental Effects Monitoring with the submission of reports on the results of extensive testing and sampling of marine and aquatic life in the area of mill

effluent discharge. The program was implemented by Environment Canada in 1992 to determine the effects of mill effluent on the environment. All pulp and paper mills in Canada are participating in the program. Mill representatives will be meeting with local monitoring committees to review the first survey and to develop plans for the next three-year cycle. The survey provides a baseline of information to track changes over time.

## **Diffuser Extended at Mackenzie**

During the year, the Mackenzie mill extended the effluent diffuser two kilometres into Williston Lake to reduce environmental impact through more effective effluent dispersion. This was required because BC Hydro may lower the lake level during years of low snowfall. Williston Lake serves as a reservoir for hydro-electric generation.

## Effluent

### Total Suspended Solids (TSS)

For the year, Mackenzie Pulp ran its secondary effluent treatment system in compliance with permit and regulations. The improvements reflect updated in-plant procedures, resulting in reduced upsets to the effluent treatment system. Crofton experienced one TSS exceedance during the year due to problems in the treatment plant. TSS is a measure of insoluble material suspended in effluent.

### Toxicity

The secondary effluent treatment systems at the three BC mills have eliminated acutely toxic effects on fish. With one exception, the three BC mills achieved 100 per cent survival of fish in 100 per cent effluent concentration in toxicity tests conducted during the year. One toxicity test conducted at Elk Falls was at 68 per cent, after a bypass valve was left open following the Christmas maintenance shutdown. To prevent future occurrences, this valve and three others have now been locked shut. The toxicity tests are performed by independent laboratories. *The scale on the toxicity chart is the reverse of other charts.*

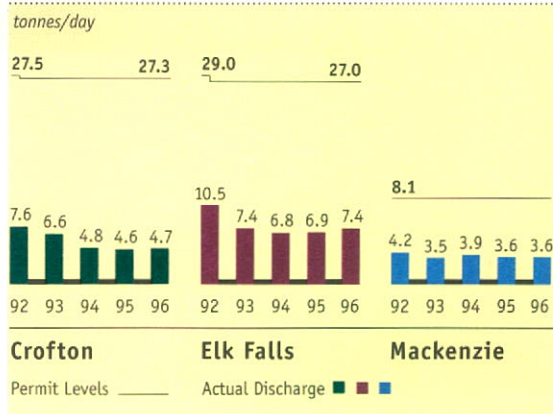
### Biochemical Oxygen Demand (BOD)

Operational changes at Crofton and Mackenzie resulted in improved BOD performance. Elk Falls experienced one BOD exceedance in December 1995 associated with start up problems following the Christmas shutdown. BOD is the measure of the amount of oxygen required to break down organic material

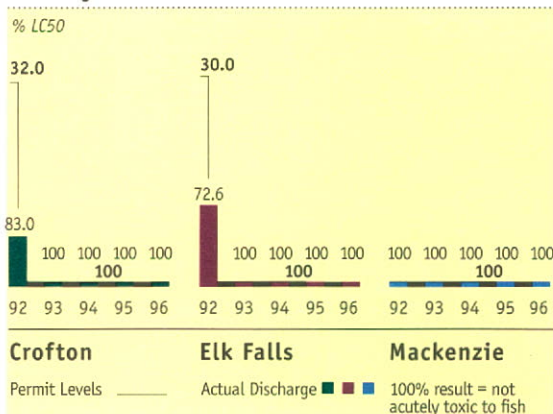
#### Charts

The following charts report total discharges. Actual permit values are specified in terms of concentrations or units per unit of production. The permit values on the following charts have been converted to total discharge units.

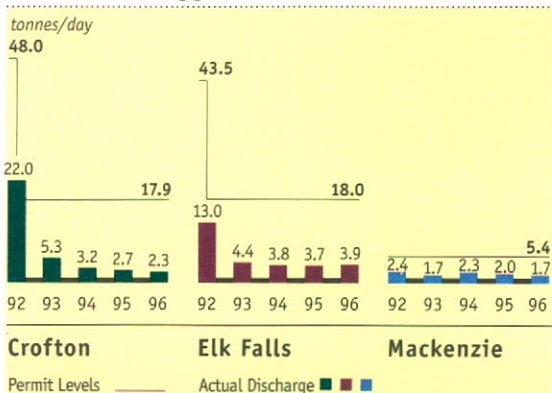
### Total Suspended Solids



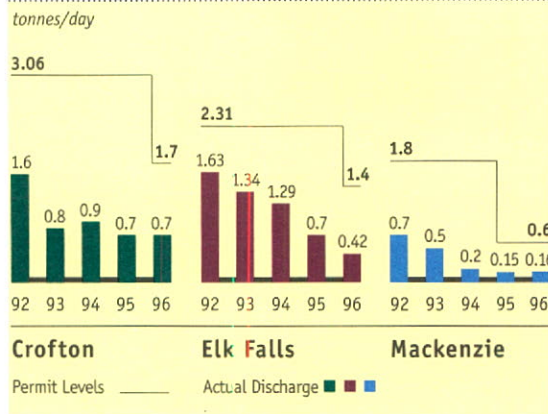
### Toxicity



### Biochemical Oxygen Demand



## Adsorbable Organic Halides (AOX)

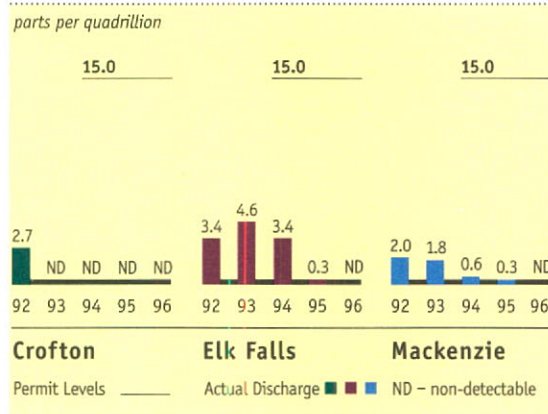


in wastewater. The mills' secondary effluent treatment systems use microbes to consume dissolved organics, in order to leave oxygen levels in the receiving water unaffected by effluent discharge.

## Adsorbable Organic Halides (AOX)

On December 31, 1995 the BC provincial government reduced the allowable level of AOX in effluent to 1.5 kg per tonne of pulp produced. To reflect this change, the AOX permit level at both Crofton and Elk Falls was reduced during the year. Mackenzie voluntarily reduced its AOX permit limit last year to 0.7 kg of AOX per tonne of pulp produced. During fiscal 1996, Crofton averaged 0.9 kg of AOX per tonne of pulp, Elk Falls averaged 0.7 kg, and Mackenzie averaged 0.3 kg. (This text refers to kilograms of AOX per tonne of bleached pulp and the charts refer to tonnes of AOX per day).

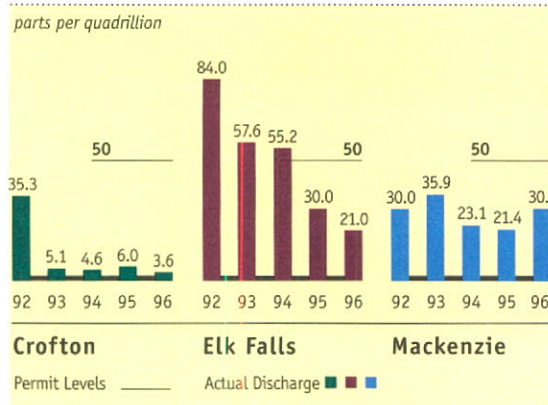
## 2378 Tetra-Dioxin



## Dioxins and Furans

Federal regulations implemented in January 1994 require dioxins and furans in pulp mill effluent to be reduced to non-measurable levels. The Company's three BC mills have met these regulations for dioxins since 1992. Elk Falls had one furan exceedance during the year resulting from burning salt-laden wood fuel in the mill's power boilers. The flyash from the boilers is removed with a wet scrubber and effluent from this process occasionally causes furan levels to rise. The mill currently uses two small ponds to settle furan-containing flyash out of the effluent system. Alternative ways of filtering this material are being assessed.

## 2378 Tetra-Furan





## Effluent

### BLANDIN PAPER COMPANY

Wastewater from the Blandin Paper mill is treated at the City of Grand Rapids Publicly Owned Treatment Works (POTW). The City monitors discharge water from the POTW daily for the following limitations:

#### Total Suspended Solids (TSS)

30 milligrams per litre

#### Biochemical Oxygen Demand (BOD)

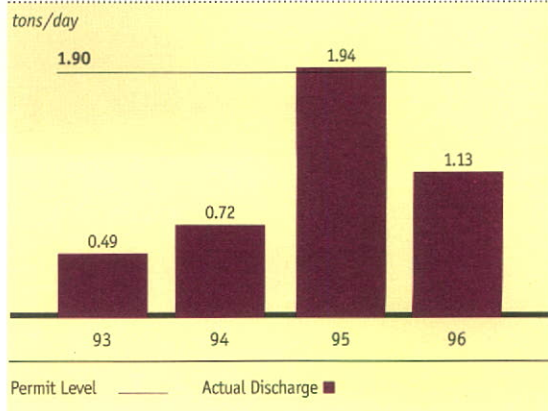
25 milligrams per litre

Prior to 1996, the POTW also monitored turbidity, however, under a new permit this is no longer required. Turbidity measures cloudiness in water.

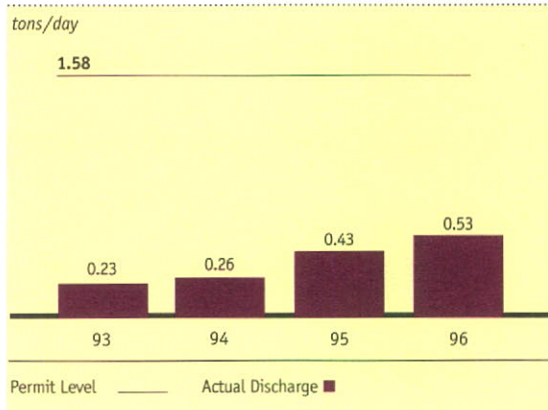
During a period of extremely hot weather in June 1995, the discharge standards for TSS and BOD were exceeded when the microorganisms in the POTW's secondary effluent treatment system died. Since that time, the mill has monitored its wastewater temperature to prevent it from affecting the treatment system. A number of approaches are being investigated to cool wastewater during hot weather. In addition, operational changes have been made at the wastewater treatment plant to prevent this problem from happening again. The POTW has been in compliance with permit limits since September 1995. Prior to June 1995, the POTW had been in compliance with its effluent permits since 1980.

The mill experienced one process wastewater overflow in 1996 caused by a loss of power at the City's pump station. During the year, a diesel generator was

### POTW Total Suspended Solids



### POTW BOD



installed within the treatment plant and redundant emergency electrical power was connected to the City's pump station. These improvements essentially eliminate the possibility of an overflow of untreated process wastewater into the environment from the mill or the effluent treatment plant.

In 1996 Blandin participated with the City of Grand Rapids in an optimization study to modernize the effluent treatment system. Over the next five years the system will be fully automated with the installation of computerized monitoring and controls.



# Air Quality Improvement

*The Company is working to improve air quality at the three BC mills.*

*The two current air quality issues are pulp mill odour — a by-product of the kraft pulp cooking process — and smoke and flyash produced from burning wood waste and other fuels. Blandin, which does not produce kraft pulp, does not have an odour or flyash problem.*

## **Controlling TRS**

Crofton is working to control Total Reduced Sulphur (TRS), a group of sulphur containing gases that produce the characteristic odour associated with kraft pulp mills. During the year, Crofton completed two major engineering studies to establish how much TRS is produced and to assess the work required to collect these gases and burn them in the mill's boilers. In place of collecting TRS, Crofton is now investigating ways to reduce generation of TRS by changing pulp cooking chemicals. Positive results were achieved with a preliminary trial and a more extensive four-week trial is planned. Plans are underway at Elk Falls to upgrade collection of TRS gases.

## **New Chlorine Monitors at Crofton and Mackenzie**

A highly sensitive monitor that measures chlorine dioxide in parts per billion, compared with the more typical parts per million, was installed in the trailer park adjacent to the Crofton mill. Both Crofton and Mackenzie installed continuous chlorine dioxide monitors in the bleach plant stacks during the year to improve early detection of high emission levels. At Elk Falls, a study was completed to assess ways to eliminate chlorine dioxide emissions at the mill site. Offsite chlorine dioxide emissions are not an issue at Elk Falls.

## Air Emissions

### Improved Monitoring

Weather stations were installed during the year at Elk Falls and Mackenzie to monitor wind speed, wind direction and temperature. Combining weather monitoring with contaminant monitoring will enable the mills to assess environmental influences on local communities. Elk Falls added a third ambient air monitor on Quadra Island.

### Air Particulate: Recovery Boilers

Recovery boiler particulate was reduced at Mackenzie, reflecting improvements in operations. Mackenzie has a policy to reduce pulp production in the event of high emission levels.

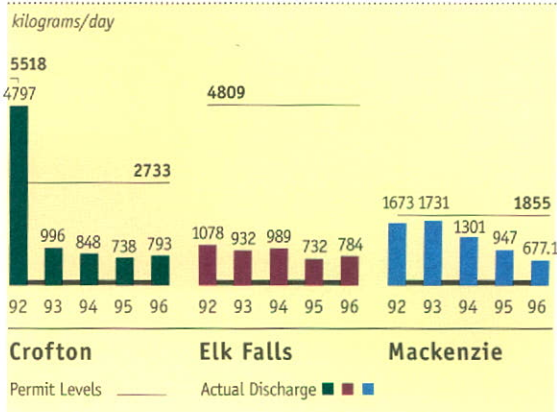
### Air Particulate: Lime Kilns

Mackenzie had four exceedances in September 1995 when the lime kiln scrubber became plugged with lime mud. The mill has adopted a practice of periodic inspections and cleaning.

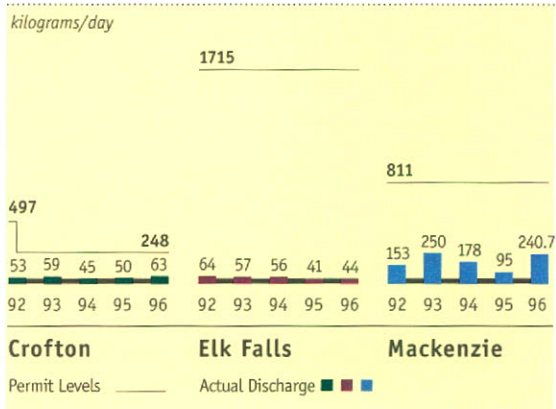
### Chlorine Dioxide

On October 5, 1995 Mackenzie released a large amount of chlorine dioxide from the bleach plant stack and a number of workers suffered respiratory irritation. To avoid future occurrences, the mill has installed a continuous chlorine/chlorine dioxide meter on the bleach plant stack. The new equipment allows the condition of the stack scrubber to be monitored and maintained. The mill also has a policy to slow or halt pulp production in the event of elevated chlorine/chlorine dioxide levels. This fall, Mackenzie will install an ambient chlorine/chlorine dioxide monitor to monitor air quality in the surrounding area.

### Air Particulate: Recovery Boilers



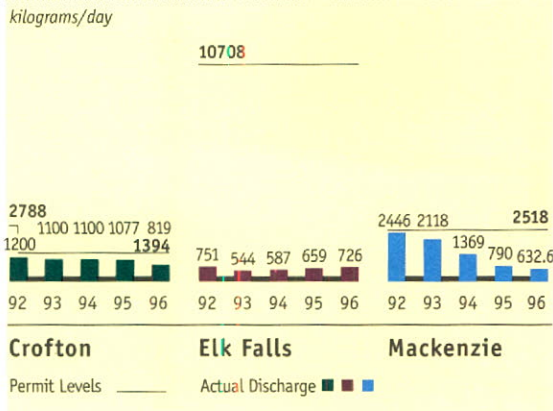
### Air Particulate: Lime Kilns





## Air Emissions

### Air Particulate: Power Boilers



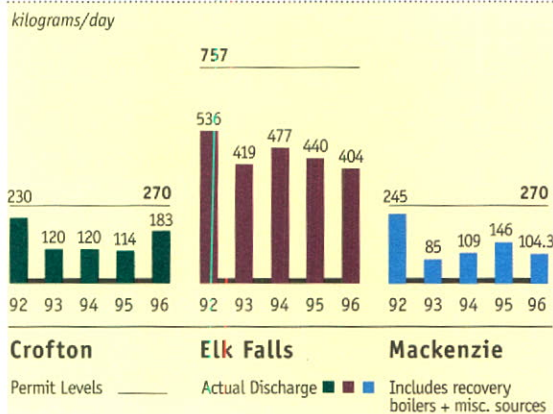
### Air Particulate: Power Boilers

At Crofton, mechanical changes have improved performance of the electrostatic precipitators on the No. 4 power boiler stack, reducing air particulate levels.

Electrostatic precipitators remove flyash from boiler exhaust gases. During the year, Mackenzie Pulp reduced power boiler particulate and improved its ability to respond to elevated emission levels.

In one instance, wood fuel was replaced with natural gas until maintenance was completed on particulate removal equipment. The Mackenzie power boiler uses mechanical collectors to remove particulate. Elk Falls is assessing ways to improve performance of its existing power boiler scrubber.

### Total Reduced Sulphur Emissions



### Total Reduced Sulphur Emissions (TRS)

The increase in the reported figure for Crofton is due to a change in the methods of sampling and testing. TRS levels at Mackenzie were reduced following the elimination of the slaker vent as an emission source. The TRS numbers include emissions from the recovery boilers plus miscellaneous sources.

## Air Emissions

### BLANDIN PAPER COMPANY

Air emissions at Blandin were substantially below permit limits during fiscal 1996.

The percentage of compliance for sulphur dioxide, nitrogen oxides and visible emissions improved over fiscal 1995 while the percentage of compliance for carbon monoxide decreased by 0.3 per cent.

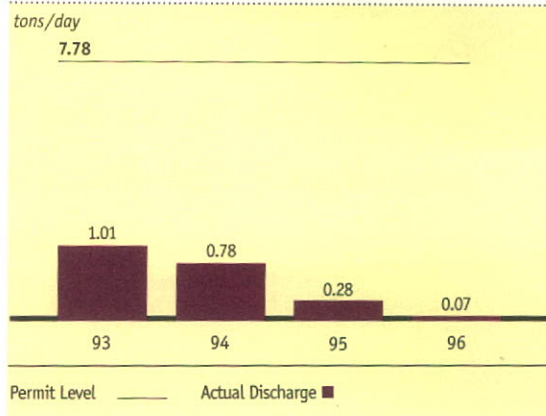
Sulphur dioxide emissions are controlled by burning a large percentage of wood waste in place of coal. During the year, a minor permit amendment application was submitted to the Minnesota Pollution Control Agency for the installation and operation of a new paper coater.

### Percentage of Compliance with Permit Level Fiscal 1996

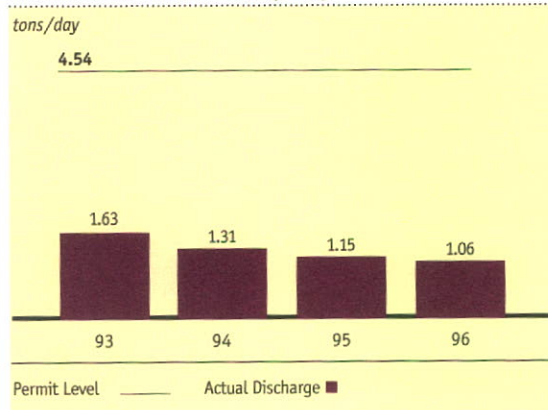
	Permit Level	Percentage of Compliance
Sulphur dioxide (SO <sub>2</sub> )	1.2 pounds per million BTU*	99.94
Nitrogen oxides	0.7 pounds per million BTU*	99.93
Visible emissions	20 per cent	99.95
Carbon monoxide	1,300 parts per million	98.8

\*British Thermal Unit

### Blandin Air Emissions (SO<sub>2</sub>)



### Blandin Air Emissions (NO<sub>x</sub>)



*During the year, Fletcher Challenge Canada sold its wood products operations at Mackenzie to TimberWest Forest Limited, its 52 per cent owned subsidiary. TimberWest, created in 1993 with the sale of the majority of the Company's wood products operations and timberlands, now represents Fletcher Challenge Canada's sole remaining involvement in the Canadian solid wood products business. In the United States, Blandin Paper conducts forest operations in northern Minnesota.*

### **Fibre Supply**

To manufacture pulp at its three BC mills, Fletcher Challenge Canada purchases fibre from approximately 40 suppliers, including TimberWest. Approximately 85 per cent of the Company's fibre supply consists of wood chips and sawdust which are residuals from sawmill manufacturing. The remainder is pulpwood — logs which are defective or otherwise unsuitable for making lumber. The fibre is derived from BC's coastal and interior forests. In addition, the Company uses recycled deinked pulp made from old newspapers and magazines. BC's forest base is primarily old growth forest. Fletcher Challenge Canada has been a leader in the use of second growth fibre. TimberWest has been harvesting second growth for decades.

### **Mini-Chip Pulp**

Fletcher Challenge Canada is the world's leading producer of mini-chip pulp, a product made from sawdust and wood shavings. With the completion of projects at Elk Falls and Mackenzie in December 1996, the Company's annual production capacity of mini-chip pulp will increase to about 260,000 tonnes. The mills will reduce production of long-fibre market

pulp, as well as their consumption of wood chips. Mini-chip pulp, which offers unique fibre properties, is used by paper manufacturers to supplement regular pulp supplies. Since sawdust and wood shavings would be burned or landfilled if they weren't used to make this valuable product, mini-chip pulp helps to reduce air pollution, generation of greenhouse gases and waste.

### **Forest Products Certification**

A program to certify forest products that originate in sustainably managed forests is being explored by the International Organization for Standardization (ISO). The ISO technical committee, currently developing standards for measuring environmental performance (ISO 14000), has formed a Forest Working Group to develop specific guidelines for forest managers. A similar process is well advanced in Canada, led by the Canadian Standards Association. The Company is monitoring these programs as they affect the operations of fibre suppliers and the eventual "eco-labelling" of Company products. BC's Forest Practices Code is among the world's most stringent systems for regulating forest management to protect ecological values and sustainability.



## BLANDIN FOREST MANAGEMENT

In fiscal 1996, Blandin Paper consumed 498,800 cubic metres (215,000 cords) of wood in making mechanical groundwood pulp. Aspen, spruce and balsam are the primary species used by Blandin to make pulp. Harvested species that aren't suitable for pulp are sold for high value uses such as furniture manufacturing. Blandin Paper purchases kraft pulp from Crofton and Mackenzie and mixes it with groundwood pulp to make lightweight coated paper.

### Hybrid Poplar

During the summer of 1996, Blandin Forestry planted 350 acres with hybrid poplar on conservation reserves and idle farmlands. The planting, which was coordinated under the U.S. Conservation Reserve Program to prevent erosion on fallow fields, will also reduce harvesting pressures on native forests, contribute to soil stabilization and provide shelter and cover for wildlife. Hybrid poplar is a fast-growing species in northern Minnesota and Blandin expects an average annual growth rate of 3.5 cords of wood per acre, as the hybrid poplar matures over a period of 12 years. An additional 300 acres will be planted with hybrid poplar during the summer of 1997, as well as 1,120 acres of conifers on company land.

### Sustainable Forestry Plan

Blandin Forestry is developing a sustainable forestry plan to comply with a new set of sustainable forestry initiatives introduced by the American Forest and Paper Association. Blandin's plan, scheduled for implementation in fiscal 1997, will also incorporate a number of the guidelines set forth by the Society of American Foresters and the Paper Task Force implemented by

the Environmental Defense Fund. In addition, the plan will enable Blandin to comply with new state legislation.

Guidelines are currently being prepared under the Minnesota Sustainable Forest Resources Act of 1995, focusing on site-specific forestry practices. These guidelines will incorporate Minnesota's existing Best Management Practices and the results of the Generic Environmental Impact Study, a comprehensive review of timber harvesting in the state.

Blandin's sustainable forestry plan will incorporate four principal sources of knowledge:

- *A new inventory of the Blandin industrial forest, providing information on non-timber values as well as standard timber measures. The inventory will be conducted next year.*
- *An environmental management "expert system" developed by a team of non-company resource professionals, including a wildlife biologist, a forest ecologist, a watershed scientist and a forest soil specialist.*
- *Staff knowledge and site-specific experience.*
- *A geographical information system (GIS) that went on-line in 1995.*

After Blandin's sustainable forestry plan is implemented, ongoing compliance will be measured internally and externally by a team of forestry staff, non-forestry mill employees and local citizens. The sustainable forestry plan will be part of Blandin Forestry's operating plan.

*Fletcher Challenge Canada is committed to promoting environmental awareness among its employees and the public, and supporting initiatives by government and non-government groups to enhance the environment. As part of this commitment, the Company is involved in a number of special activities.*

#### **Strait of Georgia Fisheries Sustainability Review**

A recent study of fish stocks in the Strait of Georgia says over-harvesting is the biggest cause of declines in salmon and other species. Rising water temperatures in the strait also play a crucial role in the decline of these important species to unsustainable levels. The study found that advances in environmental systems have significantly reduced the impact of mill effluents on fish. The review was sponsored by forest industry companies with operations around the strait and conducted by Hatfield Consultants Ltd., an international firm with expertise in environmental, aquaculture and fisheries research. The Strait of Georgia is located between Vancouver Island and the mainland of BC. A number of follow-up actions are underway to address the report's recommendations.

#### **Mississippi Headwaters River Watch Program**

During the summer of 1995, the Mississippi Headwaters Board River Watch, an environmental watch group, detected increased phosphate levels downstream from the Blandin mill. This problem was traced to a process change at the mill, which involved the addition of phosphoric acid. The City's Publicly Owned Treatment

Works (POTW) had been adding phosphate to wastewater as a nutrient for microbes. The POTW has stopped adding phosphate, resulting in cost savings and eliminating the discharge of excess phosphate into the environment. Blandin and the City of Grand Rapids appreciate the actions of the River Watch group.

#### **Noise Reduction**

Following a review of noise sources, Crofton is preparing a report recommending modifications and enclosures of equipment. At Grand Rapids, Blandin constructed a living visual and noise barrier adjacent to the mill. The barrier is planted with trees and a variety of flowers.

#### **MILLWATCH Program at Crofton and Elk Falls**

Both Crofton and Elk Falls are participating in the MILLWATCH volunteer program which involves local communities in mill monitoring activities. At Elk Falls, this consultation process resulted in the positioning of a third ambient air monitor and posting of air monitoring information on the local computer bulletin board. Crofton has held preliminary MILLWATCH meetings and will be conducting a full briefing tour. At Elk Falls, MILLWATCH activities have been incorporated with the Pollution Prevention Demonstration Project.



### **Project XL**

Blandin is developing a proposal to become a pilot papermill facility of Project XL, a voluntary federal and state program administered by the Minnesota Pollution Control Agency. Project XL supports initiatives by regulated parties to demonstrate excellence and leadership (XL) by achieving environmental performance beyond that required in existing regulations. Project XL facilities can exchange beyond-compliance performance for a measure of regulatory flexibility.

### **Birds Control Insects**

To control mosquitos, 24 birdhouses have been placed at Crofton's decommissioned Swallowfield landfill. The birdhouses resulted from the creative proposal of a Crofton employee in response to a neighbouring farmer's concerns about pesticides. The birdhouses, which are attracting swallows to the area, were designed by the employee and his father and built at the mill.

### **Elk Falls Education Efforts**

A half hour "infomercial" on Elk Falls' operations and the mill's educational environmental display aired three times on Victoria television over the past year. The environmental display, which features working models of various environmental protection systems, was also taken "on the road" and was viewed by 30,000 people. In the past three years, the show has been seen by 90,000 people, primarily students. To promote the show and tours of the Elk Falls mill, postcards were distributed on the BC Ferries system.

### **Multi-Media Inspection at Blandin**

The results of a multi-media inspection of the Blandin mill conducted by the Minnesota Pollution Control Agency showed the facility to be in excellent regulatory compliance. In a multi-media inspection, government inspectors examine a facility in depth for all regulated areas — air emissions, water discharge, wastes and chemical management.

### **Pollution Prevention Demonstration Project**

Elk Falls is the pulp and paper test mill for the Pollution Prevention Demonstration Project, an initiative launched by the BC Ministry of Environment. During the year, the mill's public advisory committee met three times and an engineer was assigned to develop a review of mill processes. The project involves multiple stakeholders, such as local community representatives, government officials, representatives of environmental groups and mill management, in developing planned approaches to avoiding pollution. Elk Falls is one of a number of industrial sites in the province participating in the project.



## Products

### COATED PAPER

Paper which is coated and treated to impart a smooth surface for enhanced printing characteristics.

### CONTAINERBOARD

The company's containerboard liners form the outer layers of corrugated containers.

### GROUNDWOOD PRINTING PAPER

Printing paper which is mainly composed of mechanical pulp.

### HIGH BRIGHT SPECIALTY PAPER

Higher brightness mechanical-pulp based paper used to print newspaper inserts and retail flyers.

### KRAFT PULP

Chemical pulp produced by an alkaline cooking process.

### LIGHTWEIGHT PAPER

Paper that weighs less than the standard. For example, the standard weight for newsprint in North America is 48.8 grams per square metre (gsm).

### MARKET PULP

Pulp produced for sale in the open market.

### MINI-CHIP PULP

A fully bleached pulp made from sawdust and wood shavings that provides some characteristics typical of both softwood and hardwood fibres.

### RECYCLED CONTAINING

For printing papers, "recycled containing" refers to paper that has been manufactured with a percentage of fibre recovered from previously manufactured paper.

## Production

### AOX

AOX is a standardized test to measure the amount of chlorinated organic material in wastewater.

### BLEACHING

The use of chemical agents to whiten and purify pulp fibres.

### CHLORINATED ORGANICS

A term used to describe organic substances that have reacted with chlorine.

### DEINKING

A process that removes inks, clays and coatings, binders and other additives from waste papers so that the fibres can be recycled into new products.

### DIOXINS AND FURANS

Specific chlorine-containing compounds that have been detected in trace amounts in effluent from pulp manufacture. They can enter the process as impurities or can be formed under certain bleaching conditions. Dioxins and furans can also be formed by combustion.

### EFFLUENT

Outflowing liquid wastewater discharge.

### ELECTROSTATIC PRECIPITATOR

A device that removes small particles such as flyash, smoke and dust from air by passing the air through a unit containing electrically charged wires suspended between plates. These wires pass a charge to the particles so that they are attracted to collector plates.

### LC 50 TOXICITY TEST

A measure of effluent concentration in which half the living organisms survive over a period of 96 hours.

### LEACHATE

Water filtered through material like wood chips or landfills, collecting contaminants in the process.

### NCG (NON-CONDENSABLE GASES)

NCGs are gaseous compounds formed as a by-product during the kraft cooking process. These gases give kraft mills their characteristic odour.

### PARTICULATE

Very fine solid particles which escape into the atmosphere with exhaust gases, typically from recovery and power boilers and lime kilns.

### PCB (POLYCHLORINATED BIPHENYLS)

PCBs are a class of chlorinated organic compounds once used primarily as electrical insulating oils. They were valued because of their inert properties.

### PRIMARY TREATMENT

A wastewater treatment process that utilizes physical properties to reduce suspended solids from effluents.

### SCRUBBER

A mechanical device that removes suspended particles from flue gas. Fine water sprays are applied to the flue gas and the particles are removed in the resultant liquid effluent.

### SECONDARY TREATMENT SYSTEMS

A wastewater treatment process that uses bacteria to reduce BOD, AOX and other potentially toxic components from effluents.

### SLUDGE

Solids, composed mainly of wood fibre, other settleable material and waste biological organisms, recovered from primary and secondary treatment. Sludge is also referred to as biosolids.

### THERMOMECHANICAL PULP [TMP]

Pulp produced using heat and mechanical energy to break down wood chips into the cellulose fibres used to make paper.

### TOTAL REDUCED SULPHUR [TRS]

A group of sulphur containing gases that produce the characteristic odour associated with kraft pulp mills.

### TOTAL SUSPENDED SOLIDS [TSS]

A measure of organic material and wood fibre suspended in effluent.

## Forestry

### CUT BLOCK

A specific area of mature forest harvested under permit as part of forest management activities.

### SECOND GROWTH

Stands of trees that have regenerated following harvesting.

### SUSTAINED YIELD

Forest management that balances the net growth and the amount harvested.

## Printing Papers

	Annual Production Capacity
<b>Newsprint and groundwood specialties</b>	<b>930,000 tonnes</b>
Annual Mill Capacity	
Crofton Crofton, BC	430,000 tonnes
Elk Falls Campbell River, BC	500,000 tonnes
<i><b>End Uses</b> – Newspapers, telephone and specialty directories, newspaper inserts, and retail flyers.</i>	

<b>Lightweight coated paper</b>	<b>475,000 short tons</b>
Annual Mill Capacity	
Blandin Paper Company Grand Rapids, Minnesota	475,000 short tons
<i><b>End Uses</b> – Magazines, catalogues, and coupon inserts.</i>	

## Market Pulp

	Annual Production Capacity
	<b>730,000 tonnes</b>
Annual Mill Capacity	
Crofton Crofton, BC	325,000 tonnes
Elk Falls Campbell River, BC	200,000 tonnes
Mackenzie Mackenzie, BC	205,000 tonnes
<i><b>End Uses</b> – Manufacture of printing and writing papers and specialty paper products.</i>	

## Containerboard

	Annual Production Capacity
	<b>90,000 tonnes</b>
Annual Mill Capacity	
Elk Falls Campbell River, BC	90,000 tonnes
<i><b>End Uses</b> – Product packaging.</i>	

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# 1996 Fletcher Challenge Canada Limited Annual Environmental Report

	Strongly Agree	Somewhat Agree	Agree	Somewhat Disagree	Strongly Disagree
The report provides useful information on Fletcher Challenge Canada's environmental performance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The bar charts provide meaningful information	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The report is easy to understand	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The report is the right length	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The report has the right amount of detail	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What did you like best about this report?

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How could we improve future reports?

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What additional information would you find useful?

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Comments and Observations

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To help us improve future environmental reports, we would appreciate your comments and observations

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