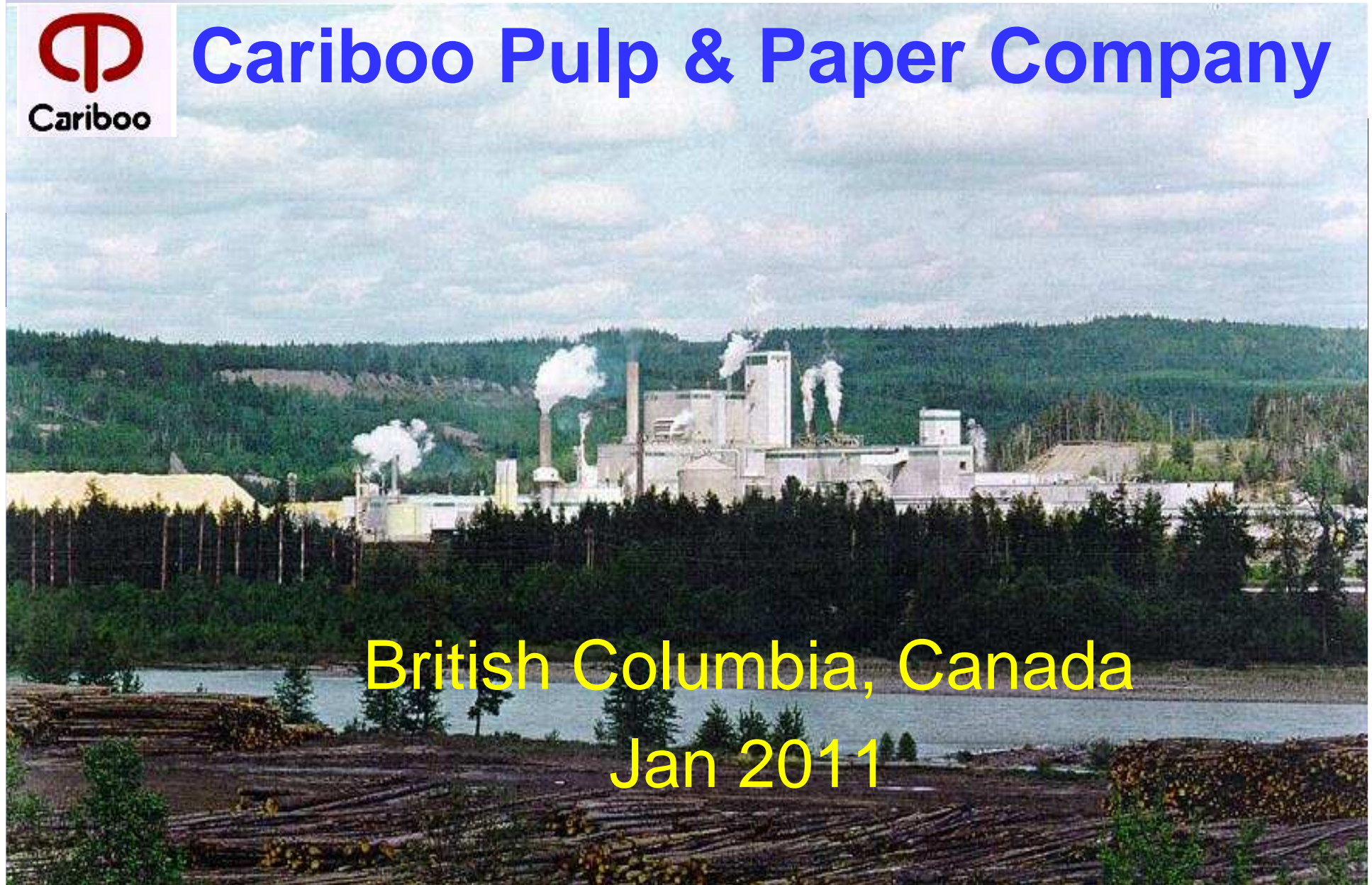




Daishowa-Marubeni International Ltd.



Cariboo Pulp & Paper Company

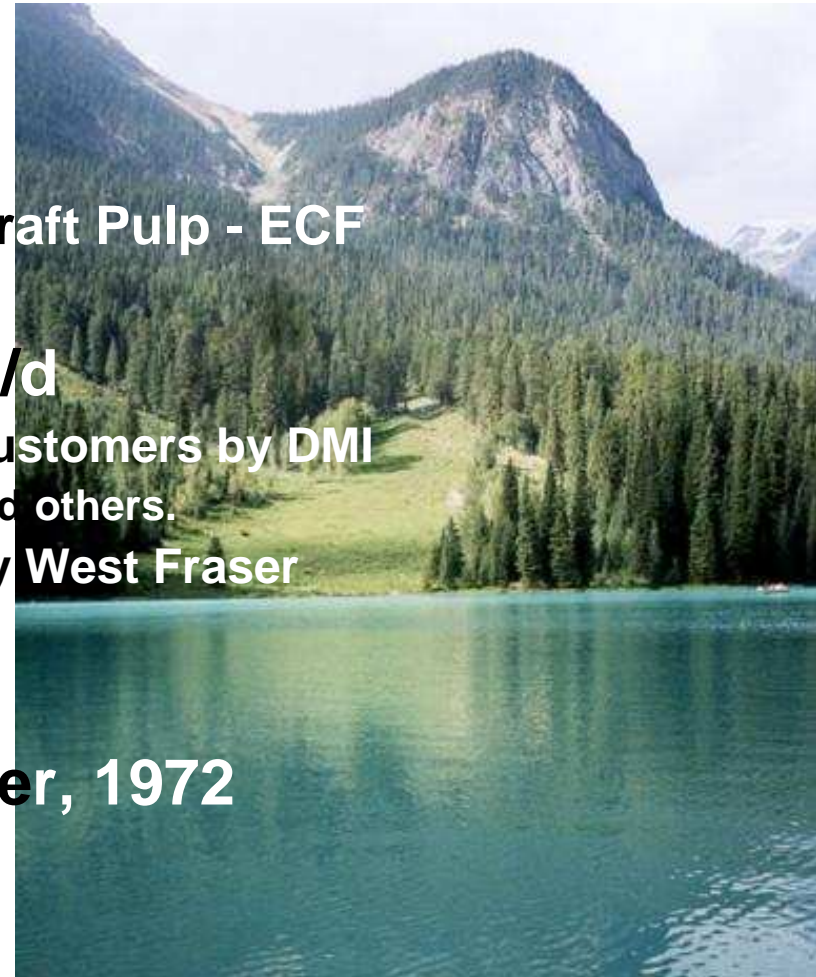


British Columbia, Canada

Jan 2011

Outline

- **Corporate Name : Cariboo Pulp and Paper Company**
- **Location : Quesnel, BC, Canada**
- **Mill Area : 2,729,000m²**
- **Product**
 - **NBSK-ECF**
Northern Bleached Softwood Kraft Pulp - ECF
- **Capacity (2011 Budget)**
: 332,640ADt/y, ave. 945AD t/d
 - **50% of products is sold to Asian customers by DMI**
 - **Japan, China, Korea, Indonesia, and others.**
 - **Another 50% of products is sold by West Fraser**
 - **North America, Europe, and others**
- **Employees : 294 (2010 Actual)**
- **Started Operation : November, 1972**



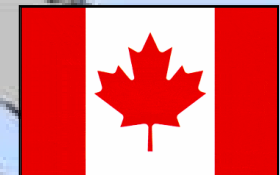
Location

British Columbia



-North latitude 53°
 -East longitude 122° 30'
 -Elevation 475m
 above sea level
 -Population 10,000

Canada



- Vancouver – Quesnel
 - BC Rail 610km
 - Highway 680km

- Prince George – Quesnel
 - BC Rail 120km
 - Highway 120km



About Quesnel

■ Population

■ 10,000

■ Major Industries

■ Lumber (West Fraser, Canfor, Tolko, and others)

■ Pulp & Paper Manufacturing (CPP, QRP)

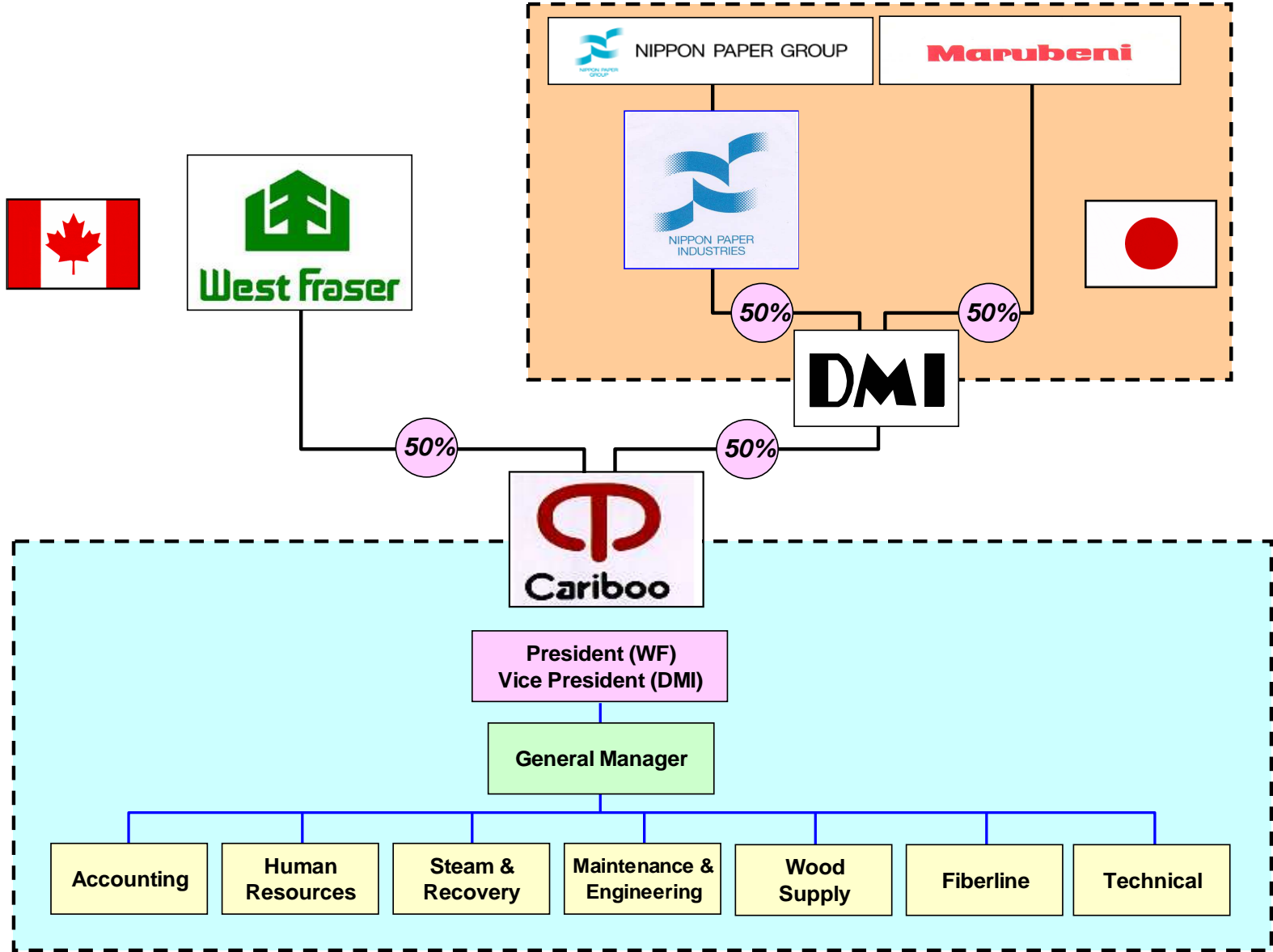
■ Climate

■ Minimum Temperature : App. -30°C

■ Annual Precipitation : 365mm

■ Annual Amount of Snowfall : 1,660mm

Organization





History

- **Dec. 1969** **Cariboo Pulp & Paper Company was established**
 - Joint venture business by DMI and Weldwood
 - <Design Capacity> NBKS 680ADt/D
- **Apr. 1970** **Started Construction**
- **Nov. 1972** **Started Mill Operation**
- **1987** **Began treating Quesnel city and Cariboo regional district sewage**
- **1988-89** **Mill optimization project (Capacity 800→900ADt/D)**
 - Increased Recovery Boiler Capacity, Installed PDW, etc.
- **Oct. 1991** **Environmental improvement**
 - Installed O2 delignification, Installed #3 Lagoon, etc.
- **Aug. 1992** **Started making ECF Pulp**
- **Jan. 1993** **ISO 9001 Certification**
- **Apr. 1996** **Upgraded Chip Screen**
- **Apr. 1997** **Installed Tall Oil Plant**
- **Nov. 1998** **ISO 14001 Certification**
- **Aug. 1999** **Converted to Lo-Solids Cooking in Digester**
- **Jan. 2000** **100% ECF production**
- **Jul. 2001** **Upgraded Turbine Generator**
- **Sep. 2002** **Installed #4 Lagoon**
- **Dec. 2004** **West Fraser acquired Weldwood**
- ※ **Current Production Capacity is 945ADt/d (YTD average 2011 Plan)**

Chips

■ Wood supply (All purchased)

- Quesnel area 55%
- Williams Lake area 45%
- 100 mile house area 0%

■ Fiber composition

- Lodgepole Pine 80%
- White Spruce 10-12%
- Interior Douglas Fir 8-10%

■ Residual chips

- Using 100% residual chips



Lodgepole Pine

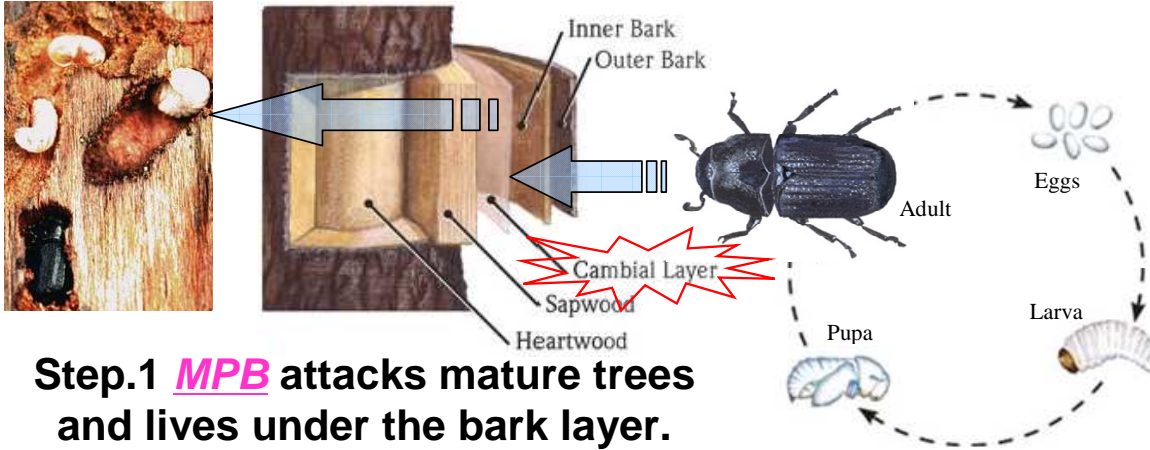


White Spruce



Douglas Fir

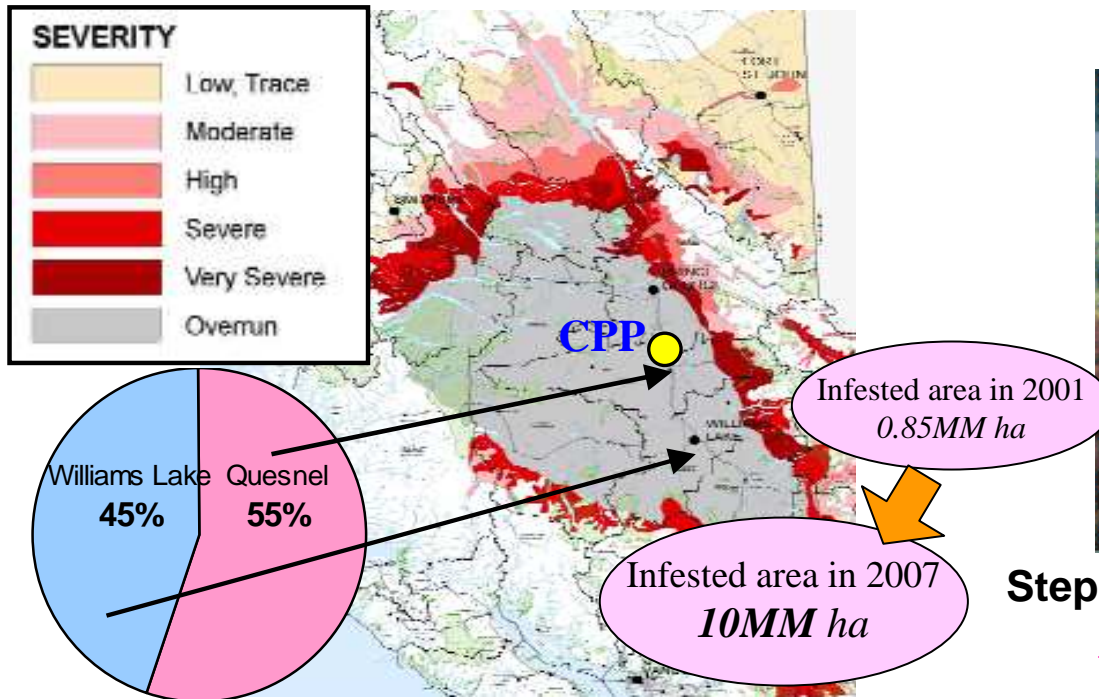
Mountain Pine Beetle



Step.1 *MPB* attacks mature trees and lives under the bark layer.

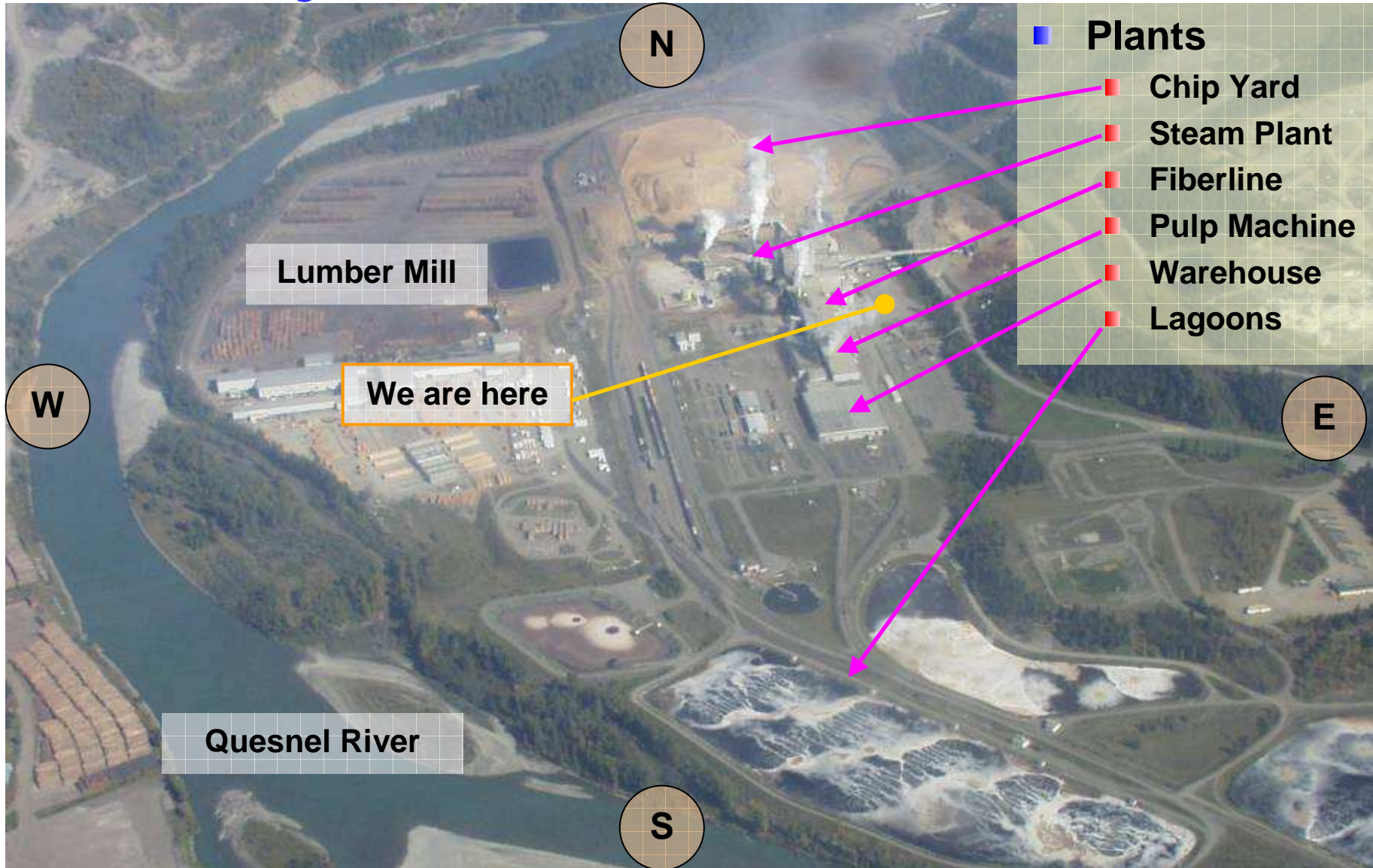


Step.2 The flow of water and nutrients inside the tree are cut off by *MPB* parasite.

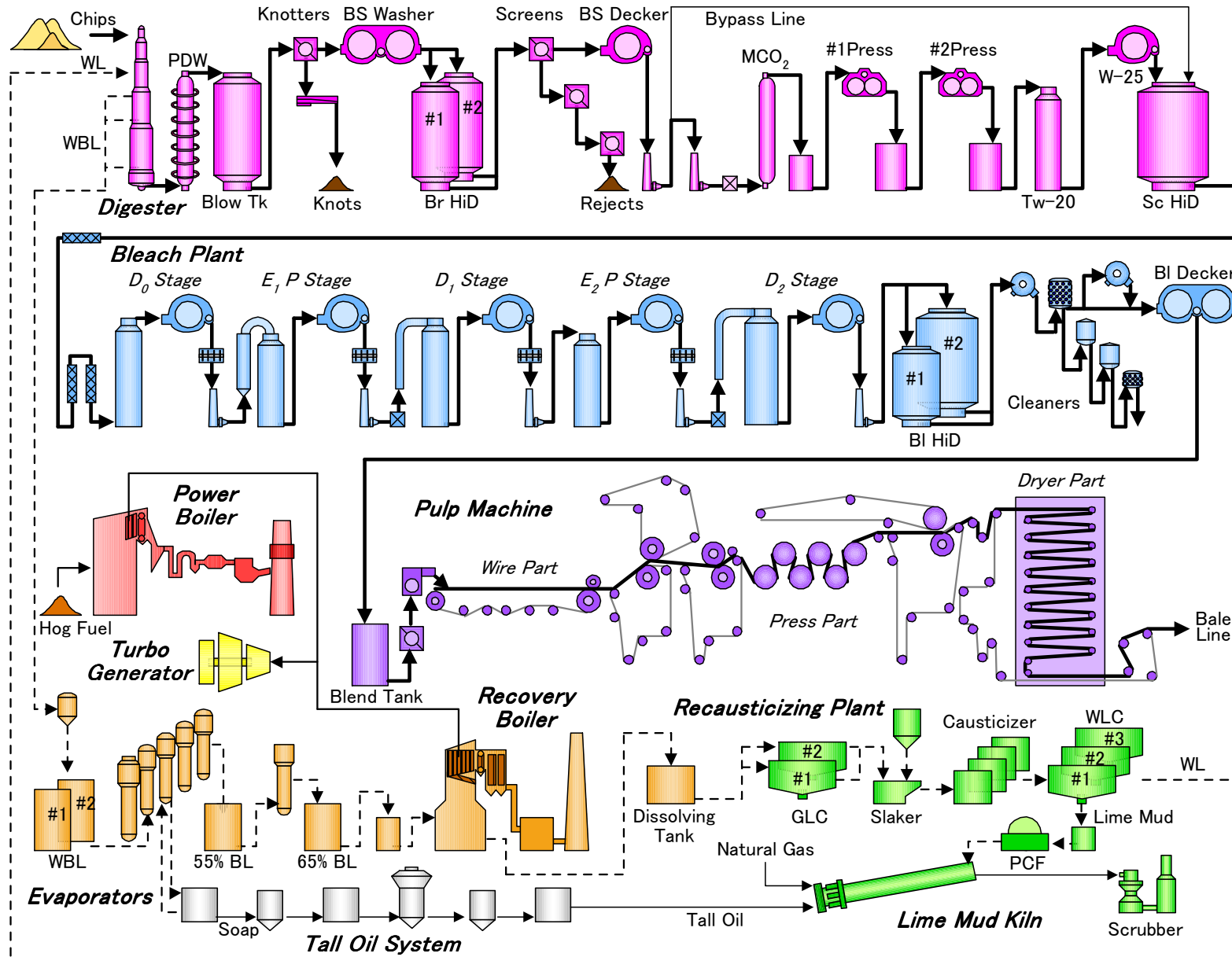


Step.3 The color of infested tree changes Green → Light-yellow → Brown.

Mill Layout



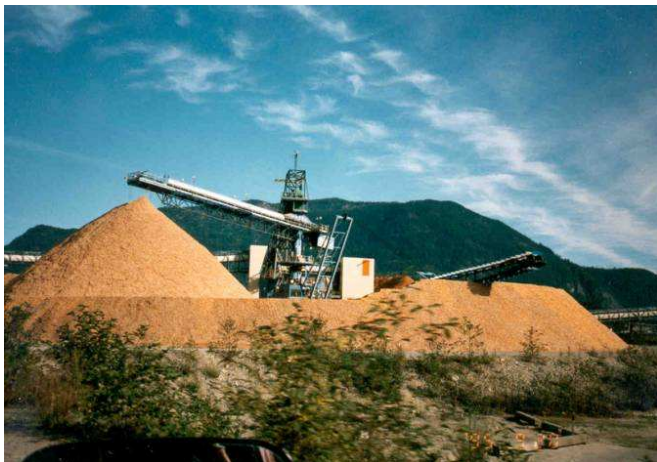
Mill Flow



Main Equipment – Fiberline 1

■ Chip Yard

- 3 Chip piles
- Capacity : 100,000BDt



■ Chip Screen



Bar Screen

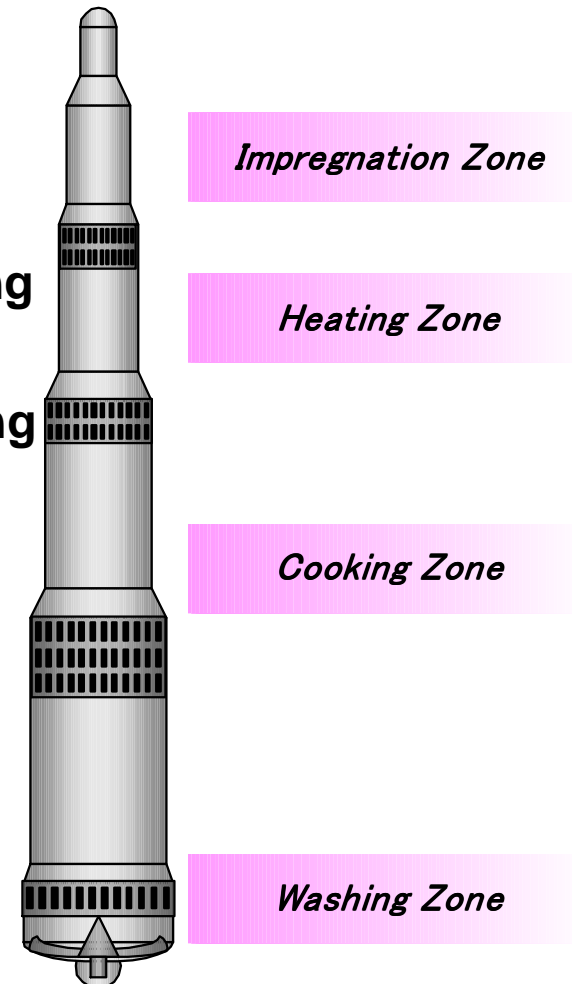


Liwell Screen

Main Equipment – Fiberline 2

■ **Digester**

- **Type : Kamyr 1 vessel continuous digester**
- **Capacity:1,150 UKPt/d**
- **Height : 54.2m**
- **Volume : 1400m³**
- **Cooking Method : Lo-Solids Cooking**
 - **Aug. 1999 Converted to Lo-Solids Cooking**
 - **Mar. 2001 Converted to**
Downflow Lo-Solids Cooking



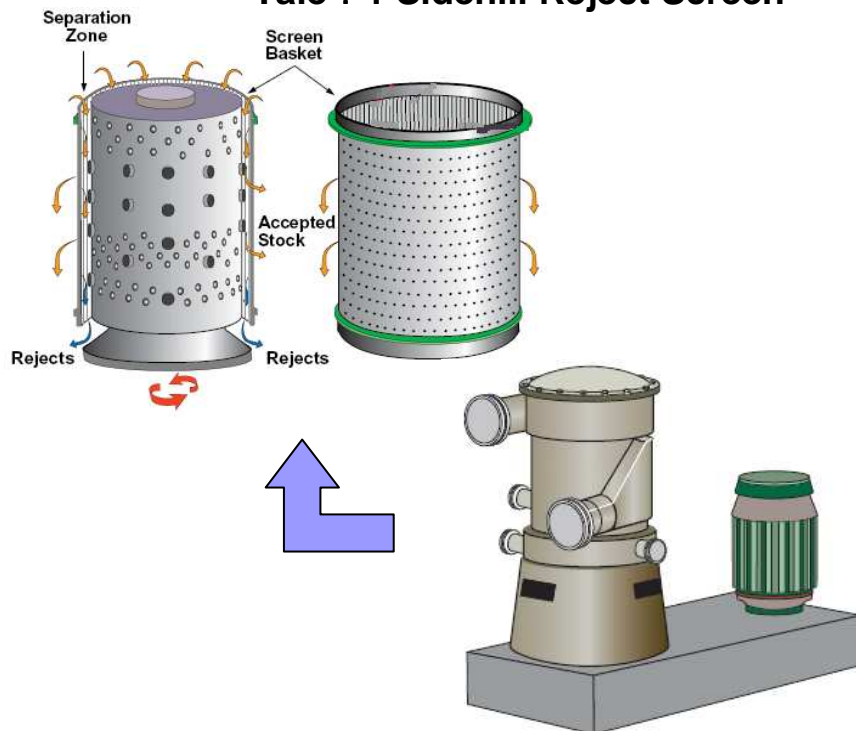
Main Equipment – Fiberline 3

■ Screen

■ Knotter

■ Screens

- 1st : 5 Centrisorter Screens
- 2nd : 2 Centrisorter Screens
- 3rd : 1 Centrisorter Screen
- Tale : 1 Sidehill Reject Screen



■ MCO₂

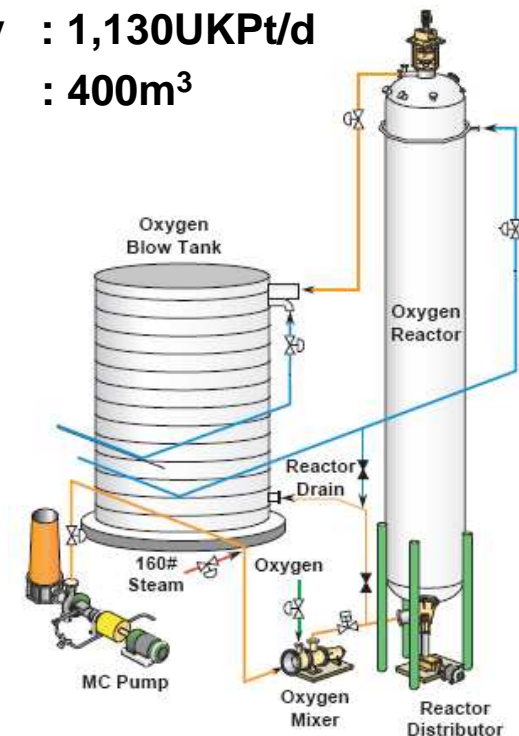
■ Type : SUNDS Medium Consistency Oxygen Delignification

● Mixer

- Type : SUNDS Hi-shear Mixer

● Reactor

- Capacity : 1,130UKPt/d
- Volume : 400m³



Main Equipment – Fiberline 4

■ Bleach Plant

- Capacity : 1,200BKPt/d
- Method : 100% ECF
- Sequence : 5 stage bleaching

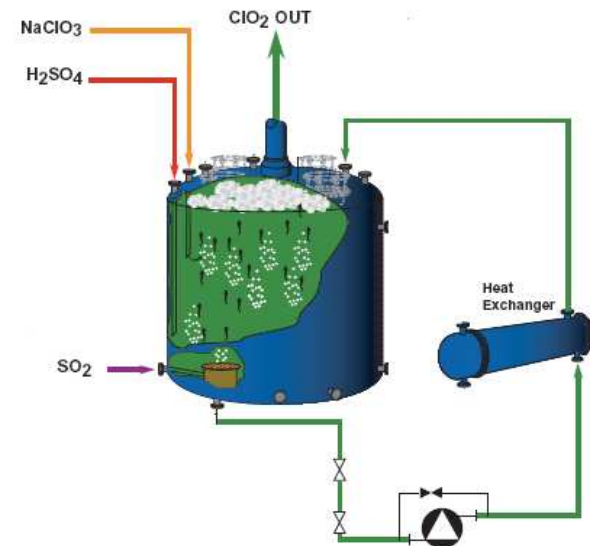
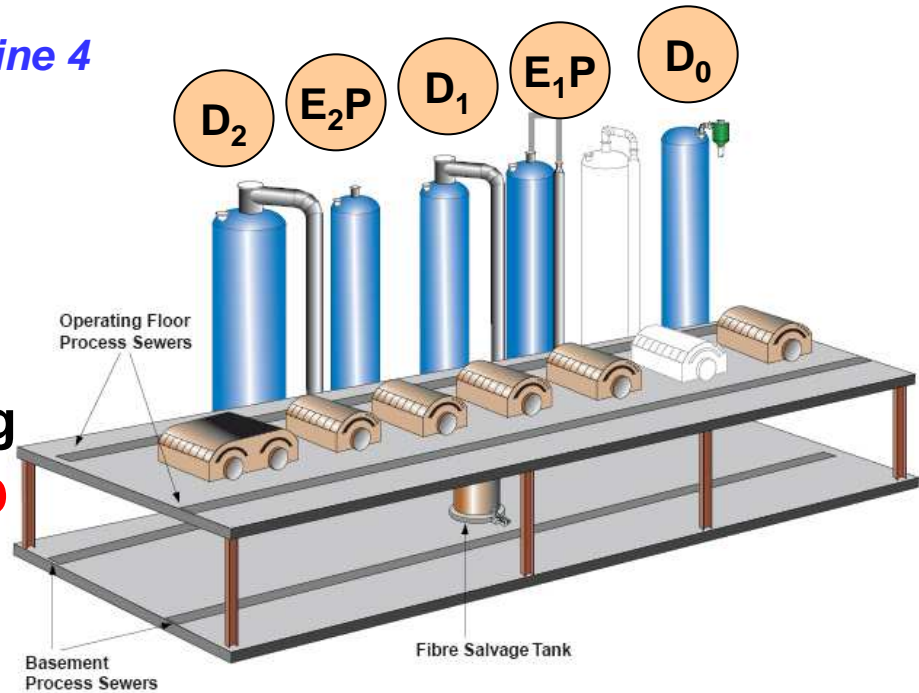
D—Ep—D—Ep—D

- D: Chlorine Dioxide
- E: Alkali Extraction
- P: Peroxide

- Washer : Kamyr/Canron

■ ClO₂ Generator

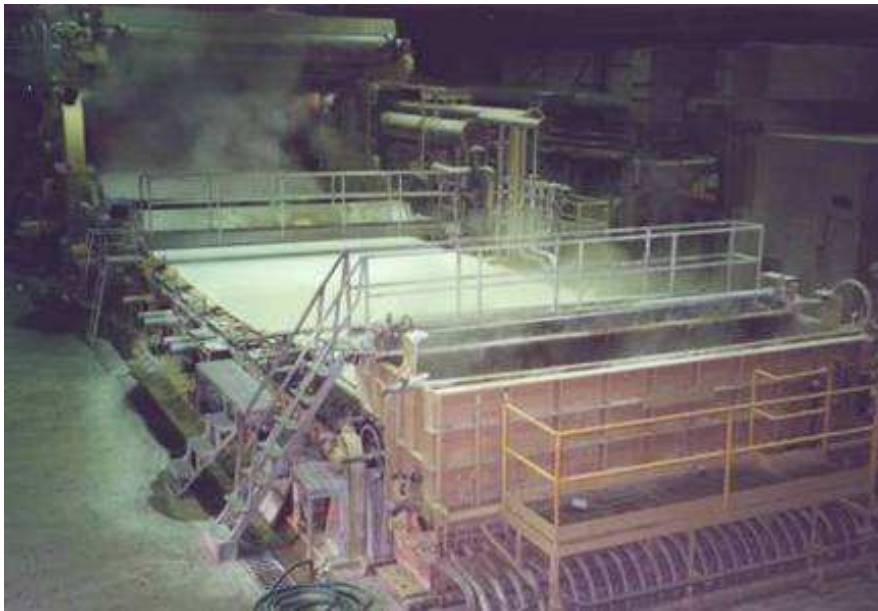
- Method : Modified Mathieson
- Capacity : 28 ClO₂ t/d



Main Equipment – Fiberline 5

■ Pulp Machine

- **Wires** : Beloit
- **Presses** : Black Clawson
- **Dryer** : Ross
- **Details**
 - Width: 5,700mm, 7sheets, Max speed: 170m/min
 - Basis Weight: 895g/m², Bale Weight: 250kg, Sheets Consistency: 90-95AD%



Wire Part



Dryer Part

Main Equipment – Fiberline 6

■ Baling Line



- **Wrapping for North America**
 - Baling Wire
 - Paper Strap
- **Wrapping for Asia and Europe**
 - Baling Wire & Unitizing Wire

■ Warehouse



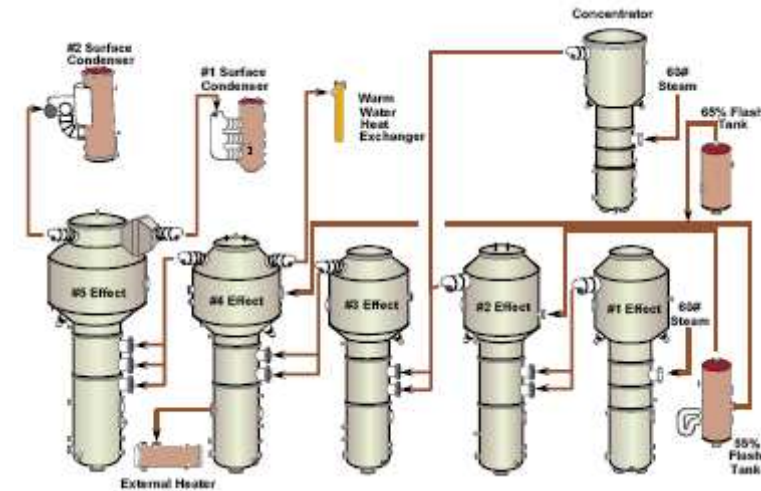
- **Capacity**
 - For North America : 4,500t
 - For Asia and Europe : 5,000t
- **Transport**
 - Rail Car
 - Truck

Main Equipment – Utility 1

■ Evaporator

■ Specification

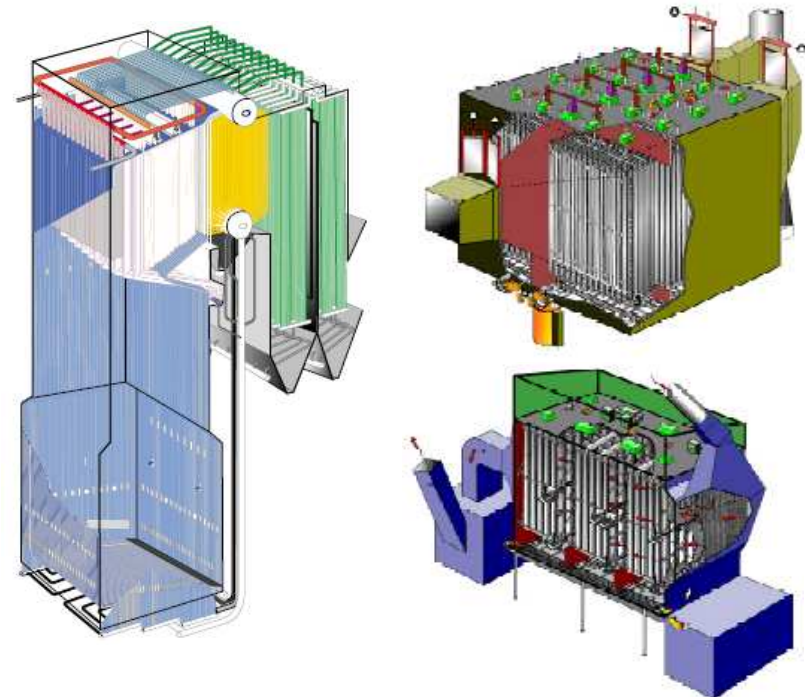
- 5 effects & 1 Concentrator
- Type : Tube
- Feed : 420m³/h (WBL)



■ Recovery Boiler

■ Specification

- Solids : 1,900 solid t/d
- Steam Production : 270t/h
- Precipitator : JOY, FLAKT (Dry Bottom)



Main Equipment – Utility 2

■ Lime Mud Kiln

■ System : F. L. Smidth

- Lime Production : 250mt/d
- Dimension : $\phi 3.5\text{m} \times \text{L}91.5\text{m}$
- Fuel : Natural Gas, Tall Oil
- Temperature : 1070°C

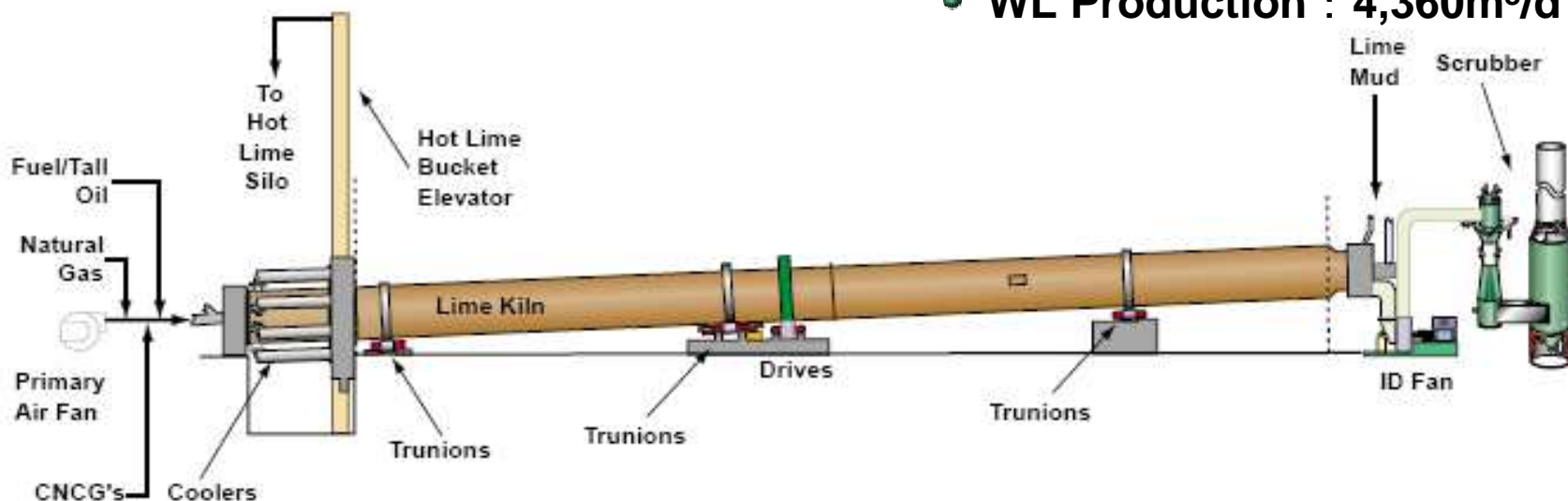
■ Causticizing

■ System : Eimco

- Lime Slaker
 - Volume : 72m^3
- Causticizer
 - Volume : $76\text{m}^3 \times 4$
- WL Clarifier
 - Volume : Total 6800m^3

■ Capacity

- WL Production : $4,360\text{m}^3/\text{d}$

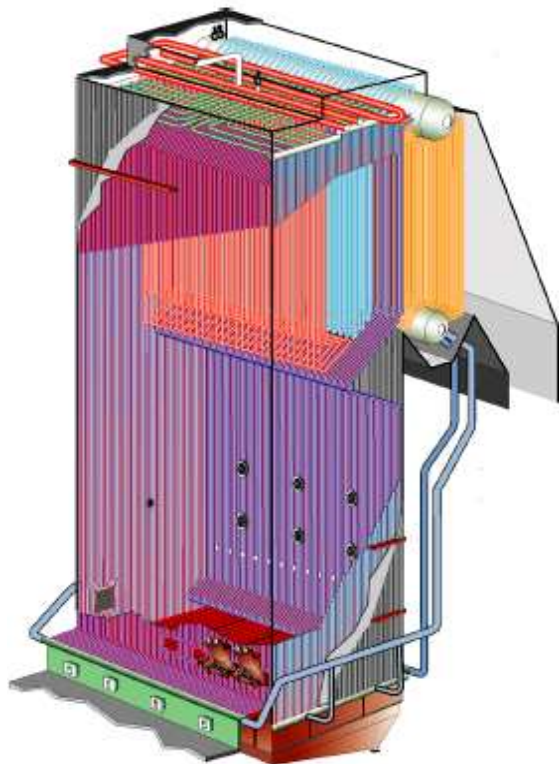


Main Equipment – Utility 3

■ Power Boiler

■ System : Foster Wheeler

- Fuel : Hog fuel
Natural Gas
- Steam Production : 218t/h



■ Turbo Generator

■ System : Toshiba (Body) Turbo Care (Rotor & Blade)

- Generate : 34,000 kW max
- Type : Extraction Steam Turbine
- ※ Jul, 2001 Installed New Rotor and Blade manufactured by Turbo Care



Environment

- ISO 14001 manages Cariboo Pulp Environment

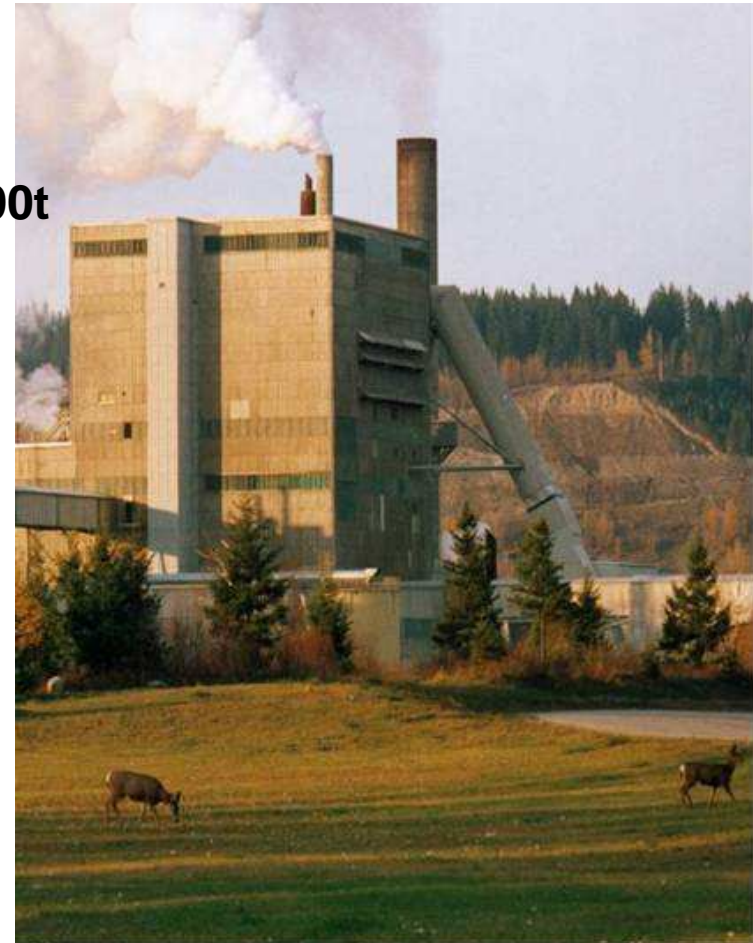
<Environmental Performance>

	Unit	Permit 2010	CPP '10 Actual	
<i>Effluent</i>				
Effluent Flow	m ³ /day	118,200	95,526	
BOD	kg/day	7,890	1,620	
TSS	kg/day	19,725	3,116	
pH		6.5-8.5	7.8	
AOX	kg/ADt	0.60	0.27	
Dioxin/Furan	ppq	15/50	0/0	
Toxicity		100%pass	100%pass	
<i>Air</i>				
Particulate Emission	Recovery Boiler	mg/m ³	230.0	62.0
	Power Boiler	mg/m ³	230.0	189.0
	Kiln	mg/m ³	230.0	155.0
TRS Emission-Combined Total		kg/day	205.0	90.6



Social Action

- Using of 100% residual Chips
- Burning of Biofuel
 - Purchase Hog fuel through saw mills
 - Burn Hog fuel on site : 105,000~110,000t
- Reducing of effluent AOX by ECF
 - AOX : 0.6kg/ADt (Before ECF)
⇒ 0.27kg/ADt (After ECF)
- Treating of Quesnel city and Cariboo regional district sewage
 - Flow : 6,500m³/D (5,000 residences)



Cariboo Pulp & Paper Company

