FRASER RIVER ACTION PLAN

Technical Summary Report Pollution Prevention Plan Riverside Forest Products - Williams Lake Mill

DOE FRAP 1998- 04

Environment Canada Environnement Canada

TECHNICAL SUMMARY REPORT
POLLUTION PREVENTION PLAN
RIVERSIDE FOREST PRODUCTS WILLIAMS LAKE MILL

DOE FRAP 1998-04

Prepared for:

Environment Canada
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North Vancouver, B.C.

Prepared by:

Reid Crowther & Partners Ltd.
Victoria, B.C.

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Any comments regarding this report should be forwarded to:

Technology and Pollution Prevention Section
Environment Canada
224 West Esplanade
North Vancouver, B.C.
V7M 3H7

TECHNICAL SUMMARY REPORT
POLLUTION PREVENTION PLAN
WILLIAMS LAKE MILL

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EXECUTIVE SUMMARY

Riverside Forest Products (Riverside) prepared a Pollution Prevention Plan (P2 plan) in 1997 for their Williams Lake mill in an effort to minimize the generation of pollutants and to reduce the overall environmental liabilities of the facility. The plan was funded through a cost sharing agreement between Environment Canada - Fraser Pollution Abatement Office and Riverside as a demonstration project for implementing P2 initiatives in the wood products industry.

A Pollution Prevention Plan Steering Committee (P2PSC) was formed to direct the P2 Planning Process. A public advisory committee (PAC) was also formed to provide input into the planning process.

An environmental review was carried out to assess the state of the environment, management and operational conditions and identify P2 opportunities.

The P2 opportunities included:

1. Reduce vehicle emissions
2. Reduce generation of vehicle dust
3. Reduce dust emissions from cyclones
4. Reduce fugitive emissions from the mill
5. Reduce wood smoke from the wood waste landfill
6. Reduce drying kiln emissions
7. Reduce the risk of subsurface soil contamination
8. Reduce the amount of waste material landfilled
9. Improve site drainage management
10. Reduce the risk of contaminating site runoff
11. Reduce the risk of groundwater contamination
12. Improve sewage disposal system
13. Reduce the risk of hydrocarbon contamination from the truck wash facility
14. Improve energy efficiency
15. Reduce noise levels
16. Reduce risk of spills
17. Implement an environmental management system
18. Address community environmental issues

Forty two (42) P2 options were then developed to address the issues raised by the opportunities. These P2 options were assessed and prioritized for implementation in

the Pollution Prevention plan (Table 5.1). A number of P2 options were not implemented for a variety of reasons as explained in Section 5.2 of the report.

The P2 plan is primarily to be implemented over the next five years, however, due to cyclical economic nature of the wood products industry there are a couple of expensive actions that are being scheduled over a ten year period.

RÉSUMÉ

Pour réduire la production des polluants et pour réduire les responsabilités environnementales, Riverside Forest Products a préparé un plan de prévention de la pollution (P2) pour son moulin à scie localisé à Williams Lake. Riverside et le Fraser Pollution Abatement Office d'Environnement Canada ont conjointement financé le développement du plan comme projet pilote pour démontrer la mise oeuvre d'initiatives concernant la prévention de la pollution dans l'industrie du bois.

Un comité de direction a été formé afin de diriger le processus de planification de P2. Un comité de conseil public a aussi été formé afin de contribuer au processus.

Une étude environnementale a évalué l'état de l'environnement et les systèmes de gestion et d'opération de Riverside, et a identifié des mesures pour prévenir la pollution.

Les mesures identifées pour prévenir la pollution comprennent les suivantes:

1. Réduire les émissions des véhicules;
2. Réduire la poussière engendrée par les véhicules;
3. Réduire les émissions de poussière des cyclones;
4. Réduire les émissions non-controlées des moulins;
5. Réduire la fumée provenant de l'entreposage des déchets du bois;
6. Réduire les émissions des sècheurs;
7. Réduire les risques de contamination souterraine du sol;
8. Réduire la quantité de déchets entreposés;
9. Améliorer la gestion du drainage sur le site;
10. Réduire les risques de contamination diffuse;
11. Réduire les risques de contamination de l'eau souterraine;
12. Améliorer le système d'égouts;
13. Réduire les risques de contamination d'hydrocarbones engendrée par le lavage des camions;

14. Améliorer l'efficacité de l'utilisation d'énergie;
15. Réduire le bruit sur le site;
16. Réduire les risques de déversements;
17. Mettre en oeuvre un système de gestion environnementale;
18. Adresser les questions environnementales identifées par la communauté

Le comité de direction a identifié 42 options de prévention de la pollution sur ce site. Ces options ont été évaluées et priorisées pour leur mise en oeuvre dans le plan P2 (voir la table 5.1). Pour plusieurs raisons expliquées dans la section 5.2 de ce document, certaines options ne seront pas utilisées.

La mise en oeuvre du plan prendra surtout place pendant les cinq prochaines années, cependant quelques actions sont planifiées sur une période de dix ans, à cause de la nature cyclique de l'économie de l'industrie de bois.

SECTION 1.0
INTRODUCTION

1.1 GENERAL

Riverside Forest Products (Riverside) operates a saw mill and planer mill in Williams Lake, BC. The Mill produces dimension lumber for local, national and international sales. Riverside has prepared a Pollution Prevention Plan (P2 plan) in an effort to minimize the generation of pollutants and to reduce the overall environmental liabilities of the facility.

Preparation of this plan was funded through a cost sharing agreement between Environment Canada - Fraser Pollution Abatement Office and Riverside. The project is a demonstration project for implementing P2 initiatives in the wood products industry.

Pollution prevention planning is expected to benefit the regulatory agencies as well as industry through:

- Reductions in emissions and discharges of polluting substances;
- Reduction of costs associated with environmental management;
- Improvements in public image; and
- Reduction of environmental liabilities.

Pollution prevention is defined by the federal government in "Pollution Prevention - A Strategy For Action" (1995) as:

> **"The use of processes, practices, materials, products or energy that avoid or minimize the creation of pollutants and waste, and reduce overall risk to human health or the environment."**

The scope of this project involves an environmental review (audit) of the mill operations; identification of P2 opportunities; analysis and prioritization of selected pollution prevention options; and preparation of a P2 plan.

The overall P2 Plan was developed through a three stage process, as follows:

- The first stage (Stage I) consisted of an environmental review which included a state of the environment summary and an assessment of the management and operational systems. It resulted in the identification of pollution prevention opportunities.

- The second stage (Stage II), resulted in identification and evaluation of feasible P2 options, and development of the P2 Plan. The P2 plan sets out an implementation schedule for the selected P2 actions. A P2 action is a P2 option that was selected for implementation, and assigned a completion date and responsibility centre (with a project manager).

- The third stage (Stage III) is the evaluation of the plan. This involves monitoring the results of the plan and recording the benefits and disadvantages of the P2 actions. This is achieved by establishing targets and objectives for environmental performance. The intent is to ensure that the mill is going beyond their existing compliance requirements and that there is a continuous improvement program in place and operating.

The detailed assessment of the feasibility of the various P2 options, carried out in Stage II, was conducted using technical, economic and environmental criteria. One of the important elements in the feasibility analysis was the P2 hierarchy which emphasizes avoidance or elimination of pollutants. The order of the P2 hierarchy as presented in BC Environment's draft Guide to Preparing a P2 Plan, is as follows:

- avoidance, elimination, or substitution of polluting products;
- reduction in the use of polluting products;
- elimination of, and reduction in, the generation of polluting by-products;
- reuse and recycling of polluting by-products;
- energy recovery of polluting by-products;
- treatment or containment of polluting residuals; and
- remediation of contaminated sites.

1.2 COMMITTEE STRUCTURE

A Pollution Prevention Plan Steering Committee was formed to direct the P2 Planning Process. The committee was made up of:

- Spence Brigden, Regional Director, Northern Region, RFP
- Richard Crowell, Manager, Williams Lake Mill, RFP
- Gurbux Saini, Human Resource Manager, Williams Lake Mill, RFP (retired)
- Robert Rogerson, Environmental Coordinator, RFP
- Andrew Green, Environment Canada
- Graeme Bethell, Reid Crowther (consultant to Riverside)
- Allan Gartner, Reid Crowther

A public advisory committee was also formed to provide input into the planning process. The role of the public committee was to:

- Identify and present the interests and concerns of the community;
- Assist in preparation and endorse the Terms of Reference, work plans, and the communication plan;
- Assist in identifying P2 opportunities, P2 options and emission targets and objectives; and
- Review draft reports that arise throughout the process.

The PAC consisted of:

- Ray K. Woods, City of Williams Lake
- Joy Hennig, Chamber of Commerce
- M.E. (Monty) Exton, Williams Lake resident
- Rick Gertzen, Mill Employee Representative
- Geoff Goodall, Williams Lake Rotary Club
- Lynda Wilson, University Collage of the Cariboo
- William (Bill) Philips, William Lakes resident
- Rose Soneff, Williams Lake Environmental Society
- Gary Crosina, Tribune News
- Nancy Sandy, Williams Lake Indian Band
- John Wolberg, Cariboo Regional District

1.3 ENVIRONMENTAL CONDITIONS

1.3.1 Adjacent Land Use

The Mill property as well as the areas south and east of it are zoned for general industrial use and contain a variety of commercial operations including Lignum Forest Products adjacent to and south of Riverside. To the west is a municipal golf course and a residential neighbourhood. A residential neighbourhood and the City's business district are located to the north east across Williams Lake River. The land directly north of the Mill is Crown Land which is mostly undeveloped.

1.3.2 Climate

The prevailing wind direction in fall, winter and spring is from the southeast up the Williams Lake River Valley and across the mill site. Winds from the northwest are common in the summer and blow across the mill down the valley towards commercial and residential areas of the town. The winds tend to be calm 25% of the time. During the summer the daily pattern appears to be easterly in the early morning shifting to westerly by mid morning. Wind speeds generally peak in the late afternoon after maximum solar heating causing wind blown dust to impact the downtown core and residential neighbourhoods.

During the cooler seasons an inversion is typically created in the valley over the town. The inversions may not break during the day consequently there is a reduction in valley

air mixing and a potential for air emissions to build up periodically. Air quality monitoring by BC Environment has shown that air emissions have decreased since the early 1990's.

1.3.3 Soils and Topography

The Mill site can be described as being located in a large meltwater or outwash river channel and is bounded by cutbanks and terraces. Outside of the river channel the topography can be generally described as gently to moderately rolling slopes of approximately 5% - 15%. In general, the soils of the Williams Lake area are loamy with a morainal or till blanket. The area is moderately well drained. That is, the soil moisture in excess of the field capacity only remains for a short period during the spring runoff period.

1.3.4 Water Resources

Williams Lake River is approximately 12 km in length and drains Williams Lake into the Fraser River. The Fraser River flows south ultimately entering the Pacific Ocean at Vancouver. Williams Lake itself is approximately 12 km long and 1 km wide. William's Lake receives flows from Asahal Creek from the north, and the San Jose River from the east. In addition there are at least four small unnamed creeks flowing into the lake. The drainage area into the lake is approximately 2,240 km^2.

The water quality of Williams Lake is poor and in need of improvement. The lake is classified as eutrophic, that is, rich in nutrients and it tends to produce excessive algal growth. The main source of nutrients into Williams Lake is suspected to be due to ranching operations along the San Jose River, east of Williams Lake.

Fisheries resources include rainbow trout, Coho and Sockeye Salmon.

Impacts from the Mill on the river include siltation due to runoff from the mill property. The source of this siltation is thought to be from the log yard and from the river bank due to its unstable condition in the area of the mill.

1.3.5 Terrestrial Resources

Terrestrial resources include the riparian zone adjacent to the Mill. This area was altered during a recent river diversion to stabilize a cut bank adjacent to the Mill. It is doubtful that the diversion caused a significant loss of habitat in the riparian zone, as there is not a significant amount of high quality habitant adjacent to the Mill. Further downstream of the Mill the quality of the riparian habitat improves somewhat.

A woodwaste landfill is located approximately 5 km west of the Mill in an isolated area. Woodwaste material is typically comprised of log yard debris including; dirty hog fuel, rocks and dirt.

SECTION 2.0
COMPANY PROFILE

2.1 RIVERSIDE FORESTPRODUCTS

Riverside produces softwood lumber and plywood for the North American, European and Japanese markets. The company is one of Canada's leading producers of softwood plywood, a major producer of stud and random length lumber and the country's largest veneer manufacturer.

Riverside's forestry operations are located in the Southern Interior and Cariboo regions of British Columbia. It operates three wood processing mills in Kelowna, Armstrong and Lumby, as well as two dimension lumber mills in Williams Lake.

The company manages approximately 1,000,000 hectares of Crown forest land with an allowable annual cut of 1,900,000 m^3, making it BC's tenth largest timber tenure licensee.

2.2 WILLIAMS LAKE MILL

The mill is located within the City of Williams Lake. The mill consists of an office building, saw mill, planer mill, four drying kilns and a log yard situated on 55 acres leased from BC Rail (Figure 2.1). Current mill production is approximately 145,000 thousand foot board measure (mfbm) of kiln-dried dimension lumber.

There are 250 people working at the mill. The planer mill and the saw mill are usually run in three shifts per day of 25 and 40 persons per shift respectively.

After purchasing the mill Riverside started a multi-year, $36 million dollar modernization program. Approximately half of that program had been completed as of 1996 year end.

The beehive burner was decommissioned in 1993. Since that time hog fuel has been diverted to the North West Energy thermal-electric plant which supplies power to the BC Hydro electrical grid.

The mill's allowable cut quota is 492,000 m^3/yr green logs, 60,000 m^3/yr from the Western Area and 50,000 m^3/yr of insect infested trees giving it an annual total of 602,000m^3 logs. In addition, the company purchases logs from small forest companies

FIGURE 2.1
AREAL PHOTO
MILL SITE

Reid Crowther

to supplement its supply. Logs are hauled to the site from distances up to 300 km away. Pine constitutes the majority of the total amount harvested with spruce, fir and cedar making up the remainder.

Tree species harvested for the last two years is as follows:

Year	% SPF	% Fir	% Cedar	% Hemlock
1995	83	10	5	2
1996	93	7	0	0

SPF - Spruce, Pine, Fir; Fir - Douglas fir.

2.3 MANAGEMENT SYSTEMS

2.3.1 Regulatory and Other Requirements

Riverside holds two permits, namely PA-3679 for the discharge of air emissions from the cyclone dust collectors and PR-7206 for the disposal of wood waste to a company landfill. Currently, Riverside's Williams Lake Mill is in compliance with its permit requirements.

2.3.2 Procurement Policies

High volume items, such as oils, grease and paint, are purchased in the largest practical container sizes to minimize shipping frequency, unnecessary packaging and also to reduce costs. Containers are returned to the supplier, where possible, for reuse.

2.3.3 Operations and Maintenance

Work staff are instructed to stop their vehicle in the event of a fuel and/or oil leak and take immediate action to stop further leakage and contain/collect material which may have already spilled. Vehicles are not driven to the maintenance shop for repairs without first stopping leaks.

Engine and hydraulic leaks in the mill are repaired as soon as possible without unnecessary stoppage of production and equipment maintenance is based on the manufacturers' specifications. Items that are known to have a shorter life-time or maintenance requirements are replaced or repaired accordingly.

2.3.4 Monitoring Programs

Two 9,000 L (2,000 gallon) underground fuel storage tanks are pressure tested on a yearly basis and weekly product reconciliation summaries are prepared.

Currently, there is no requirement for air discharge monitoring by Riverside under the mill's air permit, however, BC Environment staff monitor the discharges from the kilns and the cyclones on a routine basis.

Riverside is required to conduct routine inspections of the perimeter of the landfill for evidence of leachate.

2.3.5 Emergency Prevention, Preparedness and Response Plans

Riverside prepared an emergency response plan in 1994 and have updated it recently to respond to changes that have occurred at the mill. The highest spill risk areas are the vehicle fueling areas, the bulk lubricant and wash emulsion delivery areas, lubricant tote tanks located outside of the saw mill and mobile shop and the electrical transformers located outside of the saw mill and fabrication shop.

Also in 1994, Riverside was permitted to operate a Short Term Special Waste Storage Facility limited to 7,600 kg for the storage of on-site PCBs. The PCBs have been disposed of and the site is now PCB free.

The risk of damage by an earthquake is low. The risk of fire is high due to large quantities of wood on-site. Explosions are possible through the presence of stored fuels and wood dust. In either case, there is a comprehensive fire protection system at the mill.

2.4 OPERATIONAL SYSTEMS

2.4.1 Physical Plant Infrastructures

Current Production System

Logs arriving at the mill are sorted according to species and size and stored in the log yard. The logs are fed into the mill by grapple loaders. The loaders take logs from yard storage piles and place them onto one of three log infeed decks. Logs are fed one at a time through a scanner which optimizes wood (lumber) recovery. Once the logs are bucked to the correct length they are sorted according to diameter into one of two lines for debarking. Once the logs are debarked they are again sorted by diameter and

sent to one of three production lines in the saw mill. A generalized process flow diagram is presented as Figure 2.1.

The first production line which handles large diameter logs (>10 inch diameter) consists of a single band head saw and cuts boards off the logs one at a time. The boards are trimmed and passed through a grading scanner. The second production line consists of a double length infeed and a canter running at about 390 ft/min. It handles logs between 6 to 10 inches in diameter. The cants are broken into 2-inch boards by a 10 inch double arbor gang saw. The boards are passed to an optimizing three-saw edger. The third production line handles small logs from 3 to 6 inches in diameter and consists of a double length infeed and canter with curve sawing bottom arbor gang. It runs at approximately 450 ft/min.

Once the lumber has been cut and sorted it is stored until it can be run through the kilns for drying. Riverside operates three kilns, each drying about 250,000 fbm per charge in an average run time of 32 hours. After drying, the lumber is run through the planer, graded and packaged for shipment.

The mill's woodwaste recovery system consists of two main lines. The hog line picks up all of the bark and sawdust from various machines and trucked to the North West Energy Plant. All edgings and trim ends are chipped and screened into good chips, fines, and over sized chips (overs). The overs are re-chipped and the sawdust along with the fines goes to hog. The good chips are transported via rail to a pulp mill.

Production Improvement Program

The original Mill, constructed in 1954, has undergone many improvements over the years. The current improvement program will increase the mill's production from its current capacity of 165,000 thousand board measure to approximately 200,000 mbm. The improvements completed as of 1996 have improved production by approximately 15%.

2.4.2 Material Inputs

The mill uses the following materials:

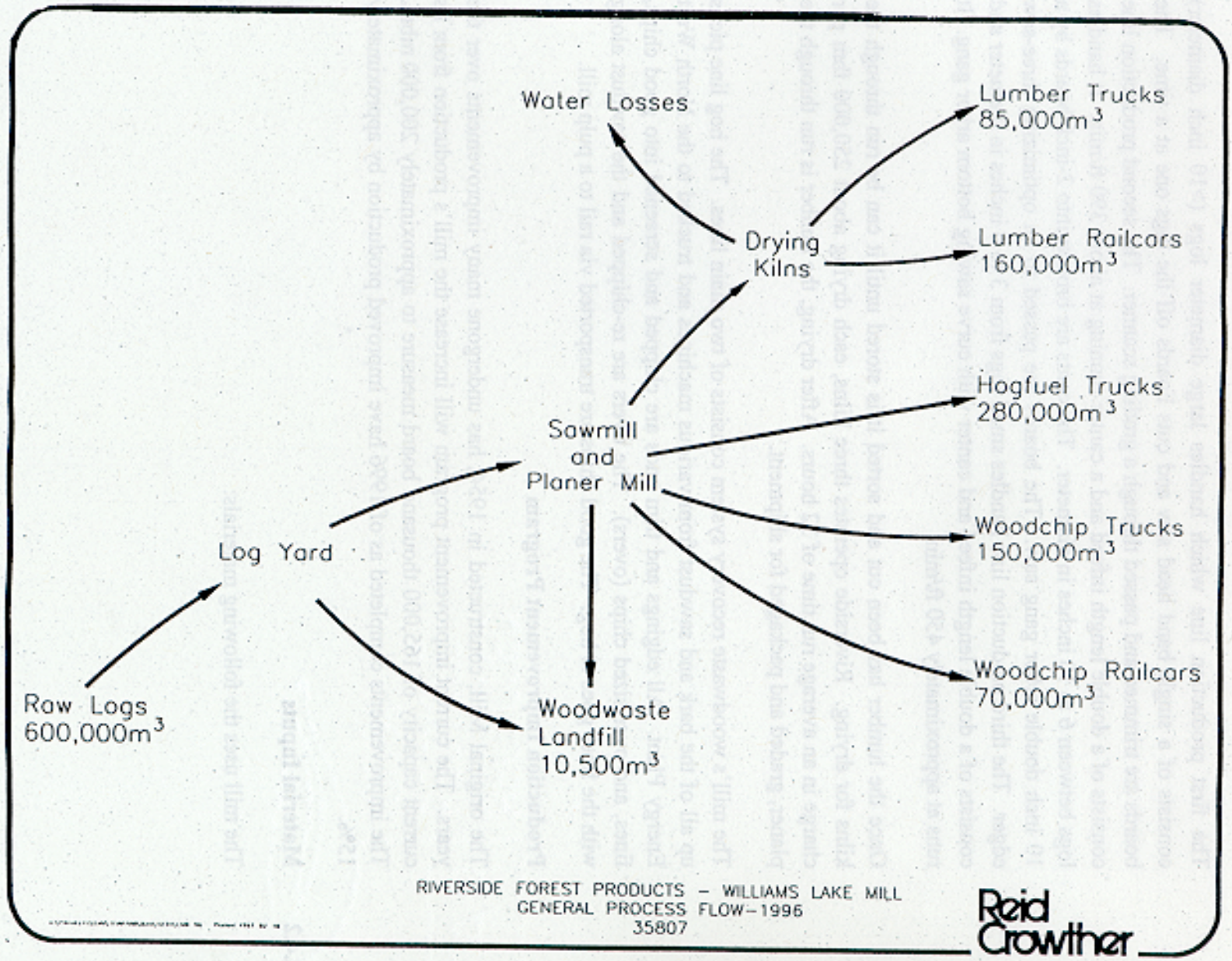
Water Losses
Lumber Trucks
85,000m3
Drying
Kilns
Lumber Railcars
160,000m3
Hogfuel Trucks
280,000m3
Sawmill
and
Planer Mill
Woodchip Trucks
150,000m3
Log Yard
Woodchip Railcars
70,000m3
Raw Logs
600,000m3
Woodwaste
Landfill
10,500m3
RIVERSIDE FOREST PRODUCTS - WILLIAMS LAKE MILL
GENERAL PROCESS FLOW-1996
35807
Reid
Crowther

FIGURE 2.2

MATERIAL	QUANTITY
Raw logs	600,000 m^3
Natural gas	4,700,000 m^3
Gasoline	36,000 L
Diesel	600,000 L
Lubricating oil	11,000 L
Hydraulic oil	7,000 L
Antifreeze	2,000 L
Paint	3,000 L
Water	unmetered

2.4.3 Production

Average yearly production, transported from the mill by truck and railcar, is as follows:

Product	Quantity mfbm/yr.	% of Total
2 x 3	3,000	1.9
2 x 4	90,000	58.5
2 x 6	32,000	20.8
2 x 8	13,000	8.5
2 x 10	11,000	7.1
2 x 12	5,000	3.2
TOTAL	154,000	100.0

The total production for the 1996 fiscal year was actually 145,000 mfbm. The 1995 production was 161,000 mfbm.

Chips : Chip production was approximately 86,000 BDUs for 1996 and 95,000 BDUs for 1995. Chips are hauled from the mill in either trucks or railcars and sold to pulp mills. The years 1995 and 1996 are considered to be “rebuilding” years in the saw mill where production was approximately 10%-12% below traditional levels.

2.4.4 Waste Materials

Waste Materials are as follows:

MATERIAL	QUANTITY	STATUS
Hog fuel to Northwest	140,000 Tonnes (approx)	Energy recovered
Dirty hog landfilled	15,000 Tonnes	landfilled waste
Septage	3,720,000 L	waste
Used oil	15,000 L	recycled
Used antifreeze	2,000 L	recycled
Used paint containers	225-5gal	landfilled waste

2.4.5 Energy

Inputs

Energy usage in 1995 and 1996 were as follows:

TYPE OF ENERGY	1995	1996
Natural Gas	4.2×10^6 m^3	4.7×10^6 m^3
Hydroelectricity	21,000 MWhr	23,000 MWhr

2.4.6 Material and Energy Losses to the Environment

Air Contaminants

The permitted air emissions are as follows:

DISCHARGE	PERMIT LEVEL	RATE	DURATION
Drying Kilns (3)	_	2,945 m^3/min.	24 hrs/D, 6 D/week
Cyclones	115 mg/m^3	2,700 m^3/min	22 hrs/D, 5 D/week
Landfill woodwaste smoke	-	-	96 hrs per burn

Site Contamination

Two fuel spills and one PCB spill which occurred between 1989 and 1995 have been cleaned up to the satisfaction of BC Environment.

SECTION 3.0
EVALUATION CRITERIA

3.1 POLLUTION PREVENTION OPPORTUNITY

A pollution prevention opportunity is a loss or potential loss of materials and/or energy to the environment, materials affecting the toxicity of the mill or a general issue affecting the community. Eighteen P2 Opportunities were identified through input from Riverside Forest Products, Environment Canada and the Public Advisory Committee. 42 P2 options were developed to address the opportunities and they were screened according to the following criteria. These P2 opportunities and options are described in Section 4.0.

3.2 POLLUTION PREVENTION OPTIONS SCREENING CRITERIA

The pollution prevention options were evaluated according to the technical, environmental and economic criteria described below. Each option was given a low, moderate or high rating (benefit or impact) and assigned a corresponding numerical rating between 1 and 5. The numerical rating enabled options to be prioritized according to their total score.

3.3 TECHNICAL CRITERIA

A. **By-product (waste) reduction:** Did the option reduce by-product output. Options that increased by-product output were not likely to be considered. Options that did not alter the by-product output rated a 1, they rated a 3 if they reduced by-product output by 50% of existing best available control technology (BACT) and 5 if they match BACT.

B. **Compatibility of new equipment or procedures:** Potential for options to improve operation of existing equipment and improve current operational procedures. Options that were not fully compatible with existing equipment/procedures rated a 1, they rated a 3 if they were fully compatible and a 5 if they improved existing equipment operations and procedures.

C. **Production flexibility:** Potential for option to increase production, service and scheduling flexibility. Options that decrease production or service flexibility rated a 1, those that maintain existing flexibility and schedules rated a 3 and those that improved flexibility and scheduling received a 5 rating.

D. **Equipment Vendors:** What level of vendor service and support was expected for new equipment installations. Options that required service and support from outside of Canada rated a 1, those that received service and support from within BC rated a 3 and those that have local service/support rated a 5.

E. **Utility modifications:** Are utility infrastructure modifications required to install and power any new equipment. Options that required utility improvements of more than $100,000 rated a 1, those that required improvements between 25,000 - $100,000 rated proportionately between 2-4 and those that required utility improvements below $25,000 rated a 5.

3.4 ENVIRONMENTAL CRITERIA

A. **P2 hierarchy:** Options that required treatment of residuals rated a 1, those that eliminate or reduced only by-product output rated a 3, and those that eliminate or reduced polluting inputs and outputs rated a 5.

B. **Government regulations:** Options that comply with current government regulations rated a 1, those that meet any proposed (anticipated) or new draft regulations and guidelines rated a 3 and those that equal BACT rated a 5. The intent is for P2 options to take companies beyond regulatory standards.

C. **Reduction of impacts on the environment:** Options that increase the risk of impacts to the environment are not likely to be considered. Options that did not alter the existing impacts on the environment rated a 1, those that reduced the risk of impacts in half rated a 3 and those that eliminated the risk of impacts rated a 5. The main factors that were assessed include total loading of air emissions, effluent discharges and leachate generation.

D. **Social concerns:** Options that did not improve specific social issues due to Mill activities (e.g. noise, dust, water quality, etc.) rated a 1, those that reduced concerns by 50% rated a 3 and those that eliminate social concerns received a 5 rating.

3.5 ECONOMIC CRITERIA

A. **Payback Period:** Options that had a payback period of more than five years rated a 1, those with payback periods between one and five rated proportionately between 2-4 and those with no cost rated a 5.

B. **Operation and Maintenance financial benefits:** Options that did not result in operational or maintenance (O&M) savings of the specific component being addressed rated a 1, those that result in O&M savings of between 1% and 4% rated between 2-4 respectively and those that result in O&M savings of more than 5% received a 5 rating.

C. **Cost of Waste Management:** Options that resulted in an added cost for waste management of more than $10,000 per year rated a 1, those options that resulted in costs between $1000 and $10,000 rated between 2-4 and those that resulted in costs of less than $1000 rated a 5.

SECTION 4.0
POLLUTION PREVENTION OPTIONS

4.1 INTRODUCTION

The following P2 opportunities and P2 options were developed through input from Riverside Forest Products, Environment Canada and the Public Advisory Committee. For organizational P2 options are categorized according to the opportunities they address.

The options were ranked according to the technical, environmental and economic criteria to evaluate their relative feasibility.

4.2 POLLUTION PREVENTION OPTIONS

4.2.1 Air

Opportunity 1 Reduce Vehicle Emissions

Vehicles used at the mill release hydrocarbon combustion products, some of which are important green house gases. The green house gases of importance at the mill include carbon dioxide and nitrous oxide. Currently there are approximately 30 vehicles used on site, including 2 letourneaus, 6 loaders, 7 forklifts and 15 pickup trucks. The majority of the vehicles burn diesel, a few of the pickups burn gasoline and 2 forklifts have been converted to burn propane.

The following P2 options are intended to reduce the hydrocarbon combustion emissions from vehicles used at the mill.

Option 1.1 - Replace of Diesel and Gasoline Vehicles with Propane Gas Vehicles

Propane is currently being used in 2 forklifts. The remaining vehicles are powered by diesel and gasoline. Some potential exists to convert these to alternative fuels such as propane. To convert to propane a full engine replacement is necessary at an estimated cost of $10,000 per forklift. The cost to convert a pickup gasoline engine to burn propane is approximately $2,000.

Although not common in the forest industry, heavy equipment (such as forklifts) which burn propane will be considered by Riverside when vehicle replacement is required. The cost of a new large diesel powered forklift is approximately $80,000, and the cost

of a new 966 loader is about $300,000. The cost for an equivalent propane powered unit is unknown. The use of propane is difficult as the nearest supplier is several kilometres from the mill. If a large scale conversion project were planned, then the supplier would be required to install a propane refueling station at the mill.

Option 1.2 - Use Electric Vehicles

Due to winter and spring climatic conditions (low temperatures, snow and rain) there is no plan to use electric vehicles at this time. Electric vehicle technology does not appear to be suitable to the site conditions (low temperatures, snow and mud) at the mill.

Option 1.3 - Use Bicycles

In regard to the use of bicycles at the mill, wet weather and snow in conjunction with dirt surfaces, make this option of limited value at this time. Bicycles are used at Riverside's Okanagan mills but this opportunity does not seem to be feasible at Williams Lake because the distances are short and people already walk, when they can, during the summer months for trips throughout the mill.

Option 1.4 - Maintain Vehicle Service Records

The existing diesel and gasoline vehicles are maintained by the staff members who use them. Typically, tune-ups and servicing are completed as needed, and as per the manufacturer's specifications.

Option 1.5 - Minimize Vehicle Use and Reduce Speed

The use of hand held radios to communicate information from one person to another has reduced the need to drive. However when personal appearance is required to deal with an issue the speed at which one drives has an effect on fuel usage and emissions. Lower speeds result in lower fuel usage and lower emissions.

Riverside reduced its onsite speed limit from 30 km/hr to 20 km/hr in 1997.

Opportunity 2 Reduce Vehicle Dust Generation

Dust is generated from incoming and outgoing transport vehicles. Currently the log yard and roads are sprayed with water on a continual basis during dry periods. In addition, calcium chloride is used on the haul roads to harden the surface on an "as needed" basis during dry periods.

Option 2.1 - Surface Access Roads and Portions of the Log Yard

Surfacing the main haul road and log yard roads would greatly reduce dust generation. Surfacing materials include asphalt and rolled compacted concrete (RCC). The main haul road would require RCC to accommodate the heavy logging trucks and log yard vehicles whereas the log yard roads could be surfaced with asphalt.

The geology of the area makes surfacing the site quite difficult as an engineered sub-base would be required. Applications of gravel have been tried in the past with little success as the fine materials eventually make their way to the surface again. The area where RCC would be required is approximately 20 m x 600 m. This option would have implications on storm water management and lower generation of wood waste.

Riverside has set the goal of surfacing the main haul road and 50% of the lumber yard and access roads by 2006.

Option 2.2 - Increase the Frequency of Dust Suppressant Applications

Currently Riverside applies potable water to the roads and log yard on a continual basis to control dust generation. As an alternative to municipal potable water use stored runoff water might be used to control dust. However, the roads need to be watered most in mid summer, when precipitation is lowest.

Recently calcium chloride ($CaCl_2$) has been applied to the main road and log yard roads twice a year by a local contractor. The first $CaCl_2$ application is approximately a 20% solution applied late May or early June followed up by a 10% application in July. There is an opportunity to increase the number of applications to reduce dust. The cost for each application is approximately $600. The environmental risk of calcium chloride is the potential for it to be washed off into Williams Lake River immediately following application. This is controlled by only applying the calcium chloride when precipitation is not expected for at least 48 hrs following application. In addition, an Ontario Ministry of Environment and Energy study found that the literature indicates that the effects of chloride applications to roads are not significant (OMEE, 1993).

Riverside has also experimented with other dust suppressants such as a petroleum based material called Enviro 2000, but this material has application problems as well as operational ones that make it a poor choice for the Williams Lake mill. The contractor is located in Kamloops and based on the poor results to-date, the mill will not use this material.

Riverside will increase the number of chloride applications starting in 1998.

Option 2.3 - Minimize Vehicle Use and Reduce Speed (see also Option 1.5)

The surficial geology of the mill site is a glacial till blanket with deposits of fine silts and clay which contributes to the problems of dust generation from incoming and outgoing transport vehicles. An immediate option is to assess the length of the trips that vehicles need to make. Retrieving logs from the back of the log yard during wet periods and from the closest part of the log yard during dry period may help reduce the amount of dust generated by limiting vehicle trip lengths wherever possible. The lowest inventory occurs during the summer months. During this period, the log yard is encouraged to dry so that it can be regraded later in the year.

Similar to the previous opportunity, vehicle use, speed and acceleration rate are also factors in dust production and the mill is continually modifying procedures to reduce dust generation in the log yard which could involve restricting the use of vehicles during extremely windy events. However, this is only possible to a limited extent and cannot be incorporated if it adversely impacts production.

Prevailing wind conditions up and down the Williams Lake River Valley compounds the vehicle dust problem. The climatic conditions of the river valley are conducive to dry summers and high winds. The entire dust issue is compounded by the presence of Highway 20 adjacent to the mill as well as other industrial operations (e.g. Lignum, CP Rail). Wind blown dust was noted by the Public Advisory Committee as a major concern for the area.

Option 2.4 Stabilize Soils by Landscaping

A final option in regard to reducing dust production is to stabilize the soils by hydroseeding or revegetating any unused portions of the roads and log yards. Another suggestion would be to plant trees around the perimeter of the site, along the boundary of the log yard by the golf course, and along the top of the river bank. The trees could serve several purposes such as to act as a wind break (for dust control), to stabilize the river bank, and to act as a visual screen for log yard activities.

Riverside will begin some landscaping in 1998, and continue on an ongoing basis.

Opportunity 3 Reduce Dust Emissions from the Cyclones

Option 3.1 - Operational Review of Cyclones

Currently Riverside's BC Ministry of Environment, Lands and Parks air emission permit allows four cyclones to discharge 115 mg/m^3 of particulates. Although currently within compliance, an assessment of the cyclones was completed in 1997 an effort to optimize performance.

Option 3.2 - Install New Cyclones

The following cyclones are in operation at the mill:

Planer Mill - One low pressure cyclone is in use for chipper fines and one high pressure cyclone is in use on the chip supply line. The chipper fines cyclone is planned to be moved outside of the planer building due to increasing space demands. The cyclone is approximately 15 years old and at this time it is not expected that it will require replacement or upgrading. A new dust collection system for the chipper would cost approximately $150,000.

Saw Mill - One low pressure cyclone is in use on the blown shavings from the planer mill, and one low pressure cyclone is in use for the sawmill dust.

At this time the performance of the cyclones is not a concern to the Ministry. The saw mill dust cyclone is in good working order. We have no data to evaluate the cyclone efficiencies. Cyclones can typically remove up to 95% of the particulate from the waste stream. To increase the percent removal would require the addition of a baghouse dust collector. A new baghouse for the sawmill cyclone would cost approximately $200,000.

Due to the large quantities of fine particulates generated, fire and/or explosion would be major concerns if baghouse filters were installed.

Opportunity 4 Reduce Fugitive Emissions from the Mill

Fugitive emissions are those emissions that escape from the Mill which are related to a Mill process (i.e. not ambient air exchange) and have not been treated.

Option 4.1 - Review Audit Findings

The 1997 audit made reference to fugitive emissions and was reviewed in 1997. A complete mill review could be carried out to identify additional sources to those identified in P2 Option 4.2.

Option 4.2 - Treat Fugitive Emissions

Fugitive emissions are generated from the following locations: sawmill heater stacks, chip and hog bins, wall vents in the chipper room, saw sharpening room vent and the maintenance shop grinding room. An additional source is the dust from the log debarkers.

The sawmill heater stacks are for the two natural gas fired furnaces. At this time we do not believe that any stack discharge treatment system is required here, however, optimizing the efficiency of natural gas combustion and proper temperature control will reduce the emissions.

Fugitive emissions from the chip and hog bins have been greatly reduced as the bins have been replaced by rail car and truck loading facilities. A form of dust control could be to use a flexible curtain around the bottom of the loading pipes to reduce the amount of dust generated when loading the rail cars or trucks. This would be a passive control system which could cost $10,000 in materials to construct.

The saw sharpening room filing exhaust vent and the maintenance shop grinding room exhaust vent have not been addressed at this time. A possibility for treatment is to install small baghouse dust collectors on each of these emission points. Estimated costs for these items could be in the order of $65,000 to 85,000.

There does not appear to be any method to reduce the amount of dust generated by the log debarkers, however, there may be better methods available to collect the dust that is produced and direct it to the hog bin.

Riverside has committed to treat fugitive emissions from chip and hog bins, the chipper room wall vent, the saw sharpening vent, and the maintenance grinding shop vent by 1999.

Opportunity 5 Reduce Smoke from the Wood Waste Landfill

The options for reducing smoke from the landfill and for reducing the total amount of material landfilled (P2 Opportunity 8.0) are closely related and are discussed in this section.

The landfill is run jointly between Riverside and the Lignum Mill and is divided into four operational areas as follows:

- an area which receives snow and mud from the mill;
- an area for metal bandings and other steel from the mills;
- an area where waste wood material is burned; and
- an area where wood waste is buried.

The opportunity is to increase the recovery of wood from the waste stream thereby increasing the amount of wood which can be used for either chips or hog and reducing the amount sent to the landfill. Side benefits include reduction in smoke from burning at the landfill through reduced quantity and reduced number of burns, reduction in

number of truck trips to the landfill thus reducing vehicle combustion emissions and reduction in the volume of material landfilled. Longer, hotter burns at the landfill are not permitted as the maximum burn length is 96 hrs.

Landfill Burns: Currently, Riverside is permitted to burn 120 m^3 of wood waste six times per year but actually only burns four times per year. Prior to burning Riverside staff inform BC Ministry of Environment, Lands and Parks and obtain the venting index for the area. The venting index indicates the climatic conditions so that the impacts of the smoke are minimized.

Metal Recycling: Riverside has recently purchased a chop saw to cut up the metal banding which is then picked up and recycled rather than being hauled to the landfill.

Option 5.1 - Separate Materials in Waste Wood Piles

Separating the component materials prior to hauling the residuals to the landfill could reduce transportation costs. Options for separating the materials using differences in weight or density include screens and vibrating belts, water baths to float off wood components, air streams. A water bath separation system is not feasible due to freezing problems for approximately 6 months per year.

An air separation system could separate the waste stream into large wood pieces, granular material and a mixture of fine wood pieces, sand and gravel. Once separated, the wood material would need to be further processed so that it could be used. This would require a new drum chipper and an infeed system. The estimated cost for a log yard wood waste separation system and a new drum chipper with an infeed is approximately $1,000,000. An alternative to constructing these systems on site would be to haul the material to the Soda Creek division where there is a system to recycle this material.

The Riverside Armstrong Mill is currently investigating the feasibility and application of a separation system which includes two scalping screens, an infeed hopper, a separator and conveyor for a cost of $460,000.

Of the three product streams that could be produced from the wood waste, the wood portion could be further separated into white wood and bark which would either be chipped and sent to a pulp mill or hogged and sent to the North West energy plant. The separated coarse granular material could be reused on site in the log yard or on the roads. The remaining fraction of fines would have to be sent to the wood waste landfill.

The existing management system at the landfill involves separation of some combustible material and storage on site until it is permitted to be burned. Depending on the quality of this material it could also be hauled back to the Mill, hogged and sent to the North West Energy Plant for energy production. Trucks currently return from the wood waste landfill empty, therefore filling a truck with waste wood would not be an additional expense in terms of time spent and transportation costs.

Riverside determined that the P2 options listed in Option 5.1 were not feasible.

Option 5.2 - Compost Wood Materials

Composting of wood material is common in larger centres, however, there may be a small market for wood compost in the Williams Lake area. Composting wood waste requires a source of nitrogen (e.g. sewage sludge) to be added. The City of Kelowna sells a composted sludge/wood waste material as "Ogo-grow" for $8-10 per cubic metre.

Option 5.3 - Reduce Log Handling

Every time a log is moved there is the potential for bits of bark and wood to break off. Therefore, reducing the number of times a log is handled will help reduce the amount of wood broken off in the log yard. This issue has already been addressed by banding the logs with metal bands. The bundles are moved from the logging trucks to a storage location using a 50 ton letourneau and stacked three deep. When required, the bundles are lifted again and delivered to the log deck area, where the band is removed and the logs fed individually onto the log deck. For a log on the outside of the bundles the number of times it could be in contact with a metal arm of the letourneau is three. Logs in the middle of the bundled may only be handled once, when they are fed into the log deck. At this time we do not see a feasible way to reduce the number of times each log is handled.

However, during times of the year when inventory is high, logs are stored off site. This adds additional handling events as the log bundles are moved on and off the trucks more than once and thereby increasing the potential for loose bark and wood to fall off in the log yard. In order to minimize or possibly eliminate the extra handling events, Riverside has purchased a new 60 ton letourneau which can stack the bundles four high thereby increasing the storage volume of the log yard.

As outlined previously, the landfilled material is a combination of organic material (wood waste) and inorganic material (rocks and debris). On average 12 trucks per day (15 m^3 per truck) haul material to the wood waste landfill. The organic portion of the material appears to be in the range of 5-25 % of the total volume.

Opportunity 6 Reduce Drying Kiln Emissions

The three drying kilns represent the largest source of air emissions from the Mill. The majority of the emissions are due to the combustion of natural gas. Low levels of volatile organic compounds (VOC) are also released from the wood during kiln drying.

The three kilns use approximately 13-15 x 10^6 BTU of natural gas per year. Optimizing burner efficiency and insulation of the kiln would decrease the BTU/mbfm to dry the wood. This would minimize emissions and reduce natural gas costs.

There has not been an audit of the kilns to determine air leaks or areas of heat loss, however, the kilns are maintained on a continual basis. The three kilns are approximately 5, 10 and 20 years old.

Emissions from the kilns other than hydrocarbon combustion products include water vapour and low levels of volatile organic compounds (VOCs). The major component of VOCs are monoterpenes. Approximately 90% of the monoterpenes are alpha and beta pinenes. Research has shown that VOCs are produced at levels of approximately 2 kg /mbf of dimension lumber dried under conventional conditions. At this time the VOCs are not included in the mill's air discharge permit.

Option 6.1 - Upgrade Kiln

In drying wood, the duration and temperature of the drying period are important to achieve the desired product quality. A temperature of approximately 80^{o}C must be maintained for 16 hours. After the drying period, the kilns are allowed to cool in order condition the wood. There is not a significant loss of heat as a charge of lumber is exchanged. A heat curtain or enclosure outside of the doors might be able to help retain heat inside the kilns, however, due to the cooling process, at best this could only be helpful during the winter months.

The cost of upgrading the dryers in order to increase their heat capacity is unknown and may not be an efficient use of funds. The cost of a new dryer can range from approximately $250,000 to $900,000.

Kiln maintenance is ongoing

Option 6.2 - Change Kiln Operations

A moisture detector could be used on the lumber prior to drying to determine those pieces which have already dried sufficiently. The pieces of lumber already dried to at

least 16% could be picked out and not dried in the kilns. Lumber dried in the kilns is acceptable as long as the moisture content is less than 19%.

Riverside plans some operational changes in 1999.

4.2.2 Land

Opportunity 7 Reduce Risk of Subsurface Soil Contamination

Currently there are two 9,000 L underground fuel (diesel and gasoline) storage tanks (USTs) on-site near the maintenance garage. Although these tanks are annually pressure tested and product summaries are completed, the potential for undetected underground fuel leaks exists. A third (3,200 L) tank, located adjacent to the sawmill, is used to contain oily blowdown water from the compressor. It too could leak.

Option 7.1 - Replace USTs with ASTs

Riverside has recently authorized a budget to replace the two underground fuel storage tanks (USTs) with above ground double walled tanks (ASTs) in 1998. The double walled tanks will have a vacuum between the walls. The vacuum will fluctuate with daily heating and cooling, however, a loss of vacuum could indicate a leak in the double wall of the tank. The tanks will need to be protected from accidental vehicle collisions by the installation of bollards or barriers around the tanks.

During the excavation of the underground tanks, soil samples will be retrieved and analyzed for hydrocarbon contamination. If hydrocarbons are encountered in the tank holes the soil will be remediated according to provincial regulations.

Compressor Oil Tank Replacement: There is an UST which collects oily blow down water from the main compressor in the saw mill. This UST could also be replaced with an above ground tank. The age and status of the UST is unknown at this time. If this tank is not replaced in the near future, wells should be installed for routine monitoring to determine any impacts due to tank leakage. An important requirement of a new aboveground storage tank (AST) will be that it not freeze during the winter.

Riverside will replace this UST with an AST in 1998.

A 45 L pail is used to contain blow down water from the saw mill compressor in the planer mill. When the pail is full, oil is skimmed off the top and the water is dumped into the mill waste water tanks.

Option 7.2 - Install Monitoring Wells

The installation of monitoring wells is used as a management tool providing an early warning system to detect sub-surface contaminant migration. With the mill prepared to replace the underground fuel tanks and compressor blow-down tank with above ground tanks the installation of monitoring wells is unnecessary.

Option 7.3 - Product Reconciliation

Fuel reconciliation is currently carried out on a weekly basis to account for usage. However, the reconciliation is not tied to the amount of fuel purchased. Making this connection would provide a better account of where fuel is being used and a better tool to account for leakages and spills.

Riverside plans to improve their product reconciliation procedures in 1998.

Opportunity 8 Reduce Volume of Material Landfilled

Bark and wood waste can be contaminated with rocks, dirt and debris in the log yard. Once contaminated, this material is no longer suitable for use as hog fuel at Northwest Energy's co-generation facility and, as such, is landfilled at Riverside's wood waste landfill. As noted previously this opportunity is closely related to Opportunity 5 (reduction of smoke from burning waste wood).

Option 8.1 - Wood Separation System (see Option 5.1)

Riverside researched wood separation systems for their Armstrong Mill in the Okanogan and determined that the most cost effective system was for an air separation system, however, the cost for such a system is in the order of $460,000. Such a system is not economically feasible for the Williams Lake mill.

Option 8.2 - Reduced Log Handling (see Option 5.3)

Log handling has been reduced by purchasing specialized equipment in 1997. No further action will be taken for this P2 option.

Option 8.3 - Surfacing the Log Yard (see Option 2.1)

Reducing the inorganic component (rocks and dirt) of the waste wood stream could be achieved by surfacing the log yard. A surfaced log yard would reduce the amount of rocks and dirt from being collected along with the waste wood. If cleaner, the waste wood could then be collected in the log yard and sent either to the hog stream or to chipping. A gravel compacted base in the log yard would not be as attractive as a hard

surface because gravel would contaminate the wood waste. Installing asphalt or rolled compacted concrete (RCC) surfacing would require significant sub-base preparation. The cost of the sub-base preparation is difficult to assess without a geotechnical report. The cost of an asphalt surface is approximately $\$15/m^2$ while the cost for RCC is approximately $\$35/m^2$. RCC lasts longer than asphalt under heavy vehicle loads.

Option 8.4 - Halt Unauthorized Dumping at the Landfill

Occasionally, unauthorized materials are dumped at the landfill by others. These actions can cause problems for Riverside if the materials are hazardous or restricted. A gate or fence to restrict unauthorized dumping could control this practice and will be installed in 1998.

4.2.3 Water

Opportunity 9 Improve Site Drainage

A large portion of the surface water flowing off the Mill property originates from off-site sources such as the Lignum Mill and the Williams Lake Golf Course. Williams Lake River is the ultimate receptor for all surface water run off in the area including potential contaminants and sediments from the mill site. In addition, there is obvious and considerable erosion occurring in the log yard ravine which flows into Williams Lake River. During high flow periods, materials may be washed into the river.

Option 9.1 - Develop a Stormwater Management Plan

A storm water management plan detailing the locations of culverts, catch basins, and ditches could be completed. The plan should include runoff management and include the neighbouring properties that contribute to the total flow.

Water from off-site sources could be directed around or through the mill property via culverts or ditches without mixing with the surface water produced on-site. There have been numerous previous attempts to deal with this issue, however, a comprehensive drainage plan has not yet been established. The fees for a designed drainage plan could be in the range of $15,000.

Riverside will prepare a stormwater management plan in 1998.

Option 9.2 - Develop a Water Re-Use Plan

In order to minimize the amount of water running through the site, surface water could be captured and stored. The water quality could be improved (i.e. reduced suspended solids) while stored, after which it could be discharged to the river or re-used on site. On site re-use could include road and log yard dust suppression.

The use of storm water is recommended. A possible location of a detention pond is the area of the meander of the Williams Lake River adjacent to the mill which was part of the river diversion project. This is a low flat area which already has a high bank on one side. The pond could be used to accept all of the surface water flow from the property. The large solids could settle out in the pond and aquatic vegetation could be encouraged to grow in it. Water could be used for road and log yard dust suppression during the summer. Excess water could be discharged to Williams Lake River.

Riverside will commence construction of a detention pond(s) in 1998.

Option 9.3 - Reduce Flows Through the Ravine

At this time, the majority of the flow through the culvert is from the Golf Course. Golf course maintenance staff could be encouraged to minimize flows through this culvert.

As a point source concern which could be addressed with or without a formal drainage plan, the flow from the golf course should not be allowed through Riverside's property. This water is the property of the golf course and should be dealt with by it. A partnership could be arranged whereby the drainage is directed back through the mill site to discharge to the river at a lower elevation. The existing discharge point (log yard culvert) is not stable and will continue to erode the ravine back into the log yard. The golf course runoff could also be discharged slowly in order to help reduce the erosion.

Riverside will attempt to initiate discussions with the golf course in 1998.

Option 9.4 - Upgrade Culvert to Reduce Ravine Erosion

There are several alternatives for reducing the potential for erosion below the log yard culvert. A reclamation plan could be designed with the objective of stabilizing the drainage channel and surrounding ravine bank. There may also be an opportunity to regain some of the lost log yard storage area through such a program.

Riverside will prepare designs to upgrade the culvert in 1998.

Opportunity 10 Reduce Risk for Contamination of Runoff Water

Due to the nature of Mill activities, hydrocarbons and other hazardous materials can be spilled and leaked on the site. Surface water may pick up these materials from the Mill site before it runs off ultimately ending up in Williams Lake River.

Option 10.1 - Assess Effectiveness of Existing Oil/Water Separators

As part of the drainage study, a closer examination of the existing oil water separators will be completed in 1998. The oil-water separators may be undersized. Surface water and surface soils could become contaminated from oil, diesel or gasoline spills at the refueling area. Installation of a concrete pad, catchment area and an oil/water separator could reduce the potential for contamination.

Option 10.2 - Minimize Lubricant Oil Use

Due to the high volume of lubricating oils used at the Mill there is a potential for soil and surface water contamination from leaks or spills. Minimizing lubricant use could reduce this risk.

The mill recently undertook a review of maintenance procedures to address engine and equipment leaks. The results have reduced lube oil usage by 25%. The mill will continue to improve its maintenance program.

Option 10.3 - Install Oil/Water Separators at the Refueling Area

The 1997 audit recommended that oil/water separators be installed at the refueling station. This recommendation will be implemented to provide better protection to the receiving environment. Construction is scheduled for 1998.

Option 10.4 - Substitute with Biodegradable Supplies

Due to the nature of mill activities there are a number of hazardous materials used on site such as oils, fuels, paints, solvents, greases, etc. In order to reduce the risk for hydrocarbon contamination of surface water runoff, prevention of spills should be the first priority. The existing oil storage tanks are good examples. The tanks are filled in bulk. There is no need to use “shop pails” as oils lines run through the Mill to the point of use.

Occasionally small spill and leaks occur. Hazardous materials could be replaced by biodegradable materials wherever possible. One example is the use of biodegradable lubricating oils. Unfortunately biodegradable oils are not available for all oil types and they are more expensive.

Riverside will research biodegradable oils in 1998.

Option 10.5 - Remove Old Equipment

As part of the on-going Mill upgrade program, pieces of equipment and construction materials are stored in the "bone yard". The concern is that some of the equipment, in particular gear boxes, have the potential to leak lubricating oil. These materials could be either disposed of or recycled as soon as possible after they are removed from service. Old equipment currently on-site could be drained of its oil and removed immediately.

Riverside cleaned up the bone yard in 1997.

Opportunity 11 Reduce Risk of Groundwater Contamination

Groundwater may become contaminated from Mill activities such as leaking underground storage tanks or landfill leachate generation.

Option 11.1 - Replace USTs with ASTs

The primary risk of groundwater contamination is due to the presence of underground storage tanks (USTs). The underground fuel storage tanks will be replaced in 1998. The underground compressor oily water blow-down storage tank will also be replaced in 1998.

Option 11.2 - Reduced Risk of Leachate Generation

Leachate from the wood waste landfill is another potential source of contamination. Leachate could be minimized through an engineered closure program at the landfill. This would include an impervious cover layer, surface slope to promote surface water runoff and the presence of vegetation which utilizes water in the soil. Finished parts of the landfill were covered in 1997.

Currently, B.C. Ministry of Environment, Lands and Parks staff have little concern with the activities at the wood waste landfills. We have no data at this time regarding leachate production from either the old or current landfills. Additionally, we are unaware of any receptor which could be impacted in the area down gradient of either landfill.

Limiting unauthorized dumping of materials at the landfill would minimize the risks associated with landfilling hazardous materials which could adversely impact the groundwater (see Option 8.4).

Opportunity 12 Improve Sewage Disposal System

There are a number of underground sewage storage tanks and possibly more than one former septic field on-site. The tanks are routinely pumped out by a local contractor who hauls the sewage to the municipal treatment facilities. There is the possibility that former septic fields or sewage tanks may leak and/or spill, ultimately impacting Williams Lake River.

Option 12.1 - Connect to Municipal Sewer System

The Riverside office building and the Lignum Mill are currently on line with the municipal sewer. Thus connection to the municipal sewer system is feasible.

An economic analysis comparing the capital cost for construction of a sewer line plus yearly usage charges compared to the yearly cost for pump out will determine whether or not a sewer line is economically feasible. Currently, the pump-out contractor visits the Mill approximately 13 times per month at a cost of $2,730/month. The City of Williams Lake sewer use fees would be approximately $600/month.

Environmental factors which should be considered with these options are that the existing holding tanks have a service lifespan before they require replacement. After that time the tanks may begin leaking. Also the risk of an accident or spill during the pump out process could result in discharge of raw sewage into the groundwater or to the River.

The cost for installation of a sewer line (e.g. 200 mm) is approximately $100/m. In addition, manholes are required every 100 m at a cost of $2,000/manhole. The closest manhole for a connection is at the bridge crossing, 200m east of the mill. In addition there may be as much as 100m of on-site piping required to connect the existing drain pipes to the municipal system.

Riverside will connect to the municipal sewage system with construction taking place in 1998.

Opportunity 13 Reduce Risk of Hydrocarbon Contamination from Truck Wash

Surface water and/or groundwater contamination at the truck wash down is possible as oil, grease and fuel are routinely washed off vehicles.

Option 13.1 - Install Oil/Water/Sediment Separator

Surface water and/or groundwater contamination at the truck wash area could be reduced through installation of a concrete pad, catchment area and an oil-water-sediment separator. The contaminants of concern are oils/grease, fuel and siltation. At a minimum an oil/water separator with coalescing plates could be installed. The cost for a 2,700 L ConCast oil/water separator is approximately $30,000.

Riverside will install an oil/water/sediment separator in 1998.

Option 13.2 - Reduce Vehicle Wash Intervals

There are only 8 to 10 vehicles which require washing, including the letourneaus and the 966 loaders. They are washed approximately once every week as needed for maintenance and servicing. An off site vehicle wash is not feasible as these vehicles are not licensed to leave the site.

Reducing vehicle washing intervals is not practical.

4.2.4 Energy

Opportunity 14 Improve Energy Efficiency

Due to the nature of sawmill operations, the Mill uses a considerable amount of energy and the mill could optimize this use.

Option 14.1 - Conduct Energy Audit

The Williams Lake Mill has recently undergone major energy conservation improvements coincidentally with its upgrading program and improvements made to its electrical and mechanical systems. These include high energy efficiency lighting, cycloidal or helical gear boxes, variable volume pressure compensating pumps and frequency drives versus hydraulic drives for variable speed pumps.

Directional heaters are used in the work area to heat the workers as opposed to heating the entire building. There is no waste heat generated at the mill that could be used for space heating, however, the winter climate dictates that a certain amount of space heating occur to make the mill bearable to work in.

At present there is very little, in terms of upgrades, that can be done to achieve a significant reduction in energy usage. Thus there are no P2 actions identified herein that could be implemented for this option.

Riverside will confirm these findings with an energy audit in 1999.

4.2.5 Environmental Management

Opportunity 15 Reduce Noise Level Impacts

The Public Advisory Committee raised concerns about noise levels at the mill. Examples of "noise" included: shift whistles (especially on the weekends), loud "bangs" (especially at night), and chip blower and conveyor generated noise. There are a number of industrial activities that occur in the neighborhood around the Mill which may contribute to the noise issue. Some of the noises may not be related to Riverside's activities.

Option 15.1 - Conduct Noise Audit

Due to the proximity of other industrial activities including rail traffic in the area it is difficult to determine any other point sources of noise from the mill. A mill noise audit may not give any more information due to activities from these other sources. However, Riverside and Lignum shut down on different days so an audit may be able to distinguish some noises generated by each mill.

Riverside will survey noise levels around the mill in 1998 and repeat the survey every three years.

Option 15.2 - Improve Chip Blower Operation

There are a number of noise issues that could be addressed through operational procedures. The problem of chip pipes running with no chips appears to be an issue of responsibility. Who ever turns on the blowers for the chip pipes to move chips should be responsible to turn them off when empty. This appears to be the largest item of concern to the Public Advisory Committee and would have little or no financial cost to implement.

Riverside implemented this change in 1997.

Option 15.3- Eliminate Outside Mill Shift Whistles

The issue of loud shift whistles can also be easily remedied. The existing whistles are old style mechanical ones. These whistles could be replaced with whistles with an adjustable intensity and duration. There may also be procedural methods to replace whistles. Many of the mill employees carry two-way radios and are in communication with supervisors and foremen. Shift changes and announcements can be broadcast over

the radios. Flashing lights could be used to signal coffee and lunch breaks. The radios cost approximately $1,500 per unit.

Outdoor shift whistles were eliminated in 1997.

Option 15.4 - Reduce Chain Conveyor Noise

An additional source of noise is chain conveyors. Steel chains rub against the steel return troughs. The smaller troughs could be lined with ultra high molecular weight (UHMW) plastic at a cost of approximately $20,000. The main trough could have a water drip lubrication system installed to minimize noise.

Riverside will make this change in 1998.

Option 15.5 - Investigate Alternatives to Vehicle Reverse Beepers

Reverse beepers are another sound which travels off the mill site. The beepers are required as part of Workers Compensation Board (WCB) Regulations. However, motion detectors can be installed with the beepers so that they will only be on if someone is working behind a truck.. We are unaware if this system is allowed under the WCB. It could be researched if this issue continues to affect the outside community.

Riverside will contact WCB in 1998.

Opportunity 16 Reduce Risk of Spills

Minimize risk of hazardous material spills. Conduct a risk analysis to identify the potential and consequences of spills and develop a spill response plan accordingly.

Option 16.1 - Centralize Storage of Hazardous Materials

The sawmill currently has a system that centralizes lubricating oils in tanks with spill containment. Oil is pumped to areas throughout the mill where it is required. Flow sensitive shut off valves are used to minimize product loss if a line breaks. Riverside intends to expand this central storage area and hydraulic delivery line system so that it can remove all 45 gallon barrels of oil from the mill.

Currently there are two types of oil stored in 20 barrels throughout the site. The centralized storage system could cost between $25,000-$50,000 to upgrade it to deliver oil to all parts of the mill. All hydraulic units in the mill have been equipped with drip pans.

There may also be an opportunity to centralize paint storage and handling.

The intent of these options is to develop one or more highly controlled areas for hazardous products and wastes. This reduces the opportunity for uncontrolled spills to occur on the site. This centralized area could also be used to "break down" products from larger volume containers into "daily use" containers for use throughout the mill as required. This would be for any products that cannot be economically purchased in smaller containers or for which empty containers pose an environmental management issue.

Riverside will design a centralized storage system in 1999.

Option 16.2 - Implement Hazardous Materials Inventory Tracking System (see also Option 7.3)

The inventory tracking system could be updated to include all potentially hazardous chemicals and products used on-site, and to clearly show usage as well as amounts in stock. All materials at the Mill could be analyzed to determine if they still need to be used (e.g. do all pallets of wood need to be stencil painted?). Materials stored at the mill without a necessary use should be disposed of appropriately.

It is also suggested that coordination with other mills be increased so that similar procedures are in place throughout Riverside's operations. As part of this review, a "just-in-time" approach could be adopted to minimize quantities kept on-site.

Riverside will implement a hazardous materials inventory tracking system in 1998.

Option 16.3 - Update Spill Response Plan

Riverside currently has a procedures document that identifies training requirements for key staff having environmental responsibilities including emergency spill response. This document could be routinely updated and the spill response section could be based on a risk analysis approach. Additionally, individuals could be provided with regular training courses so that their knowledge is kept current. This would cover such topics as WHMIS, emergency spill response and environmental sampling.

In addition to the spill response plan an environmental procedures manual could be developed to outline approved procedures for handling hazardous materials (such as fuels, oils, grease, paints and solvents) and to also identify training requirements for staff having environmental responsibilities.

Riverside will update their spill response plan in 1998.

Opportunity 17 Environmental Management

Option 17.1 - Environmental Management System

An environmental management system (EMS) could be developed to manage the mill's environmental responsibilities. This environmental management system could be structured around the activities of the mill and would include a system that identifies B.C. Ministry of Environment, Lands and Parks reporting requirements. In addition, it could also facilitate ISO 14000 certification if required in the future.

An EMS plan will be developed in 1998.

Option 17.2 - Environmental Training

A central component of an EMS could be environmental training and an important element in P2 planning is solicitation of ideas from employees. To optimize this potential, employees could receive P2 planning training to teach them what to look for regarding pollution prevention. It is likely that staff who intimately know specific mill areas could offer valuable suggestions to improve efficiency and reduce waste.

Pollution prevention ideas will be solicited in 1998.

Opportunity 18 Community Environmental Issues

There are environmental issues that are community based and not the sole responsibility of Riverside. Industrial noise, road dust and stormwater management are a few of the issues in this category. The surrounding industries, including Lignum Forest Products, BC Rail, Westech, also contribute to these issues.

Option 18.1 - Environmental Forum

Addressing these issues on the mill site only would result in little improvement on the overall environmental and social impacts within Williams Lake. Their resolution require a community based management approach. Riverside could organize a forum to review and address these issues.

This was determined to be not feasible.

Option 18.2 - Education and Communication

Riverside publishes a News Letter of company activities including their participation and commitment to pollution prevention. This News Letter is available to all employees and community residents.

Riverside also participates in the Williams Lake Fall Fair with a booth display of its activities including its pollution prevention program.

SECTION 5.0
POLLUTION PREVENTION PLAN

5.1 IMPLEMENTATION SCHEDULE

The pollution prevention plan was developed primarily for implementation over the next five years, however, some projects were scheduled over a ten year period. These actions will be re-evaluated in 2001 and assessed as to whether the implementation schedule remains accurate at that time.

A number of options were deemed to be "not feasible" and were rejected from the plan. The rationale for their rejection included their being unnecessary, impractical or that they appeared to lack both environmental and technical benefits for the mill. The rejected options are listed in Section 5.3 and can be re-evaluated in the future to determine their feasibility at that time.

5.2 POLLUTION PREVENTION ACTIONS

The P2 options that will be implemented over the next five years are called P2 actions. A P2 action is a P2 option that has been selected for implementation and assigned a completion date and responsibility center (with a project manager).

A summary of the pollution prevention plan is laid out in Table 5.1:

Table 5.1 Pollution Prevention Actions

Opportunity #1	**Reduce vehicle emissions**	
Option 1.1	Replace diesel and gasoline powered vehicles with propane vehicles	Some replaced by 1999
Option 1.2	Use electric vehicles	Rejected due to site conditions
Option 1.3	Use bicycles	Rejected due to site conditions
Option 1.4	Maintain vehicle service records	Implemented 1997
Option 1.5	Minimize vehicle use and reduce speeds	Speed reduced 1997
Opportunity #2	**Reduce vehicle dust generation**	
Option 2.1	Surface roads and portions of log yard	Surface main haul road and 50% of log yard by 2006
Option 2.2	Increase the frequency of dust suppressant applications	Increase CaCl applications in 1998
Option 2.3	Minimize vehicle use and reduce speed	1997 (see Option 1.5)
Option 2.4	Stabilize soil through revegetation	Landscaping 1998
Opportunity #3	**Reduce dust emissions from cyclones**	
Option 3.1	Operational review of cyclones	Implemented 1997
Option 3.2	Install new cyclones	Rejected.
Opportunity #4	**Reduce fugitive emissions from the mill**	
Option 4.1	Review audit findings	Reviewed 1997
Option 4.2	Treat fugitive emissions from chip and hog bins, chipper room wall vent, saw sharpening vent and grinding shop vent	Implement 1999
Opportunity #5	**Reduce smoke from wood waste landfill**	
Option 5.1	Separation of materials in waste wood piles	Not feasible
Option 5.2	Composting wood materials	Not feasible
Option 5.3	Reduce log handling	Purchased new letourneau 1997
Opportunity #6	**Reduce Drying kiln emissions**	
Option 6.1	Kiln upgrade - seal cracks, add insulation	Kiln maintenance ongoing - 1997
Option 6.2	Improve kiln performance through changes to kiln operations	Kiln changes 1999

Opportunity #7	**Reduce risk for subsurface soil contamination**	
Option 7.1	Replace underground fuel storage tanks with above ground double-walled tanks	Above ground tanks 1998
Option 7.2	Installation of monitoring wells	Not necessary
Option 7.3	Product reconciliation	Implement 1998
Opportunity #8	**Reduce volumes of material landfilled**	
Option 8.1	Wood separation system (cf. Option 5.1)	Not feasible
Option 8.2	Reduce log handling (cf. Option 5.3)	1997 (see Option 5.3)
Option 8.3	Surfacing the log yard	50% 2006
Option 8.4	Halt unauthorized dumping at the landfill	Install gate 1998
Opportunity #9	**Improve site drainage**	
Option 9.1	Develop a stormwater management plan	Prepare in 1998
Option 9.2	Develop a water re-use plan	Construct detention ponds 1998
Option 9.3	Reduce flows through ravine	Negotiations with golf course operators 1998
Option 9.4	Upgrade culvert to control erosion	Prepare designs in 1998
Opportunity #10	**Reduce risk for contamination of runoff water**	
Option 10.1	Assess effectiveness of existing oil/water separators	Performance review 1998
Option 10.2	Minimize lubricant use	Review use 1998
Option 10.3	Install oil/water separators at refueling area	Construction 1998
Option 10.4	Substitute with biodegradable oils	Research 1998
Option 10.5	Removal of old equipment	Cleaned up 1997
Opportunity #11	**Reduce risk for groundwater contamination**	
Option 11.1	Replace waste oil underground storage tank with above ground storage tank	Construct in 1998
Option 11.2	Reduce risk for leachate generation	Cover and finish parts of landfill 1997
Opportunity #12	**Improve Sewage Disposal System**	
Option 12.1	Connect to municipal sewage system	Construction 1998
Opportunity #13	**Reduce Risk of Hydrocarbon Contamination from Truck Wash Facility**	
Option 13.1	Install oil/water/sediment separator	Construction 1998
Option 13.2	Reduce vehicle wash intervals	Not practical
Opportunity #14	**Improve Energy Efficiency**	
Option 14.1	Energy audit	Conduct 1999

Opportunity #15	**Reduce Noise Levels**	
Option 15.1	Conduct a noise audit	Survey 1998 and repeat every 3 years
Option 15.2	Eliminate empty chip blower operations	Procedural change 1997
Option 15.3	Eliminate outside mill shift whistles	Completed 1997
Option 15.4	Reduce chain conveyor noise	Install UHMW plastic in conveyor troughs 1998
Option 15.5	Investigate alternatives to vehicle reverse beeper noise	Initiate WCB discussions 1998
Opportunity #16	**Reduce Risk of Spills**	
Option 16.1	Centralize storage of hazardous materials	Design 1999
Option 16.2	Implement hazardous inventory tracking	1998 (option 7.3)
Option 16.3	Update spill response plan	Update plan 1998
Opportunity #17	**Environmental Management**	
Option 17.1	Implement Environmental Management System	Develop plan 1998
Option 17.2	Employee training	Soliciting P2 ideas 1998
Opportunity #18	**Community Environmental Issues**	
Option 18.1	Environmental forum	Not feasible
Option 18.2	Education/communication	News letter announcement and Community Fair Display 1997

5.3 P2 OPTIONS NOT IMPLEMENTED

The following P2 options were deemed to be impractical or not feasible under the current economic and technological climate and it was decided that they would not be implemented during the next five years. They will, however, remain as identified pollution prevention options for re-evaluation in the future.

Option 1.2 The technology of electric vehicles is not advanced enough to make this practical for the mill.

Option 1.3 Climatic conditions would limit the use of bicycles to the summer months as snow and mud would make it difficult to be practical at other times of the year. In addition, the distances between points are short enough for people to walk unless they have to carry tools and equipment.

Option 3.2 The addition of new cyclones is not appropriate to improve the capture of dust emissions. The existing cyclones are about ten years old and the technology for cyclones has not improved over the past ten years.

Option 5.1 & 8.1 The installation of an air separator is not economically feasible based on current cost estimations. The cost for a system is in the order of $450,000. The mill will continue to improve its log handling efforts and use the landfill for dirty hog fuel disposal purposes.

Option 5.2 The option to compost wood waste is not feasible due to the high cost of waste wood separation equipment that cannot be justified and the low demand for composted wood. It is simply uneconomical at present.

Option 7.2 The existing underground fuel storage tanks will be removed, along with any contaminated soil, by the end of 1998 thus making monitoring wells redundant.

Option 13.2 Reducing vehicle washing as a means to reduce the potential for contaminating soils around the truck wash area is not feasible. Standard practice for operating the large vehicles at the mill requires that they be washed frequently as part of their routine maintenance program. This cannot be stopped or altered at this time. This issue will be addressed by installation of an oil/water separator at the truck wash in 1998 (see Option 13.1).

Option 18.1 The opportunity to form a community forum to review common environmental issues, such as noise and road dust, while admirable cannot be seen as the responsibility of Riverside. Therefore, this option is not feasible. Riverside will continue to have informal discussions with neighbouring industries regarding community issues but this process will not be part of their pollution prevention plan.

SECTION 6.0
TRACKING AND MONITORING

6.1 INTRODUCTION

The monitoring and tracking program will enable Riverside to report their progress on the success of the plan.

The objectives of the P2 plan were outlined in Section 1.0 and the targets are based on the current permit limits and the goals and objectives of the P2 plan.

The monitoring plan identifies those elements that can be monitored on a monthly or annual basis to determine whether the P2 program is having the desired effect of reducing the generation of pollution and impacts on the environment. The monitoring plan is also designed to quantify the benefits as they accrue.

In addition, the success of the P2 plan can to a degree be judged by whether the actions identified in the plan have been or are eventually implemented.

6.2 TARGETS AND OBJECTIVES

6.2.1 P2 Objectives

The P2 objectives are as follows:

- To eliminate, minimize and / or reduce the release of pollutants to the environment;
- To reuse and recycle by-product waste materials wherever possible; and
- To minimize environmental management costs and reduce liabilities.

6.2.2 P2 Targets

The P2 targets all have numerical elements by which they can be measured, such as engineering works installed by a specific date, works to cover a specific area by a certain date or reduction of a percentage in emissions or discharges. The targets include existing government permit levels for cyclone emissions.

Air Emission Targets

- Apply a minimum of 3 applications of calcium chloride on the main haul road and log yard roads annually commencing in 1998.
- Maintain essentially invisible cyclone emissions that are below the regulatory limit of 115 mg/m^3.
- Reduce the number of dust complaints year by year.

Water Discharge Targets

- Develop a data base of stormwater runoff quality and quantity commencing in 1998.

Land Discharge Targets

- Reduce the annual permitted amount (68,000 m^3) of waste wood and dirty hog fuel that can be landfilled by 50% by 2000.

6.3 MONITORING PROGRAM

The following items can be monitored on a quarterly and/or annual basis to determine whether Riverside is implementing the P2 plan according to the schedule shown in Table 5.1. It is also important to provide an explanation of implementation and the costs and benefits as they occur so as to be able to better evaluate the overall value of pollution prevention to the company.

The specific items that should be recorded are as follows:

- Monitor the implementation of P2 actions outlined in the P2 plan and provide an explanation for those actions implemented and those actions not implemented according to the plan.
- Monitor the number of dust complaints. Inform each person who calls of the actions Riverside is taking to reduce nuisance dust.
- Conduct a bi-annual dust fall survey to determine dust levels on-site commencing in 1998.
- Monitor point source outfalls for water quality in the spring and late summer periods.

- Record the number of trips and the total volume of wood waste/hog fuel being hauled to the landfill.
- Audit on-site noise levels every three years commencing in 1998.
- Summarize the economic costs and benefits of the implemented P2 actions. This would include such items as septage disposal costs, cost of hauling hog fuel to the landfill, application of dust suppressant, etc.