

Decommissioning Kimsquit— The Long and Costly Struggle

by Corby Lamb, WFP Area Manager

Logging in the Kimsquit River Watershed first occurred in 1917 when Pacific Mills Limited constructed a logging trestle and dump for a railway operation. Operations were limited, with the tracks on the east side of Kimsquit River only extending about 2 miles from the river mouth. The main focus of this early logging was to access the valuable Douglas-fir stands in the lower valley.



Aerial view of Kimsquit Camp prior to demobilization photo: Corby Lamb

In those early days steam was the main source of power. Wood was used to fire the boilers in the locomotives, eliminating the problem of soil contamination from fossil fuels. The challenge with steam, however, was the many associated large forest fires caused by sparks from the wood-fired boilers.

The 1917 operation lasted for about 2 years, during the time the Kimsquit Area was planned to be

the western terminus of a cross-Canada railway. Once it was obvious the terminus would be elsewhere, operations moved to other areas of the central coast. Except for the Nuxalk Reserve on the river, there was no activity at Kimsquit until Mayo Lumber returned in the late 1970s.

In 1980 Doman Industries assumed control of FL 16845 and constructed a modern 60-crew camp two miles from the beach on

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the west side of the river. The AAC was set at 120,000 m³ per year for the following 18 years. And significantly, Kimsquit was the first operation to be managed under an Integrated Resource Management Plan as a Grizzly Bear Conservation Area.

In 1997, the Central Coast land issues were beginning to heat up. Under the laws of the day, no more timber could be harvested in the watershed. When future operating sites started to be constrained by land use issues elsewhere on the Central Coast, every option was examined in the Kimsquit Watershed.

Unfortunately, due to the Integrated Resource Management Plan, no more economically-viable “first pass” wood could be found. This meant the camp facilities would have to be removed and any soil contamination from fuel staining and so on would have to be remediated.

In the past 10 years, rules regarding the treatment of contaminated soil have been ratcheted up considerably. MOELP now requires any contaminated soils to be brought back to their natural condition. This can be achieved through a number of ways, including excavation and transportation to a registered paving company and excavation and treatment in a “biocell”, which uses micro organisms to virtually eat the oil byproducts.

Once the decision was made to pull the camp out, WFP contacted an environmental consultant to conduct a Phase I report: Reid Crowther and Partners Ltd. from Victoria, BC.

Phase I

Phase I of the project consisted of a visit to the operation to see



There are two biocells over 800 metres long running on both sides of the Kimsquit airstrip
photo: Corby Lamb

how the camp was laid out and to determine where possible contamination had occurred, such as fuel transfer areas, the generator room, shops, staging areas, and equipment bone yards. Consultants held interviews with long-time management and contract personnel as part of this initial review. Crews mapped all oil staining and dug 30 test holes with an excavator wherever consultants determined there was potential contamination. The test holes dug in Phase I were located all over the operation: 20 in the camp/shop area, 7 in the tank farm/dryland sort area, and 3 on the airstrip where fuel barrels were stored.

All test pits had to be sampled to determine the level of contamination in parts per million (PPM). This was done in two different ways:

- Using a Micro Tip HL 2000 Photo Ionization Detector (PID), each pit was sniffed for petroleum contaminants.
- Samples were taken from each pit and placed in teflon-sealed glass jars. These jars were placed in coolers and flown to

a lab to test for “contaminants of concern” or COCs. Examples of COCs are benzene, toluene, ethylbenzene and xylenes, all petroleum contaminants found in gasoline, diesel, and furnace oil.

Depth of contamination was noted as well, allowing consultants to estimate the extent of soil (in cubic metres) to be treated.

Crews also dug groundwater pits to determine whether groundwater had been contaminated over the years. Since no groundwater appeared in any of the test pits, fortunately, no wells were required. At the tank farm site, one groundwater monitoring well was installed.

Phase II

Phase II included the review of all of the test samples and field data. The results determined there were several contaminated areas that would require remediation. The problem areas included the bone yard, shop area, generator building, waste oil storage area, and the marshalling yard.

The areas around the camp fuel tanks and wash rack showed visual evidence of contamination, but had to be removed in order to conduct a proper investigation.

The Phase II investigation provided the required recommendations and action plan we needed to review and make applications to MOELP for approval to proceed with the site clean-up.

The cost to WFP for MOELP to review and approve the report was \$12,500.

Phase III

Once MOELP accepted the Phase II results and approved the plan, the actual dirt work (remediation) could begin.

Before digging up any contaminated soil, we conferred with the consultants to make several decisions:

- **How much soil did we expect to remediate?**

Once all the test results were in, we expected to treat between 7,000 to 10,000m³ of soil (up to 625 truckloads).

- **Where could bio-remediation cells be properly constructed?**

The Kimsquit Operation had a 1,000-metre airstrip close to camp (100 metres away). To avoid future liability problems, the airstrip was scheduled to be deactivated. We therefore decided that the air strip would be an excellent area close by on which to construct the biocells.

- **What equipment would we need?**

To address concerns from MoF and MOELP as well as local First Nations, 43 kilometres of Forest Service Road had to be deactivated with MoF funding. Having the deactivation equipment on-site allowed us to use equipment efficiently. When there was a slow

period in road deactivation, the equipment moved to camp remediation at WFP's cost. We found, however, that the camp job would need substantially more equipment than forecasted.

- **How much would the program cost?**

In every project it is necessary to have a budget. But the problem with soil remediation is that until you know what the extent of the contamination is, it is virtually impossible to estimate the cost.

The estimates for decommissioning the tank farm alone ranged from \$40,000 to \$135,000, depending on what the consultant was required to do. Tank farms are very expensive to decommission, since all tanks must be emptied, washed out, cut-up and transported for disposal. All liquids accumulated during the washing must be recovered and sent to a hazardous waste disposal facility.

In the case of Kimsquit, everything had to be barged 250 miles

to the nearest scrap yard and 350 miles to the nearest waste facility.

Once the soil remediation began, we had to keep digging at each site until contamination met acceptable levels for an industrial site.

In total 12,000m³ of soil was placed in biocells, constructed along both sides of the airstrip. Biocells have an impermeable bottom liner to eliminate the possibility of contaminating another site and a waterproof top cover. For soil microbes to work properly, they must not have too much water, the temperature must be above 10° C and they need nitrogen. Contaminated soil was placed in the cells in layers with a high-nitrogen fertilizer. In total, we used 8 tons of fertilizer.

On completion of the project, we had constructed biocells covering the entire length and width of both sides of the airstrip (40m x 1000m).

*continued as **Kimsquit**, page 11*



Visible hydrocarbon stains in marshalling yard

photo: Corby Lamb

Wildlife Tree or Danger Tree—What To Do?

by Dean McGeough, RPF

Forestry operations have become more complex. We see smaller block sizes, reserve areas, single trees or groups left standing, and varying harvest methods. Amidst all these complexities there remains the golden rule of the woods: **safety is first**.

Recently, a coastal forest company was fined \$30,000 for leaving a wildlife tree within an active forestry operation. The veteran Douglas-fir tree was alive with a relatively small dead spike-top and growth burls (possibly blind conks of *Fomes pini*). Because the company had failed to properly assess the tree for hazards, this defect tree was considered, by default, to be a dangerous tree. Despite its good intentions to protect a valuable wildlife tree, the company failed to follow current Danger Tree Assessment procedures, and Workers' Compensation Board cited them under Occupational Health and Safety Regulation 26.21(1) for bypassing a dangerous tree.

In April 1998, WCB Regulations replaced the word "snag" with "dangerous tree." Workers need to be watchful for both snags **and** live trees that may have dangerous defects. Any defective trees (living or dead) within or adjacent to a worksite must be assessed by a qualified danger tree assessor. If the tree is safe, then it must be marked (by paint, flag, shallow blaze, or tag) to communicate to workers that it was assessed and found to be a safe tree.

When forestry workers encounter live trees that are planned for retention (such as the vet fir tree noted above), or a tree with signs of wildlife use (such as a bear den,

feeding or nesting cavities) and their plan states to keep these trees standing, what should workers do?

First and foremost, ask yourself, "Is the tree safe to leave standing?" If the tree is defective, a qualified person must assess it, and the tree marked if found to be safe. Otherwise, the tree is dangerous.

Review your plans or ask your supervisor to clarify the danger tree procedures. According to Danger Tree Assessment procedures, when you discover a dangerous tree, you have only three possible choices of action:

- Remove the tree.
- Remove the dangerous part of the tree.
- Install a No Work Zone to protect workers from the danger tree

So the next time you discover a wildlife or culturally significant tree, or a defect tree within your work-



"Widowmaker" danger tree

site, and the plan requires you to leave the tree standing, assess the tree and follow the appropriate safety procedures.

One last word: bear in mind that company planners should work with fallers to assess retention clumps or falling boundaries—safety remains our #1 concern.

Hot Name Will Win Cool Cash!

During the development of the WFP Environment Management System (EMS) over the past two years, we have noted that methods of recording WFP activities and agency directives have varied widely from region to region. During the ISO registration audits, QMI observed this inconsistency and requested that WFP either clarify the process for each region in writing or develop a single recording system. The Environment Review Committee recommended and the Senior Management Team has agreed that a single WFP recording system is the best approach for our company and supports our pursuit of due diligence.

To that end, we have hired Forsite Consultants to work on combining the best features of the two current recording systems into a single system over the next 3–4 months. The new computerized system will be incorporated in all operations. This system will be used to track all the activities and obligations that occur on blocks, roads and bridges. It will also provide staff with information on the status of permit approvals, volumes, and inspection results.

Work has already begun on this project, but the system still needs a name—and we're willing to pay cold, hard cash for it. One hundred bucks goes to the wordsmith who can come up with a name for the system. The contest is open to all staff and employees of WFP. Send your suggestion to Heidi Walsh in the Vancouver office, or by email to hwalth@westernforest.com, by August 31, 2000. Remember, the name should reflect that the system will be used to track our forestry activities. Members of the Environmental Review Committee will select the winning entry in early September.

Standard Operating Procedures Vital Due Diligence Tools

by Paul Cassidy, Blake, Cassels and Graydon



Contrary to perception, any logging job, from road building to falling to processing, can be a complex activity. It's not just a matter of going into a setting, doing a job, and then leaving. A lot of thought and planning must go into any of these tasks, and to minimize the possibility of legal troubles later should something go wrong, it is a good idea to develop standard operating procedures ("SOPs").

What are SOPs? They are written versions of the best way to undertake a logging activity, and every company should have them or follow ones given to them. For example, if a culvert or bridge is to be installed in the course of road building, an SOP should exist that explains to the installer how the work is to be done, what to look for when doing the work, and what to do if something unexpected is encountered in the field.

Logging activities in the past have been carried out by very experienced crews who needed no written instructions on how to carry out their tasks. But under the *Forest Practices Code*, the days of the "oral tradition" in logging are long gone. Carrying on logging

without the benefit of SOPs simply makes you look disorganized, and can lead to trouble should you face enforcement action under the Code.

SOPs do two essential things: they reduce the possibility of infractions of the Code, and if infractions occur they can help to demonstrate you were duly diligent and the incident happened beyond your control. In either case (but especially the first), SOPs can save you a lot of money because they act as a preventative mechanism to avoid trouble later.

“ The days of the ‘oral tradition’ in logging are long gone. Carrying on logging without the benefit of SOPs simply makes you look disorganized, and can lead to trouble should you face enforcement action under the Code. ”

SOPs should be developed with significant input from the most experienced staff members in your company, and they should be kept current as practices change. They should be given to all operators with adequate and recurring training to ensure they will be followed (there's nothing worse than an out-of-date SOP that sits unused in a binder in the office). The appropriate SOPs should be reviewed with field crews prior to the start of each job to ensure they are followed (or departed from only with good

reason, which should be documented).

“ SOPs do two essential things: they reduce the possibility of infractions of the Code, and they can help to demonstrate you were duly diligent and the incident happened beyond your control. ”

If possible, it's a good idea to write your SOPs in simple language and, where feasible, to keep them to one page each. Several companies even plasticize them (for weather-proofing in field use) and put them in each operator's vehicle.

Paul Cassidy is a lawyer with Blake, Cassels and Graydon, who specializes in resource management and environmental law.

Watch for newly-updated SOPs!

Three years after our first Standard Operating Procedures in 1997, we have made updates to all SOPs to better reflect the changes in practices, input received from numerous operations, regulation changes, and to replace outdated procedures. Watch for the newly-updated SOPs. Our grateful thanks to all those who contributed valuable suggestions or assisted by reviewing the changes.

SOPs and Good Records Worth the Effort in Zeballos Contravention

by Doug Folkins, RPF, Operations Forester, Zeballos Forest Operation



MoF C&E Officer Henry Grierson stamping seized blocks

photo: D. Folkins

Since 1997 WFP's Standard Operating Procedures have been helping the company, its workers, and its contractors maintain a high level of compliance with forest legislation in all "higher risk" activities. SOPs for Minor Forest Products are extremely important to establish the company's due diligence in the event of contraventions related to cutting outside of approved boundaries. This recent example of how SOPs and good records helped us in handling a contravention within the Zeballos Operation reaffirm their importance.

The contraventions

On March 15th this year, WFP discovered a possible trespass by a longtime shake operator within TFL 19 of the Zeballos Forest Operation. WFP inspection found an area of cutting outside the obvious timber boundary. Eight to

ten trees were cut up and the wood had been flown to the road. Several saplings had also been cut and damaged. WFP personnel took photos and measured the wood on the road, approximating the volume at 30–35m³. At this point, WFP personnel seized the wood, then spray-painted "DO NOT REMOVE—WFP" on the ground in three locations.

As Operations Forester for the area, I then contacted Bill Dumont (WFP's Chief Forester) for direction. Bill recommended that I report the situation to the MoF as soon as possible. I contacted the compliance and enforcement officer for the Zeballos operation, and set a date for an on-site inspection.

The shake operator said that the workers in the area felt they were not in violation; however, he admitted that the cutting was obviously outside the boundary.

The operator agreed that all his employees had either undergone WFP SOP training or he had reviewed the SOPs with each worker. He could offer no further explanation. And at this time he reported a separate possible trespass that he had recently discovered in another operating area.

The MoF inspection and investigation

On March 17th, Compliance and Enforcement (C&E) officers from Campbell River MoF held a meeting at WFP office with me and the Operations Engineer. We asked if this was an inspection or an investigation. C&E officials replied that they needed more information to determine that, but would treat the procedure as in similar cases where a third party had reported a potential violation. We asked the officials to clearly indicate at what point WFP was being investigated. We reviewed our findings and outlined the provisions within the WFP SOPs and Minor Products Operating Agreement to establish WFP diligence. We also stated that WFP had recently conducted a second SOP training course (on February 8, 2000) with all the salvage crews working in the TFL. Recent inspections of shake operators' operating areas were found to be in compliance.

Inspection at site #1:

The operator explained that two inexperienced splitters were working under the direction of a cutter who had packed up and left town overnight. The operator explained that the cutter had been given SOP training and was fully aware of where the boundary was. The splitters said that they had questioned the cutter on several occasions about whether they were

inside the line, and that each time the cutter told them that they were. The C&E officers asked the operator and the splitters to meet at the WFP office for one-on-one interviews.

C&E officers took photos of each of the cut-up trees and the surrounding standing timber in each case. We took photos for WFP as well. The wood that was flown to the road was photographed, measured, and marked with seizure signs. A large percentage of the blocks were stamped with the forest service hammer mark.

Inspection at site #2: We and the officials walked up an S5 stream where cutting within the 10-metre “No Cut” zone had occurred. We crossed the flagged pink line and photographed 5 cut-up logs within the proposed cut block Z105 (SP was approved). More photos were taken of damaged regen and cuttings in the creek. As before, the wood that was flown to the road was photographed, measured, and marked with seizure signs. A large percentage of the blocks were stamped with the forest service



Log cut outside the harvest boundary, TFL 19

photo: D. Folkins

hammer mark.

C&E officers then conducted individual interviews with the operator and the splitters involved at the WFP office.

Wrap-up meeting: The C&E officers said that they could not perceive any faults caused by WFP. They said that they felt WFP’s diligence was more than adequate in both cases, and that

the MoF would not require copies of WFP’s records, since we were not being investigated.

C&E officers felt that the shake operator had expressed a good attitude in that he admitted his mistakes and wanted to move forward. The operator had shown records to establish partial diligence. However, officers felt that his supervision was lacking.

The shake operator and cutters involved in the violations were issued tickets.

Since WFP is the licensee holder, the C&E officers said that WFP would be able to deal with the contractor internally, as long as any discipline was in line with the following MoF goals:

- Stumpage is paid.
- The action is stopped.
- Preventative measures are established.

Concluding remarks

Administration of Minor Forest Product salvage operating agreements, pre-work meetings, onsite SOP reviews, SOP training, block inspections, scaling and cutting approval administration can often be a considerable time strain on WFP staff. The importance of maintaining proper records and following the SOPs may sometimes be lost amongst the mountain of paper. However, as we found at Zeballos, when problems arise, maintaining good records and following SOPs are of paramount importance in establishing due diligence.



MoF C&E Officer Russell Boucher establishing size on illegally cut log photo: D. Folkins

ISO 14001 Certificate Pres

by Sandy Lavigne, Coordinator, Environmental Programs

On May 3, 2000, WFP held ceremonies in Vancouver, Campbell River, Gold River, Zeballos and Port McNeill to present the ISO 14001 registration certificates to staff, employees and contractors.

Vice President Vic Woods and Lead Auditor Peter Johnson of Quality Management Institute (QMI) presented the certificates confirming that the company has been granted ISO 14001 registration throughout all our coastal forest operations following a thorough audit and review of our Environmental Management System (EMS). The registration audit, conducted in February, included interviews with numerous operational personnel and looked at forestry and harvesting systems.

Awarding the individual operations certificates recognized their 18 months of dedication in implementing the EMS throughout the entire company. This included extensive training of all personnel in environmental awareness, setting up an internal audit team, and regular meetings of environment committees in all company and contractor camps.

ISO 14001 is an international standard of environmental excellence, based on a commitment to continual improvement. Targets for environmental performance have been set for maintaining air, soil and water quality; annual internal audits confirm our progress in relation to these targets.

This important initiative is a major milestone for WFP. Said Woods, "This certification confirms our continued commitment to managing our forests in an environmentally-responsible way and shows our international customers that we are meeting the highest environmental standard in our day-to-day forest activities."

WFP's registration to ISO 14001 is one of the largest and most comprehensive audits in North America. QMI's Johnson noted that "the audit results confirmed WFP's thorough and effective EMS at all levels of the organization."



Back row L to R: Paul Turner, Dave Moger, Daryl Stewart, Murray Watkinson, Joel Du... Middle row L to R: Berni Zimmerman, Kim... Joe Schluchter, John Halusiak, Chris Bick... Davidson, Jim Dunn; Front row: Jim Newm... Mainland/Islands



L to R: Brendan M...



L to R: Rick McRae, Graham Lasure, Berni Clark, Gary Griffith, Andy Hansen, Jim Cox, Ivan Amos, Helen Wallace, Mickey Brown, NVIR



L to r: Peter Johnson, CMI, Vic Woods, Jim Cox, Gio Alberti

Presented to WFP – Well Done!



nsen, Roger Wade,
maresq
Christensen,
nell, Patrick
man,



Sharon Moffat, Purchasing
Manager, Vic Woods
Central Warehouse



L to R: Trevor Boniface, Bob Craven, John McLaughlin,
Mark Kenny, John Costin, Gerry Fraser, John Waring,
Kevin Sommerville, Graham Hues Nootka Region



ohan, Daniel Gachter, Jim Basha



L to R: Vic Woods, Sandy Lavigne, Dan Jepsen,
Bill Dumont, Head Office



ods,



Back row L to R: John Crowhurst, Bob Dunn, Dan Jepsen, Peter Johnson;
Front row L to R: Gregor MacIntosh, Lane Thornton, Doug Folkins, Phil Fenn,
Pearl Myhres, Vic Woods, Rick Osmond, Bill Dumont, Zeballos



NVIR Regional Man-
ager, Gary Griffith

Guidelines for Helicopter Fuel Storage and Mop-up

by Dan Jepsen, Manager, Aboriginal Affairs and Environment

Since we have received a number of inquiries about proper storage and mop-up techniques in the event of jet fuel spills, I thought it timely to provide an update of the issues.

Storage

There is little guidance in the legislation on the proper storage of the 45-gallon drums of jet fuel products in helicopter fuel transfer areas. WFP requires that storage and transfer of jet fuel products meets with the company's yellow Common SOPs card, which clearly states our policies on using petroleum products, for example, "Don't dump gas or oil anywhere, don't store petroleum in an RMA, and when you see an emergency like a fuel spill, follow the WFP emergency procedures and tell your supervisor as soon as possible."

“ Storage areas should be located both 1) as far from RMAs as possible and 2) where they are least likely to suffer collision damage from vehicles. ”

We are all aware that there is a well-recognized procedure for drum storage: helicopter pilots must ensure the drums are stored on their sides to reduce the possibility of the water contamination that results from the water accumulating on the drum's top if it's stored upright. This informal policy complies with the current legislation regarding storage of 45-gallon

drums. Secondary containment is not required for 45-gallon drums. However, storage areas should be located both 1) as far from RMAs as possible and 2) where they are least likely to suffer collision damage from vehicles. Old fuel and damaged drums should be disposed of in the appropriate manner.

“ The environment is important, but safety remains our number-one priority. ”

Mop-up

Jet fuel and regular gas are very volatile. Pay special attention to their proper mop-up in the event of a spill. Your first priority is the safety of personnel, and second, the protection of property.

Although you must reduce spills and drips, and mop up small quantities of fuel, generally the proper method of responding to these types of spills is to keep the fuel away from personnel and property and allow it to evaporate. Using pads or constructing berms to restrict or contain spills is too dangerous for these types of fuel.

In spill training, the Coast Guard uses a test scenario where they ask what you would do in the case of a Jet "B" spill to water adjacent to a barge facility. Most people fall into the trap of suggesting that containment booms be launched and an effort made to contain and mop up the spill. But this is completely incorrect. The recommended response is to ensure the slick is kept away from the barge by using a fire hose set to a fine spray.

Please keep this example in mind when using the more volatile fuels like Jet "A" and "B" and regular gas. The environment is important, but safety remains our number-one priority.



Lewey Da Loser says....
"Remember, the number one cause of injury in the woods is slips and falls. Plan ahead, check your footing, think 'Safety!'"

Cartoons by Heather Brown

Hazardous Waste

by Heidi Walsh, RPF

The Waste Disposal Program is one of the environmental programs under WFP's Environmental Management System. Its goal is to dispose of any hazardous waste in WFP operations by December 31, 2000. This includes surplus wastes not currently disposed of through the regular waste disposal channels.

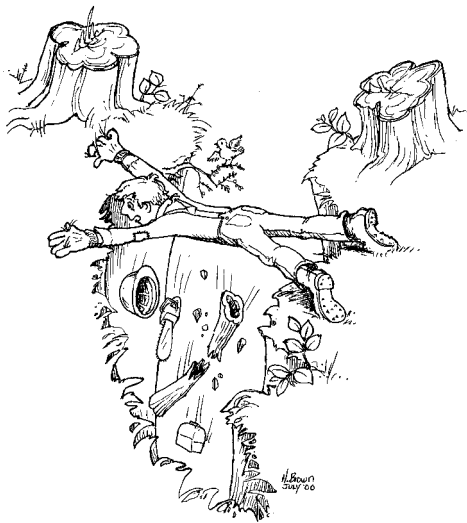
Does Your Operation Have an Environment Committee?

by Heidi Walsh, RPF, Assistant, Environmental Programs

Operations Environmental Committees are a crucial part of the EMS, providing the opportunity for all employees and contractors to assess WFP's environmental performance. They identify potential environmental issues in an operation, provide feedback, and suggest solutions to potential issues.

All working operations must have a committee and meet

quarterly (March, June, September, and December). It's vital that these committees are set up and working, since they provide important feedback about how well WFP is performing on the ground, and thus key to maintaining our ISO Certification. Your input is welcome, so if you're interested or have issues, please see the manager of your operation for information.



"Being reminded that slips and falls are the number one cause of injuries in the woods is effective only if YOU make the effort to plan ahead, check your footing, and think 'Safety!'"

Disposal Program

Earlier this year, a request for an inventory of these wastes was sent to all WFP operations. With their help, a final inventory was compiled and work to dispose of these wastes by our deadline is well on its way. Thanks to all who are helping to make this happen.

Facts and Arguments

- With every turn of the second hand on your watch, the world's population increases by 3. That means our planet must support another 93 million people every year. The United Nations predicts global demand for forest products will increase at the rate of 86 million cubic metres annually. BC harvests less than 80 million cubic metres per year.
- Not all forests are equal. About 220,000 hectares of forest land is harvested each year in BC. To produce an equivalent volume of wood from Siberia, about 1.76 million hectares would have to be harvested; in the Amazon, about 11 million hectares.
- Lumber production is cleaner than its alternatives. To manufacture steel studs results in 40 times more harmful effluents and 3 times more carbon dioxide emissions than manufacturing wooden 2x4 studs.

Kimsquit, continued from page 3

And it's not over yet . . .

Decommissioning Kimsquit took four months to complete, at more than \$600,000. The largest amount of contaminate was found under the marshalling yard. Approximately 7,000 m³ of soil was removed from the site.

Everyone should remember that parking a vehicle or piece of equipment in the same spot day after day can have a negative potential cumulative impact on the environment. Leaks need to be addressed immediately to prevent the same situation elsewhere.

And the \$600,000 spent so far is not the end of this project. For the next 3 to 5 years, the Kimsquit bio cells will have to be turned over and re-fertilized annually, at an approximate cost of \$50,000. Each year a consultant has to take readings and submit a report to MOELP.

In future, camp decommissioning should be minor, requiring one small biocell, at a fraction of the cost—providing we all learn from experience.

Water Facts

- Canadians use, on average, 390 litres of water per day—about twice as much as the average European.
- A tap that drips once every second wastes about 10,000 litres of water per year.

Vandals Mistook Natural Selections for GMOs

by Annette Van Niejenhuis, Tree Improvement and Research Coordinator, Saanich Forestry Centre

As a result of vandalism at Western Forest Products' Saanich Forestry Centre last fall, and more recently at the Ministry of Forests' Saanich Seed Orchard, more people have been asking what the forest tree breeding and seed production program is about. The vandals apparently thought that the trees, gene archives, and seed orchards that they destroyed and damaged were genetically modified.

But they were terribly mistaken. And as a result some of WFP's reforestation efforts and research programs have been set back by as much as 5–7 years.

What are the real facts?

Tree breeding is not genetic modification. Breeding identifies and selects naturally-occurring characteristics from the genetic variation in natural forests. It does not introduce new genes or modify existing ones.

In contrast, genetic engineering creates genetically-modified organ-

isms (GMOs) by introducing foreign DNA into the natural genetic material of the product. No GMOs are used to reforest any Crown lands.

WFP has been involved in programs to improve the quality of seedlings available for reforestation projects for more than 30 years. These include studies of disease and insect resistance, growth rate, stem form, and wood quality. Why? In all the species of interest to our company, there are high levels of variation in each of these traits in wild stands. The tree improvement programs for each species select numerous individual trees from across the landscape for breeding programs.

In the early years of the programs, foresters selected "plus trees" having good growth and form, which generally means they have good resistance to pests and diseases. Wood quality continues to be monitored in these selections. Selections of "plus trees" continue



Georgina Dampier, Forest Technician, Saanich Forestry Centre

in species such as Sitka spruce, many of which have natural resistance to weevils, and in western white pine, which have natural resistance to blister rust.

Further tree improvement programs have helped solve problems like "in-breeding depression." This is the result of the natural breeding strategy of conifers. Trees growing adjacent to one another are often closely related; they may result from seed produced by a single tree. Pollen from these adjacent trees has a much greater probability of reaching the cones of immediate neighbours than of reaching and effectively pollinating cones on more distant trees. Though many species reject self-pollination through various means, once they detect a threshold of difference in neighbouring trees, pollination will proceed.



Kathy Brown, Saanich Forestry Centre

The orchard system allows growers to choose individual trees that are different from each other and replicate them through grafting. Because near neighbours will have little chance of being near relatives, a well-designed orchard removes in-breeding depression. Not only is this a benefit in producing timber, but it also increases the number of seeds per cone in many cases. Where in-breeding is prevalent, seed yields, seed germination rates, and seedling performance are low.

“ Only natural reproductive processes are used to produce seed in our orchards. At no time in the history of the orchard trees have they been subject to genetic engineering or DNA tampering. ”

Removing in-breeding depression can be accomplished by simply selecting one tree at random from stands separated by a few thousand metres. However, to realize additional gains, we also consider the performance of the selected trees.

For example, consider a hemlock stand of one hectare where the mean annual increment is 10 cubic metres a year. If 1,000 hemlock were contributing to that annual increment, each tree contributes 1/1,000th of the volume. When you walk through the hemlock stand, it becomes very apparent that some trees are contributing more than their share, while others are contributing less. Selecting the individual trees that produce more

than their share and replicating them in the orchards through grafting leads to an orchard full of high-performing trees. Though not all the offspring of these high-performers will produce at this level, they will on average out-perform the progeny of trees that contribute less than their share to the mean annual increment of the stand. This is the premise underlying choosing trees for orchards. All selections included in the seed orchards are tested to confirm that they are truly “plus trees.”

Where possible, seed for enhanced regeneration of WFP’s managed forests comes from seed orchards. Regulations stipulate this as part of the *Forest Practices Code*.

However, not all seedlings result from seed collected in seed orchards. Seed transfer guidelines limit the area each orchard can serve. So an orchard developed for hemlock on Vancouver Island will not produce seed for regeneration on the north coast. And a redcedar orchard developed for low elevations on Vancouver Island will not produce seed for use above 600m.

Two species of significant interest to WFP that do not produce

seed in orchards are balsam and cypress. We take wild seed collections periodically to meet our needs in these species. WFP favours stecklings for enhanced regeneration of cypress. Research continues in these species to determine a strategy to overcome the seed production obstacles.

“ Tree breeding is not genetic modification. Breeding identifies and selects naturally-occurring characteristics from the genetic variation in natural forests. It does not introduce new genes or modify existing ones. ”

At the Saanich Forestry Centre and at our former Lost Lake Seed Orchard, seed crops are managed for western redcedar, western hemlock, Sitka spruce, and Douglas-fir. Activities include grafting

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WFP Public Forest Tours Are Back

The North Island Forestry Centre, sponsored by WFP, Canfor, Weyerhaeuser, Interfor and TimberWest, is running free tours for the public in July and August. The weekday tours give us a chance to showcase our operations. Debbie Anderson, Manager of the Forestry Centre, says the tours show everything imaginable: “They meet the fallers, they’ll see clearcuts, they’ll see old growth and second growth, fertilizing. We show the good and the bad, and it’s a long day.” Plan to invite your family and friends to visit or take a tour. Bookings can be made by calling the Forestry Centre at (250) 956-3844.

Don’t forget other sites of interest—call the Saanich Forestry Centre at (250) 652-4023 to arrange for a tour of their tree breeding and seed production programs. Tours are available to WFP personnel and contractors. Tours are also running at Gold River. Contact the Tourist Information Centre at (250) 283-2418 for more information.

Western Pulp Squamish Operation

by Steve Sutherland, Manager, Technical Marketing, Western Pulp Squamish Operation

Western Pulp has two pulp mills, one located in Port Alice and one in Squamish, each of which produce two different products. Port Alice is a dissolving mill and Squamish a Kraft mill. Dissolving pulp is used in various specialty products from rayon fabric, explosives, and lacquers, to acetates. Kraft pulp, although it has some specialty applications, is mainly a commodity product, like lumber.

The Squamish mill produces NBSK (Northern Bleached Softwood Kraft pulp). NBSK is considered a long fibre pulp and is valued for its strength. Papermakers usually add 20 to 30% long fibre into their product for strength. These long fibres can be easily seen with the naked eye: take a piece of normal photocopy paper and tear it. Closely examine the torn edge. You will notice some fibres longer than others; these longer fibres are the softwood portion of the paper. NBSK fibres are normally around 2.5 to 3mm long.

The commodity market for NBSK is strong. Prices have risen from a low of \$460 US/ton in March of 1999 to \$670 US/ton in April of 2000, a 45% price increase in about a year. It's a big change from the 1990s, when there was only one strong year in 1995. Brian Fallows, Vice President of Marketing at WP, has said, "The renewed strength in the pulp prices coupled with the major efforts to improve the environmental performance and achieve ISO certification are major marketing advantages for the Western Pulp products in the global marketplace."

The mill's main markets are in Europe (35%) and the Pacific Rim (55%). With our unique location in Howe Sound (there are no roads or railroads to the mill), very little product is sent to North America. It's cheaper to have deep-sea vessels arrive directly at the mill for loading, than transfer pulp to Vancouver for rail transportation within North America. All mill employees (plus equipment and supplies) must arrive to the mill by ferry each day.

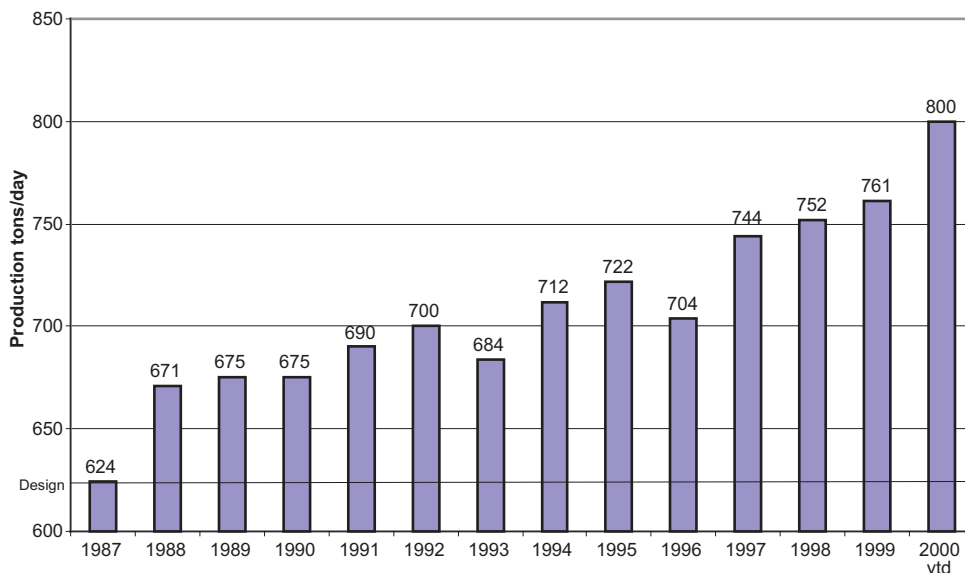
The Squamish mill first started in 1914, and has gone under several modifications since then. The mill went through a modernization project in 1986. It was designed to produce 623 tons/day. The mill is now averaging 795 tons/day, over 25% more than its design capacity. Small projects and process "de-bottlenecking" have achieved this gain. Production rate is one of the main measures of how a mill is performing. Says Dave Ingram, mill Manager, "I am very pleased at the hard work and



Steve Sutherland worked for three years as Assistant Production Superintendent of the Woodfibre Mill before becoming the Technical and Environmental Manager in 1996. Since 1999, he has worked as Manager of Technical Marketing.

dedication of our mill workers in pushing the performance of our mill—this is truly a major accomplishment. Chart 1 shows how Squamish has increased its production year over year.

Chart 1 Squamish Production—Daily Average



Squamish came under considerable environmental pressure in the 1980s and early '90s. With the mill rebuild in 1986 and a new secondary treatment plant installed in 1992, the mill's environmental record has been excellent. The two charts below give an indication of how well the Squamish mill is performing environmentally. Chart 2 shows the mill's AOX (chlorinated compounds) discharge. The present level of only 0.5 kg/ton is well below the provincial regulation of 1.5 kg/ton. Chart 3 shows BOD, Biochemical Oxygen Demand.

BOD gives an indication of how much oxygen the mill's effluent will consume, thus competing with other organisms in the environment that require oxygen. The mill's BOD discharge is 1.0 kg/ton, again well below the provincial regulation of 7.5 kg/ton.

Squamish mill achieved its ISO 9000 certificate (quality standard) in 1993 and ISO 14001 in 1999. We're very proud of both of these achievements. And with Kraft pulp prices rising and production high, we're looking forward to a strong 2000.

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and propagating orchard trees of known origin and rank, doing reproductive bud surveys to determine the proportion of contribution of each individual to the seed yield, managing pollen to decrease inbreeding rates and increase the contribution of high-ranking individuals to the crop, and seed harvesting. These are all traditional breeding practices; only natural reproductive processes are used to produce seed in our orchards.

At no time in the history of the orchard trees have they been subject to genetic engineering or DNA tampering. Most of the genetic diversity of these species is captured in the seed and breeding orchards. By selecting numerous "plus-trees" from across the range of these species, most genes are represented. As further selections take place among the original plus-trees, a few more genes may be removed from the seed orchards. However, with the number of reserves established across the landscape, it is unlikely that any genes are being removed from the gene pool. All original selections have been replicated in gene banks around the province.

All seed is registered with the Ministry of Forests and stored. The shelf life of each seed crop depends on the quality of the seed and the species. Seed of most species remains viable for years when stored under ideal conditions.

Why not come and see for yourself? The Saanich Forestry Centre welcomes all WFP personnel and contractors to visit our facilities on the Saanich Peninsula. Just give us a call beforehand at (250) 652-4023 to confirm that one of our staff can give you a tour.

Chart 2 Squamish Mill AOX Discharge

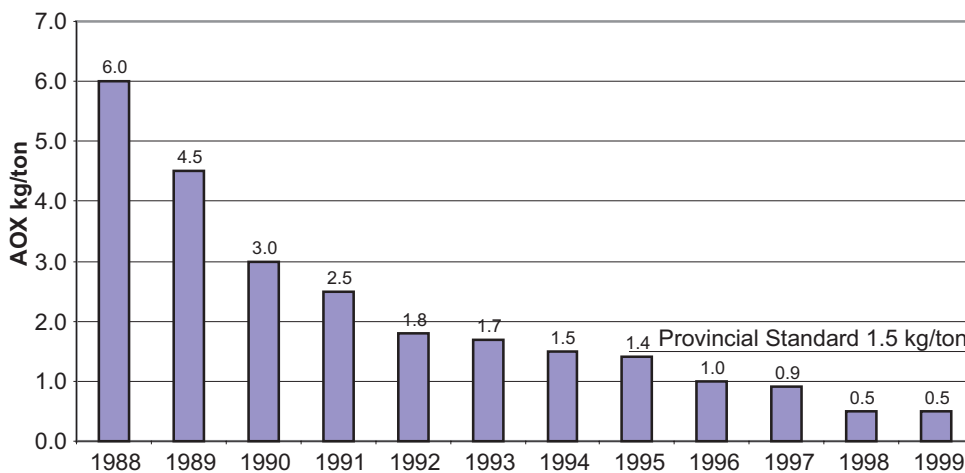
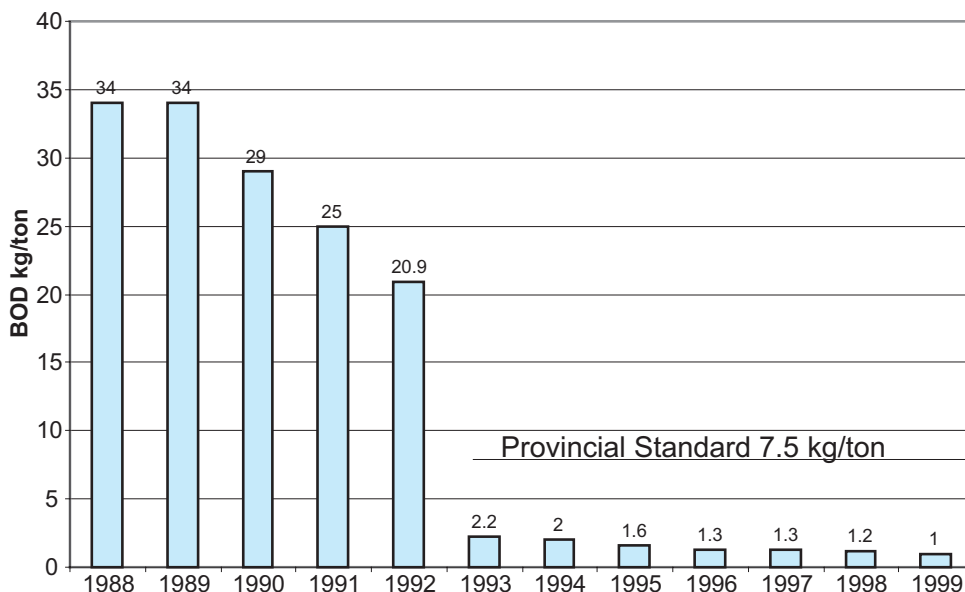


Chart 3 Squamish Mill BOD Discharge



Oktwanch Spawning Channel Open after Completion of 4-Year Project

A blessing ceremony performed last November by cultural leaders from the Mowachaht/Muchalaht First Nation marked the successful completion of a 4-year project to complete a new spawning channel near Gold River. Located at the mouth of Oktwanch River where it empties into Muchalaht Lake, this innovative groundwater-fed channel is giving new life to those Muchalaht Lake salmon populations that use the Oktwanch River for spawning and rearing habitat.

"This project will finally allow the Muchalaht Lake sockeye, coho, and chinook stock to rebuild," said Bill Dumont, WFP Chief Forester. "While the salmon have years of recovery ahead of them, we are one very important step closer to returning stable spawning and rearing habitats to the watershed."

Then \$300,000 spawning channel was a WFP project, supported with Forest Renewal BC funding, started four years ago when the potential renewal of the Oktwanch River fish habitat was first examined. The project was initiated by Canfor, then reassigned to WFP.

Fisheries and Oceans Canada and Forest Renewal BC had recognized that the river's fish habitat would benefit from a restoration project. However, further study showed that due to increased peak flows, reduced woody debris, and accelerated sediment delivery, the river would be unable to support large-scale salmon spawning for some time. Fisheries biologists from Fisheries and Oceans Canada and the Nuu-chah-nulth Tribal Council determined that a solution to saving the runs rested in enlarging a small side channel to the west

of the main river. This newly-enlarged channel, converted to a groundwater-fed system, provides stable spawning and rearing areas that are protected from the changing dynamics of the river.

The natural side channel that existed before the WFP work was of uncertain value. Juvenile coho salmon that over-wintered were generally dying as their rearing pools evaporated during the spring and summer months. In addition, the channel water exited via 2–3 separate sub-channels at the lower end of the main channel. These exits often dried up during the summer and early autumn months, preventing juvenile salmon from entering and exiting the lake. Much work was needed on the channel to ensure survival of eggs and fry.

Site work began during the spring of 1998, and was completed in August 1999. In total, 28 people worked on the project, including contractors, members of the Mowachaht/Muchalaht First Nation, Fisheries and Oceans Canada, the BC Ministry of Lands, Environment and Parks, and WFP staff.

Work began by excavating the channel bed down to 1m below the groundwater table in summer, when water levels were lowest. This ensured year-round water flow for both spawning and rearing. In addition, digging the mouth of the new channel low enough to exist directly into the lake in all seasons ensured access between channel and lake. The lower sub-channels were cleared and access to old beaver ponds nearby secured for summer and juvenile rearing areas.

The bulk of the channel work was carried out before spawning

was due to start in July and August.

The 1.4 km-long spawning channel incorporates the newest fish habitat management techniques and research. It mimics a natural stream by providing calm rearing areas for fry, log and root tangles where fish can hide from predators, and graveled areas for spawning. Ferns, salmon berry, maple, and alder will provide coverage on the banks, and assist with restricting access to the stream by large animals and people. The long, raised berm protects the channel from the nearby river.

Other fish habitat improvements proposed for the Oktwanch River include gravel bar stabilization, another spawning channel project on the opposite valley wall, force pools, and large woody debris cover in the main river. It is expected that the river's main fish spawning and rearing zones will gradually recover.

The Oktwanch channel will be used primarily by sockeye, coho and chinook salmon, and may also assist cutthroat trout and Dolly Varden char. *Oktwanch* comes from the Nuu-chah-nulth word *Okwasht*, which means "smoking salmon."

Forest Renewal BC chair Roger Stanyer has pointed out that since 1994, Forest Renewal has invested almost \$350 million to restore watersheds across BC. "Assessments have been completed in 860 watersheds. Restoration efforts have been completed in 150 watersheds, and some restoration has been done in 320 watersheds. This significant restoration effort is generating employment in local communities, supporting water quality, and protecting fish species."