Westcoast CED

PG Inland Port

Profiled Logs
Manufactured and Wholesaled

Pre-feasibility Analysis

Final Report 2007

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ACKNOWLEDGEMENTS

The preparation of this pre-feasibility analysis was made possible through the generous support of Indian and Northern Affairs Canada, Ministry of Economic Development–Province of British Columbia, and the Nechako–Kitamaat Development Fund Society. Their funding is greatly appreciated.

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1 INTRODUCTION

1.1 BACKGROUND

Why this pre-feasibility analysis at this time?
This pre-feasibility analysis is part of a larger report on the opportunities created by the establishment of an inland port in Prince George. The Prince Rupert container port facilities are close to becoming operational and will create a number of potential economic opportunities for the northern Interior. The subsequent announcement by Canadian National (CN) during the research stage of the investigation of their intention to locate expanded terminal facilities in Prince George marks the beginning of an inland port in Prince George. The research project is focused on identifying business opportunities associated with the inland port for First Nations people, and companies, in the North-Central Interior region of BC.

The findings of the research have been presented in a Phase 1 report on the economic opportunities and recommends pre-feasibility analyses on two of the top economic opportunities. This is a pre-feasibility analysis on the "Production of Profiled Logs for the Profiled Log Building Industry."

Research process and reliability of results
In a pre-feasibility analysis, venture ideas are explored with the intent of including only those ventures that are expected to generate revenues that exceed expenses for future research and analysis in a full-blown feasibility study. Pre-feasibility analysis requires: product or service definition(s), information on industry trends, market information, materials required, scale of sales and operation, work force requirements, capital required, and information on significant industry-related regulations where they exist. A pre-feasibility analysis provides the information needed to make a decision regarding whether to invest further resources in additional research. A pre-feasibility analysis does not provide enough information for business planning.

2 PRODUCT DEFINITION AND BUSINESSES CONCEPT

2.1 DESCRIPTION OF THE BUSINESS CONCEPT

When eastbound trains stop in Prince George because of the inland port, and if they have capacity to haul locally filled containers east and south, they will provide lower-cost rail rates for shipping container loads quickly into the US mid-west, east, and southeast. One of the key opportunity areas for the region around Prince George is in manufacturing and exporting speciality value-added wood products. One of the niche market wood products that is in high and growing demand is profiled log buildings. The US is by far the largest market for log buildings worldwide with strong growth in the mid-west (Great Lakes), eastern, and southern regions.

The US market for log buildings was estimated at $1.72 billion in 2003 with substantial growth since then. It is by far the largest market for log buildings in the world, dwarfing all other countries and regions in the world. The US log building market is dominated by profiled log building suppliers (at least 75% by sales), with the remainder being made up of handcrafted log and timberframe buildings. Many of these profiled log building companies focus their efforts on design, marketing, and sales, preferring to purchase the raw product—double or single tongue-and-groove profiled logs, usually 6 by 8 in 'D' logs in two-foot increments from 8 to 36 feet long. The profiled logs are matched to the design/order and shipped to the erection site as part of a complete building package.

The North and Central Interior have ample supply of standing dead pine from the mountain pine beetle epidemic. The business concept is to locate a processing facility adjacent (or co-located) to an existing primary breakdown sawmill facility and to obtain the species and size required for the operation as part of the regular bush run and sorting process employed by the sawmill. The specific steady supply of the feed stock, low-cost standing dead (not rotten) smaller diameter logs (8" top), would be used by a canting operation, followed by a profiling operation. Once the logs are profiled then they would be sprayed lightly with preservative to prevent colouring and then shipped. The logs would ship easily in 20- and 40-foot closed-top containers depending on the customers' desired lengths. Using mobile conveyor technology, the logs could be quickly loaded directly into containers already placed on trucks.

This high demand for profiled log homes is expected to continue for a least a decade and a half as it is fuelled by "baby boomers" that have already earned much of their retirement incomes and are keen to establish second homes for their families to enjoy. In wealthy regions of the US, the demand for second homes has not followed the general downturn in the housing market.

2.2 PRODUCT DEFINITION

Specifications

The business will provide white and lodgepole, standing dead (due to pest infestation) pine cants and profiled logs. The cants and profiled logs will have variable moisture content levels depending on the length of time that they have been dead and the length of time between cutting, processing, shipping, and arrival in customers' yards. The cants will be primarily 8 ¼ by 6 ¼ inch with larger (10 ¼ by 8 ¼ inch) and smaller sizes available. The profiled logs will be milled to the specifications of the buyers from the cants listed above. Some blue stain from the pest attack may be reduced in canting. The cants and profiled logs will be shipped by container, initially to the eastern USA.

A smaller supply of Engelmann spruce, usually in larger dimensions for handcrafted buildings, which also comes along with the pine, can also be sold to the same buyers for their specific projects; however, pine is the primary species. Two decades of supply of standing dead pine is expected to be available.

Preferred Service

The business will begin by supplying cants but the strong desire is to add value by also profiling the cant to any specifications a log home company may desire. Log facade siding can also be produced.

The Advantages & Disadvantages of Standing Dead Logs

There are several advantages in using standing dead logs as follows:

- It is much drier than green wood and therefore shrinks much less then logs taken as living trees.
- Dead wood is lighter than green and lower shipping weights reduce freight costs (when based on weight).
- Lower weights make assembly easier.
- Historically, standing dead logs have been of substantially lower value or of no value to the major mills and therefore are available for substantially less cost.
- Stumpage rates for standing dead logs have been much lower.
- Dead logs are considered environmentally friendlier due to low impact on healthy forests.

There are also disadvantages and they are as follows:

- The term "standing dead" can have many meanings. For example, a tree may appear to be dead while standing but it takes several years for the moisture content to lower to ambient levels, providing only limited reduced shrinkage.
- As the log dries on the stump it is exposed to deterioration; moisture loss can also cause splits or checks in the tree.
- Checks can harbour rot and mildew that leads to losses of useable volume to the mill.
- The degree of deterioration increases in three years and often logs are of no value after six years.
- Boring insects can also add to the deterioration and lower quality, which is reflected in the grade and therefore the price paid by end users.
- The early stage of deterioration adds a "blue stain" to the surface of the log. Although not structurally significant, there has been less market exposure and acceptance to this variation.

3 MARKET FOR PROFILED LOGS

3.1 US MARKET

Traditional Market for Standing Dead Logs

The Bitteroot Valley of Montana has a historical concentration of both machine-profiled mills and handcrafted log-home building companies. The majority of these companies use standing dead pine for their log system. Higher grade lodgepole pine—straight and 9- to 10-in tops in 30 feet lengths—has ensured steady demand from the handcrafted companies. Sorting out higher grades, is worthy of consideration as higher grade logs used by the handcrafters fetch a substantially higher price.

The largest machine-profile log home building company in the area indicates their access to logs is cyclical. At this time they have an adequate supply from Montana, but have a shortage of large pine (12-in tops) and spruce of an equal size or greater, which is often used for roof structure purlins and ridge logs.

The standing dead wood used by the Bitterroot Companies represents a small percentage of the machine-profiled market in the USA. By far, the highest concentration of manufacturers and buyers are in the eastern USA.

Eastern USA Market

The Eastern US client base has not been receptive to profiled logs with blue stain regardless of how minor the occurrence. However, if this material is priced right, it is felt a market for it will emerge.

Manufacturers are interested but reserved. Jay Forester, from Real Log Homes—a major player in profiled log homes—is familiar with timber coming out of the beetle-kill region in BC. He has been getting some of the fresher cut material. He indicates that he would be concerned about the extent of checking and rot that develops in those checks. He explained that he has spent a lot of time working with the supplier to make sure he is getting the quality he requires.

From the Eastern consumer perspective, there is also an issue of boring beetle holes. The profiled log building companies believe that boring beetles will go into dead standing trees which is a concern for market acceptance. Killing larvae before they exit the log wall through the heat-treated process would reduce the issue, hence making the product much more plausible.

Grading will be done by the log-home manufacturing company if product is sold to them as cants. If the logs are coming in a final milled form, then a grade mark or Certificate of Inspection may be required. If the purchaser wants certification of moisture content for the purposes of establishing an estimate of shrinkage, that will have to appear on the grade mark as well. TPI inspections, available in BC, can handle both.

3.2 SPECIFICATIONS

Current Purchasing Specification

Example 1: Mill run cant—16 ft in length

- No blue stain, no wormholes, and no rot
- Cant sizes are 8 x 8 ft (8 ¼ x 8 ¼), 6 x 12 ft (6 ¼ x 12 ¼), 6 x 6 ft (full sawn) and 4 x 6 ft (full sawn) with 1x8, 1x10, and 1x12 ft pieces to match. They would order the cants and plane the material to their patterns.

Example 2: Mill run cant—random length 10ft. to 16ft.

- Sizes: 6 x 6 ft, 6 x 8 ft, some 6 x 12 ft, 8 x 8 ft, 8 x 12 ft, 10 x 10 ft, 12 x 12 ft, even some off sizes for milling Swedish cope (9 x 9 ft, 11 x 11 ft)
- Cants: all cants are to be oversized by at least 1/8 in up to ¼ in.
- Knots: in general, knots should be limited to one-third of the width of the face of the cant. The specifications on knots vary, with one company looking for 1 ½ in knots maximum.

Rot and insects are not permitted in any form. Evidence of insects (holes) can be permitted if small and scattered. Blue stain and checking are the big questions in everyone's minds. Several production managers suggest they expect to return half of the initial loads because of quality and acceptance issues when dealing with new suppliers.

Volume

Volumes can be quite high, in excess of a container load per week, if the quality matches requirements. It may also be required to keep an inventory in the East to ensure timely delivery for on-demand ordering when the product is fully accepted.

Price

Manufacturers are willing to pay $500 to $600 per thousand board feet for cants. The price ranges depending on quality

3.3 MARKET CONCLUSION

Current acceptance of standing dead pine is limited to only a few manufacturers of profiled log homes with limited sales regions. To increase the market for this product will require introducing it to the large manufacturers in the eastern USA. If the price is competitive, several of these manufacturers have indicated they would be interested in examining the product and offering it as an alternative product line. To achieve this acceptance will require an experienced sales and marketing professional, with specific experience in the log home industry, to personally present a video and significant sample selection to approximately 12 manufacturing facilities. Attendance at industry conferences would also provide substantive exposure. Firm information on volumes available, cost, certification/grading, quality control, and production capability would be required for any additional market feasibility assessment.

Appendix 1 contains a listing of people interviewed during the research.

4 PRODUCTION

4.1 LOG SUPPLY

A June 2007 report on harvesting in mountain pine beetle-affected areas[1] indicates that Prince George Timber Supply Area (TSA) forest company operators are cooperating on maximizing harvest flow over time. The report demonstrates efforts of encouraging harvest in stands over 70% pine in the short term, so that stands with higher percentages of other components will be retained for harvest in the mid and longer range terms, when their economic viability becomes crucial.

Table 1: Prince George TSA harvest focus 2004 to 2006

Administrative Unit	%THLB* Pine ≥ 70%	%Harvest Pine ≥ 70%
Prince George TSA	**37%**	**71%**
Vanderhoof District	**71%**	**85%**
Fort St. James District	**26%**	**59%**
Prince George District	**26%**	**65%**

** THLB is Total Harvestable Land Base*

Positive results are evident, demonstrating that forest operators understand and are actively pursuing a long-term timber supply, critical to the consideration of setting up a new business.

The Prince George Annual Allowable Cut (AAC) is currently over 14 million m^3 per year, and will experience a forecasted decline of approximately 21% as pine harvest declines after 2010.[2] The base case AAC is 9.1 million m^3, of which spruce historically contributed 33%. The licensee base is broadly varied, with sufficient volumes being controlled by First Nations to consider multiple small log mills manufacturing across the TSA.

4.2 SAWMILL CONSIDERATIONS

Small log mills are many and varied (See Appendix 1). The first choice is between and band mill and a circular mill, and for smaller logs, a band mill is clearly the right choice.[3] For the purposes of this report, the band mill supplied by BC producer Povlsen Machining Ltd. will be used as an example, and an assumption will be made that the intended products are squared materials (cants) for profiled log production. The profile (round, Dee Log, single tongue and groove, or double tongue and groove) will be left to the individual owner's choice, depending on examinations of markets. For the purposes of this report, an assumption is made that producers will initially ship squared output only, to maximize shipping efficiency, reduce breakage, and provide maximum flexibility to the customer.

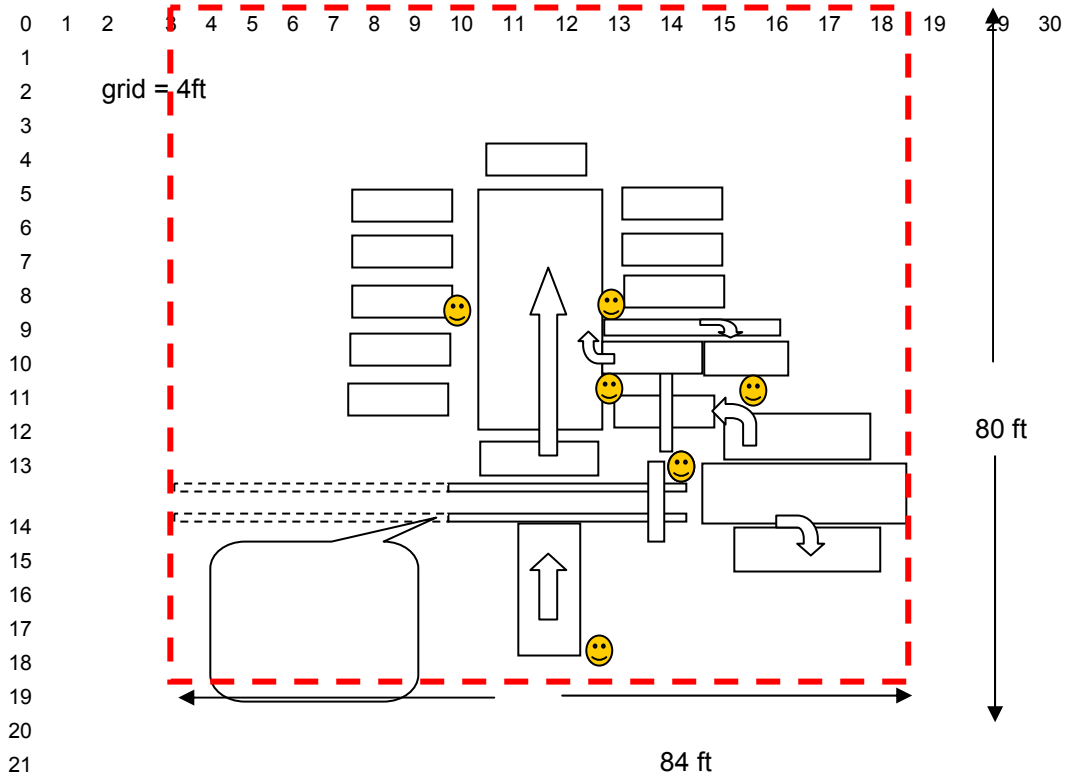
[1] Monitoring Harvesting Activity across 16 Mountain Pine Beetle Impacted Timber Supply Areas, BC Ministry of Forests and Range, June 2007
http://www.for.gov.bc.ca/hfp/mountain_pine_beetle/MPB_Harvest_Monitoring_2007.pdf

[2] http://www.policy.forestry.ubc.ca/issuebriefs/Facilitating%20community.html

[3] http://www.woodweb.com/knowledge_base/Portable_bandmill_vs_circular_mill.html

Povlsen Machining Ltd. offers the Model 36 mobile band mill, a self-contained, high-production sawmill with integral edger. The log remains stationary on the log bed, while the saw head travels back and forth. The 19-gauge (0.0042 in) band results in better recovery, the company says. The 5-inch wide double-cut blade allows the Model 36 to cut in both directions.[4] Heavy slabs are kicked off to a 36 inch resaw (single cut). The main mill can cut two 16 foot lines per minute or 860 lines per shift. This relates to approximately 77 m^3 (two truck loads of logs) per shift. The following diagram shows the basic mill configuration:

Figure 1: Basic Flow Plan Povlsen Band Mill



Assuming log quality parameters are in place, and the "right" log is arriving at the mill yard, log conversion using this system results in very little waste. Table 2 and Table 3 identify some assumptions inputs and outcomes of the Povlsen System.[5]

[4] http://www.forestnet.com
[5] Marvin Funk, owner. July 2007. Personal communication with C.S.Ortner.

Table 2: Sawmill Operating Parameters

Input to Sawmill	Measure
Average Log Diameter (top)	22.86 centimetres
Average length	5 metres
Average cubic metre content	0.269 m^3
Average end section recovered	0.1161 m^3
Recovery in timbers	43.2%
Recovery as lumber	21.8%
Total lumber recovery	65%
Average estimated log cost per m^3	$56.00
Fibre cost in finished product	$86.15 per m^3
Fibre cost in finished product (Mfbm)	$203.30 per Mfbm

Producing only squared timbers and side lumber, with slabs going to standard sawn dimension lumber and fascia, and shorts going to pallet stock or lath, the following outcomes can be expected:

Table 3: Sawmill Output Estimates

Product	% Produced	Approximate value ($/$m^3$)[6]
Timbers and Cants	60.0%	233.08
Fascia and Std. Sawn	16.0%	127.13
Pallet Lumber	16.0%	63.57
Lath, kiln sticks, etc.	8.0%	80.52
Average $ value per m^3	100.0%	$176.80/$m^3$
Cost of Fibre		$86.15/$m^3$
Cost of production		$51.64/$m^3$
Gross margin per m^3		$39.00/$m^3$

Set up costs, including site preparation, purchase, and placement of mill components, on-site equipment and loading docks are included in the cost of production (above). Basic equipment in this scenario includes the 36 inch Double Cut Pavlson Band Mill ($85,000), the horizontal resaw ($38,000), and edger ($19,700). Employees will include a manager, a clerk, a loader operator, a sawyer, resawer, and edger operator, 2 pilers, and one general labourer for a total of 9 jobs. The average wage for hourly workers is estimated at $17.00 per hour, and includes 25% payroll loading. Total potential profit with 250 shifts per year is $488,802.42, prior to shipping. Costs of shipping will be variable depending on distance to market.

4.3 SHIPPING

For the purposes of this report, it is assumed that loading will be on to containers at a central facility in Prince George. Logistics and timing make it unlikely that loading will occur at remote locations. Assuming one trip per day, a trucking cost of $1400 per day, and a B Train volume of 35,000 fbm, transport costs would be approximately $16.00 per m^3, and container stuffing an additional $3.00 per m^3. Under this scenario, final potential profit for the mill operation is $250,650 per year.

[6] Average value in m^3 = Value Mfbm / 2.3597 Example value is $550/Mfbm

5 CONCLUSIONS

In North-Central BC there is an extensive supply of standing dead pine that is expected to be available for at least the next decade and a half. There is also a strong, growing, large market for profiled log buildings in the US; profiled log homes represent approximately 75% of a total market for log and timberframe buildings that exceeded $1.7 billion in 2003 alone.

The large demand for profiled log buildings creates a substantial demand for cants to process into profiled logs. There initially is a small and, then potentially, very large market for BC beetle-killed pine cants, and eventually then for profiled logs, for use in the profiled log building industry in the US.

Using relatively low-cost technology, with an initial investment in equipment of less than $200,000, cants (and other by-products) can be produced to match the required specifications. At a sale price of $500 per thousand board feet measure (mbfm), the operation's revenue closely matches its expenses. With cants at a price of $550/mbfm, the operation generates a substantial return of capital.

The combination of available supply of standing dead pine, the current and potential size of the market for cants and/or profiled logs, the availability of relatively low-cost, efficient, basic sawing technology, and the potential viability of the proposed operation this business concept is a strong candidate for further research including a pilot production and marketing process.

APPENDIX 1 – INTERVIEWS

- Jim Young, President – Precision Log Homes – Boise, Idaho
- Pat Connell, Chief Forester – Rocky Mountain Log Homes – Bitterroot, Montana
- Jay Forester – Real Log Homes – North Eastern States
- Jackie Cherry – Honest Ab Log Homes - Tennessee
- Yellowstone Log Homes – Rigby, Idaho
- Slatterwhite Log Homes – Longview, Texas
- Kauns Brothers Log Homes – Lewisburg, Pennsylvania
- Apine Log Homes – Bitterroot, Montana
- Marvin Funk – Timber Pro Industries Inc. – Logan Lake, BC

APPENDIX 2 – PORTABLE SAWMILLS[7]

Povlsen Machining Ltd

Povlsen Machining Ltd offers the Model 36 mobile band mill, a self-contained, high-production sawmill with integral edger. The log remains stationary on the log bed, while the saw head travels back and forth. The 19-gauge (0.0042") band results in better recovery, the company says. The 5" wide double-cut blade allows the Model 36 to cut in both directions. Povlsen's Model 36R resaw has 36" steel wheels, 5" single cut, 19-gauge band and an 18" wide conveyor belt. Cutting capacity is 18" wide, 24" high and up to 20' in length. It has hydraulic variable speed up to 200 fpm. A return conveyor brings cants back to the operator. Multiple heads can be added. Also available are the Model 26 mobile band mill and the Model 26R resaw. Both have 26" steel wheels and a two-inch wide single cut blade. The Model 14H board edger comes with two hydraulic shifts and a 14", 24-tooth carbide-tipped thin kerf saw. Povlsen also offers a two or three saw scragg.

OTHER MANUFACTURES OF SIMILAR EQUIPMENT

1. Enercraft/Baker Products Inc
2. Kodiak Mills Inc
3. Select Sawmill Co.
4. Summer Industries
5. Clarke Custom Steel Inc
6. Ellington Manufacturing/Baker Products
7. Wood-Mizer
8. Mobile Manufacturing
9. Timber Harvester
10. Cutting Edge
11. Josa/Jonsered
12. Dika Industries
13. Kasco Manufacturing
14. Heartwood Saw
15. Isaac Ironworks
16. Hud-Son Forest Equipment
17. Micromill Systems
18. Pendu Manufacturing
19. Norwood Industries
20. Kara/Kallion Konepaja Oy

[7] http://www.forestnet.com