



FOREST SECTOR ADVISORY COUNCIL (FSAC)

**STUDY OF THE MARKET
PULP INDUSTRY
DECEMBER 1985**

HD
9750
.P741
1985

**FOREST SECTOR ADVISORY COUNCIL
CONSEIL CONSULTATIF DU SECTEUR FORESTIER**



4D
9750
.P741
1985

FOREST SECTOR ADVISORY COUNCIL
STUDY OF THE MARKET PULP INDUSTRY

DECEMBER 1985

36340

FOREST SECTOR ADVISORY COUNCIL
STUDY OF THE MARKET PULP INDUSTRY

TABLE OF CONTENTS

| | <u>PAGE</u> |
|-------------------------------|-------------|
| SCOPE AND APPROACH | 1 |
| DATA ANALYSIS | 4 |
| REGIONAL DIFFERENCES | 5 |
| CONCLUSIONS AND OBSERVATIONS | 8 |
| SUMMARY OF EXHIBITS | 9 |
| REVIEW OF MAJOR COST ELEMENTS | |

EXHIBITS

1. Summary of Costs - Currency of Country
2. Ratio of Major Cost Elements
3. Summary of Costs - Canadian Dollars
4. Key Economic Factors - Exchange Rate and Consumer Price Indices
5. Mill Capacity
6. Wood Fibre - Consumption
7. Wood Fibre and Chemicals - Costs
8. Energy - Consumption
9. Energy - Cost
10. Labour - Total
11. Labour - Operating Personnel
12. Labour - Administrative and Supervisory staff
13. Other Mill Level Costs (Includes Other Materials)
14. Corporate Expenses, Delivery Costs and Depreciation

APPENDICES

1. Selected Questionnaire Data
 - A. Plant and Production Data
 - B. Energy Data
 - C. Labour Costs
 - D. Delivery Data
 - E. Mill Administration, Corporate Level Expenses and Depreciation
 - F. Total Manufacturing Costs and By-Product revenues
2. Impact on B.C. Interior Production Costs of the 1984 Shutdown

Price Waterhouse



December 31 1985

Mr. W. I. Hughes,
Vice President,
Pulp and Paper Manufacturing,
Canfor Corporation,
P.O. Box 6000,
PRINCE GEORGE, B.C.
V2N 2K3

Dear Mr. Hughes:

We are pleased to present to the market pulp sub-committee of the Forest Sector Advisory Council (FSAC) our report on the market pulp study. This report includes a description of our approach, an analysis of the data base, an outline of regional differences that can be observed from the data base, various exhibits presenting the data which we collected, and our conclusions.

SCOPE AND APPROACH

The purpose of this study is to assess the world-wide competitive position of the Canadian bleached softwood kraft market pulp industry. To conduct this assessment, we have developed a data base of manufacturing costs for major producing regions of softwood kraft pulp.

The regions covered in this study include:

- . British Columbia Coast;
- . British Columbia Interior;
- . Eastern Canada;
- . Western U.S.;
- . Southern U.S.;
- . Finland; and
- . Sweden.

As agreed with the Council, we have studied a representative sample of the industry in each region, rather than attempting to obtain 100% coverage. For the Canadian and U.S. regions, our approach for collecting data has been as follows:

- . Design a questionnaire requesting detailed cost and operating data in a standard format;
- . Obtain approval of the questionnaire from the FSAC pulp sub-committee;
- . Select, with background information from the pulp sub-committee, four survey participants in Eastern Canada and three in each of the four other regions. The names of the participants are confidential and known only to Price Waterhouse;
- . Obtain co-operation from each participant and send the questionnaire;
- . Develop a computerized model to analyze the data on a regional basis and input data received from the completed questionnaires;
- . Analyze the data, identify any inconsistencies in the data and any regional differences;
- . Visit each mill to correct any errors or anomalies in the data and confirm any regional differences identified in the preliminary analysis;
- . Make adjustments to the data to ensure consistency across various mills within each region, i.e.,
 - adjust production costs so that only bleached softwood kraft pulp production made from pulp logs and chips but not sawdust is considered; and
 - adjust production costs where peculiar production conditions such as a major strike or unusual downtime would distort the regional average for a specific year. We did not adjust the data, however, when an entire region was affected by a change in the operating environment. More specifically, the B.C. data were not adjusted for the 1984 nine week shutdown caused by labour disputes. However, the impact of this latter anomaly is discussed later in this report.



- . Estimate any unavailable data in co-operation with mill accounting departments; and
- . Present the data in our report to the pulp sub-committee.

For Finland and Sweden, we had expected to collect data using the approach used for Canada and the U.S. However, the Scandinavian mills were unable to complete our detailed questionnaire. We revised our approach for collecting the Scandinavian data, as follows:

- . Contact Finncell, the central marketing agency for pulp producers in Finland, and obtain summary cost data for eight major Finnish pulp mills;
- . Contact the individual Swedish producers and obtain summary cost data of six major Swedish mills;
- . Review the data and identify differences with the North American data;
- . Design a summary version of our detailed questionnaire;
- . Visit Finland, discuss the summary cost data with two individual mills and Finncell; and obtain the co-operation from four mills to complete the shorter version of our questionnaire;
- . Visit four Swedish companies, and obtain their co-operation in the study;
- . Collect the questionnaire data, analyze industry information, and estimate missing data whenever possible;
- . Forward the Finnish results to industry representatives at Finncell to obtain their concurrence and reaction to their data; and
- . Present the data in a report format to the pulp sub-committee.

TABLE 1

FOREST SECTOR ADVISORY COMMITTEE
STUDY OF THE MARKET PULP INDUSTRY

LEVEL OF COVERAGE

| | TOTAL CAPACITIES BASED ON CPPA DATA (a) | | | | CAPACITIES IN PWA STUDY (a) | | | |
|------------------|--|-----------------------------|---------------|-----------------------------|--------------------------------|----|-----------------------------|----|
| | 1984 | | 1983 | | 1984 | | 1983 | |
| | % of Total | Metric tonnes (000's) | % of Total | Metric tonnes (000's) | Metric tonnes (000's) | % | Metric tonnes (000's) | % |
| B.C. | 23 | 3,229 | 23 | 3,170 | 1,672 | 52 | 1,667 | 53 |
| Quebec & Ontario | 9 | 1,243 | 9 | 1,220 | 1,005 | 81 | 988 | 81 |
| Rest of Canada | 7 | 1,028 | 7 | 1,010 | - | - | - | - |
| Total Canada | 39 | 5,500 | 39 | 5,400 | 2,677 | 49 | 2,655 | 49 |
| U.S. South | 17 | 2,454 | 17 | 2,370 | 394 | 16 | 383 | 16 |
| U.S. West | 4 | 546 | 4 | 527 | 284 | 52 | 246 | 47 |
| Other U.S. | - | 30 | - | 29 | - | - | - | - |
| Total U.S. | 21 | 3,030 | 21 | 2,926 | 678 | 22 | 629 | 22 |
| Finland | 5 | 697 | 6 | 760 | 289 | 42 | 347 | 46 |
| Sweden | 14 | 2,033 | 15 | 2,033 | 880 | 43 | 880 | 43 |
| Norway | 2 | 233 | 1 | 165 | - | - | - | - |
| Rest of World | 19 | 2,669 | 18 | 2,542 | - | - | - | - |
| Total | 100 | 14,162 | 100 | 13,826 | 4,524 | 32 | 4,511 | 33 |

(a) These data include only the capacity of bleached softwood kraft market pulp.

SOURCES OF DATA:

Canadian Pulp and Paper Association (CPPA)
 Industry publications
 Respondents

The level of operating and cost data attributable to production capacities covered in this study include information from contributing mills and estimates based on published sources.



DATA ANALYSIS

The survey data for 1984 represent 49% of the Canadian capacity for bleached softwood kraft market pulp and 22% of the U.S. capacity. The Scandinavian data include 4 mills in each of Finland and Sweden, and in 1984 these mills accounted for 42% and 43% of the market pulp capacity in Finland and Sweden respectively. A summary of the level of coverage of the study is presented on Table 1.

We are confident that the data presented in this report are reasonably accurate. The 1983 and 1984 data is comparable because the same mills are included in our sample for each year. However, different accounting practices and operating conditions affect the data consistency across the various mills and regions. For example:

- . Transfer prices of fibre and energy between related operations may not reflect market value.
- . Contracting out of major activities affects the cost breakdown among various elements:
 - mills which contract regular maintenance, security, and cafeteria operations have lower labour costs but higher mill expenses;
 - mills located on tide water with their own shiploading crews, have higher labour costs but lower transportation costs.
- . Design of the mill may be such that one cost element is lower at the expense of another. For example, mills which produce some of their own chemicals may have higher energy costs but lower chemical costs.
- . The type of machinery affects the cost breakdown between elements. For example, Foudrinier pulp machines decrease labour costs but increase the cost of machine clothing.
- . Some mills produce market pulp from both hardwood and softwood and the product costs for softwood pulp sometimes had to be estimated in collaboration with the mill. The same comment applies for integrated mills that produce paper and for mills that use chips as well as sawdust. In this latter case, we adjusted data to exclude the production of sawdust pulp.

- Corporate accounting practices also differ across mills, therefore affecting cost elements such as research and development, the allocation of head office expenses, depreciation and interest expenses. We could not obtain data consistency in the reporting of interest expenses and depreciation, and these have been excluded from our analysis. Depreciation expenses, however, are reported on Exhibit 14 only.

In conclusion, differences in the operating environment and the accounting for various costs may cause some distortions in the individual elements of total costs. Members of the committee should keep these factors in mind when analyzing the data, and particularly when comparing individual cost components among the regions.

REGIONAL DIFFERENCES

The following table compares the mill level production costs of bleached softwood kraft market pulp, expressed in Canadian dollars per Air Dry Metric Tonne (ADMT), of the seven regions included in the study:

| | 1984 | | 1983 | |
|----------------|--------------------|------|--------------------|------|
| | Mill Cost/ ADMT | Rank | Mill Cost/ ADMT | Rank |
| Sweden | 343 | 1 | 331 | 1 |
| Finland | 382 | 2 | 389 | 4 |
| B.C. Interior | 408 | 3 | 371 | 2 |
| Eastern Canada | 424 | 4 | 413 | 6 |
| U.S. South | 428 | 5 | 388 | 3 |
| U.S. West | 434 | 6 | 406 | 5 |
| B.C. Coast | 456 | 7 | 422 | 7 |

A breakdown of these mill costs into the major elements - wood fibre, chemicals, labour, energy and other mill costs - is presented in the attached exhibits along with some observations on the data. Where

available, corporate level and delivery costs are also presented in the exhibits. The detailed data base by region is then presented in Appendix 1.

As the above table shows, Sweden is the lowest cost producer in both 1983 and 1984. In 1984, Finland was the second lowest cost producer after ranking fourth in 1983. Finland gained competitiveness over the other regions for the following reasons:

- . Energy costs decreased significantly largely because of major capital investments at the Finnish mills;
- . Finland had the lowest overall cost increases of all regions when costs are expressed in the local currency of each country;
- . In 1984, the Finnish Markka further devalued by 2.6% relative to the Canadian dollar (following larger devaluations in 1982 and 1983).

The B.C. Interior region dropped from second in 1983 to third place in 1984. The worsening in the competitiveness of B.C. Interior mills was partially caused by a nine week shutdown in 1984. We estimate that the shutdown affected mill level costs for the B.C. Interior region by \$12 per ADMT assuming an 88% operating rate. Our analysis of the impact of the shutdown is summarized in Appendix 2.

Other major regional differences which can be observed from the data base include the following:

- . The average age of pulping facilities in Canada ranges between 1960 for B.C. Coastal mills and 1972 for the B.C. Interior compared with 1973 and 1974 in the U.S., 1978 in Sweden and 1980 in Finland. Capital investments have been larger in Scandinavia in recent years. It was beyond the scope of this study to identify and explain regional differences in capital investment patterns, and these are not discussed further in this report.
- . Fibre costs in the B.C. Interior are the lowest of all regions. In North America, fibre costs per ADMT range between 32% and 48% of

mill level costs, whereas in Scandinavian countries fibre costs are over 60% of mill level costs.

- . Total energy costs in Scandinavian countries when expressed in Canadian dollars per ADMT are less than one third of the energy costs of mills in other regions.
- . In 1984, on a net basis, 97% of total energy consumed by Finnish mills was self-generated, compared to less than 60% for Eastern Canada and British Columbia.
- . In 1984, labour costs in Finland were less than half of those in North American mills (one third in comparison with B.C. Coast), when expressed in Canadian dollars per ADMT, because:
 - Total hours worked per ADMT were equal to 2.7 hours, the lowest of all regions; and
 - Operating labour costs expressed in Canadian dollars per hour worked were only 75% of Eastern Canadian costs and 63% of other North American regions.
- . Statutory holiday pay is about the same in all regions but most U.S. and Swedish mills do not shut down during these times.
- . Only the Canadian regions reported operating interruptions due to labour disputes. In 1983, seven days in each of B.C. Coast and B.C. Interior; in 1984, 69 days, 68 days, and 37 days in B.C. Coast, B.C. Interior, and Eastern Canada respectively.
- . Property taxes per ADMT in B.C. are over twice the average for other mills in North America. Mills in Finland and Sweden pay relatively minor amounts of property taxes.
- . Delivery costs expressed in Canadian dollars per ADMT are the highest for B.C. Interior mills reflecting the location disadvantage of these mills relative to major markets.

These and other regional differences are reported further in the attached exhibits and appendices.

CONCLUSIONS AND OBSERVATIONS

The major conclusions and observations which can be drawn from this study are as follows:

- . Canada is a high cost producer even before delivery costs are taken into account. It is important to note that Scandinavian mills are very competitive despite very high fibre costs. Not only are other Scandinavian costs lower than those elsewhere but so are hours worked and energy consumed on a per tonne basis.
- . The competitive position of producers is very significantly impacted by rates of currency exchange. This extremely important external factor exacerbates the problems Canada has with its high operating costs.
- . Opportunities exist for improvement in the Canadian competitive position. The report indicates promising areas where action might be taken. A better understanding may be needed of all of the factors involved to better define the actions to be taken by industry, labour, and governments.

* * * * *

The participants went to considerable efforts in completing the detailed questionnaires and in responding to our further requests for information. Their co-operation is very much appreciated.

We would also like to thank you and your committee for your support and assistance.

Yours very truly,



M. MacCallum,
Partner.

SUMMARY OF EXHIBITS

EXHIBIT
NUMBER

- 1 SUMMARY OF COSTS - CURRENCY OF COUNTRY
- 2 RATIO OF MAJOR COST ELEMENTS
- 3 SUMMARY OF COSTS - CANADIAN DOLLARS
- 4 KEY ECONOMIC FACTORS - EXCHANGE RATE AND CONSUMER PRICE INDICES
- 5 MILL CAPACITY

FOREST SECTOR ADVISORY COUNCIL
STUDY OF THE MARKET PULP INDUSTRY

SUMMARY OF COSTS
(expressed in currency of country)

| | CANADA | | | | | | U.S.A. | | | | FINLAND | | SWEDEN | |
|--|---------------|------------|------------------|------------|-------------------|------------|------------|------------|------------|------------|--------------|--------------|--------------|--------------|
| | B.C. Coast | | B.C. Interior | | Eastern Canada | | West | | South | | 1984 | 1983 | 1984 | 1983 |
| | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | | | | |
| COST PER AIR DRY METRIC TONNE (ADMT) | | | | | | | | | | | | | | |
| Wood fibre | 146 | 138 | 135 | 126 | 204 | 200 | 126 | 120 | 127 | 126 | 1,252 | 1,199 | 1,409 | 1,274 |
| Chemicals | 48 | 44 | 58 | 53 | 54 | 54 | 40 | 41 | 48 | 45 | 218 | 196 | 193 | 207 |
| Energy | 60 | 53 | 45 | 39 | 37 | 36 | 61 | 63 | 42 | 41 | 21 | 71 | 60 | 98 |
| Labour | 112 | 106 | 88 | 78 | 77 | 73 | 59 | 60 | 73 | 65 | 167 | 185 | 339 | 311 |
| Other Mill Level (1) | 90 | 81 | 82 | 75 | 52 | 50 | 49 | 45 | 40 | 38 | 118 | 112 | 192 | 169 |
| Mill Level Cost | 456 | 422 | 408 | 371 | 424 | 413 | 335 | 329 | 330 | 315 | 1,776 | 1,763 | 2,193 | 2,059 |
| Corporate and Selling Expenses (2) | 29 | 21 | 13 | 10 | 22 | 19 | 7 | 7 | 4 | 4 | 73 | 71 | - | - |
| Delivery | 72 | 64 | 92 | 92 | 58 | 54 | 44 | 47 | 55 | 56 | 186 | 170 | 257 | 239 |
| Total Delivered Cost (before depreciation and interest expense) | 557 | 507 | 513 | 473 | 504 | 486 | 386 | 383 | 389 | 375 | 2,035 | 2,004 | 2,450 | 2,298 |
| % Increase (Decrease) from 1983 | | | | | | | | | | | | | | |
| - Mill level | 8.1% | | 10.0% | | 2.7% | | 1.8% | | 4.8% | | .7% | | 6.5% | |
| - Delivered cost | 9.9% | | 8.5% | | 3.7% | | 0.8% | | 3.7% | | 1.5% | | 6.6% | |
| Reference: Consumer prices - % change from 1983 | 4.3% | | 4.3% | | 4.3% | | 4.3% | | 4.3% | | 6.8% | | 7.5% | |

Notes:

- (1) Other mill levels costs include materials, maintenance services and mill administration and they are net of byproduct revenues
(2) Sweden did not report any corporate expenses.

SUMMARY OF COSTS (Expressed in currency of country)

Exhibit 1 summarizes the 1983 and 1984 cost data in the currency of each country. Also, the exhibit compares the percentage change in 1984 costs relative to 1983 with changes in the consumer price index (CPI) for each country.

In 1984, none of the regions lowered their production costs. Finland had the lowest cost increases of all regions, largely because of a 70% drop in energy costs and lower labour costs.

In British Columbia, cost increases exceeded changes in the CPI, contrary to Eastern Canada. In the Western U.S., Finland, and Sweden, cost increases were also lower than changes in the CPI. In the U.S. South, changes in costs approximated changes in the CPI.

The mills in British Columbia showed relatively large cost increases, partially because of labour difficulties in 1984. We estimate that for 1984, the mill level and total delivered costs per ADMT for the B.C. Interior mills would have been \$396 and \$499 respectively, assuming no labour difficulties and an operating rate of 88%. An analysis of the cost impact of the shutdown is included as Appendix 2. We did not have sufficient data to estimate the impact of labour difficulties on the B.C. Coastal mills.

We did not include depreciation expenses in total costs because of different accounting methods between the mills and regions. Depreciation expenses are reported on Exhibit 14 only.

FOREST SECTOR ADVISORY COUNCIL
STUDY OF THE MARKET PULP INDUSTRY

RATIO OF MAJOR COST ELEMENTS

| | CANADA | | | | | | U.S.A. | | | | FINLAND | | SWEDEN | |
|--|---------------|------|------------------|------|-------------------|------|--------|------|-------|------|---------|------|--------|------|
| | B.C. Coast | | B.C. Interior | | Eastern Canada | | West | | South | | 1984 | 1983 | 1984 | 1983 |
| | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | | | | |
| EXPRESSED IN % COST PER ADMT | | | | | | | | | | | | | | |
| Wood fibre | 32 | 33 | 33 | 34 | 48 | 48 | 38 | 37 | 38 | 40 | 71 | 68 | 64 | 62 |
| Chemicals | 10 | 10 | 14 | 14 | 13 | 13 | 12 | 12 | 15 | 14 | 12 | 11 | 9 | 10 |
| Energy | 13 | 13 | 11 | 11 | 9 | 9 | 18 | 19 | 13 | 13 | 1 | 4 | 3 | 5 |
| Labour | 25 | 25 | 22 | 21 | 18 | 18 | 17 | 18 | 22 | 21 | 9 | 11 | 15 | 15 |
| Other Mill Level | 20 | 19 | 20 | 20 | 12 | 12 | 15 | 14 | 12 | 12 | 7 | 6 | 9 | 8 |
| Mill Level Cost | 100 | 82 | 100 | 83 | 100 | 79 | 100 | 78 | 100 | 84 | 100 | 85 | 100 | 85 |
| | == | == | == | == | == | == | == | == | == | == | == | == | == | == |
| Corporate and Selling Expenses | | 5 | | 4 | | 3 | | 2 | | 4 | | 4 | | 0 |
| Delivery | | 13 | | 13 | | 18 | | 20 | | 12 | | 11 | | 10 |
| Total Delivered Cost (before depreciation and interest expense) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | == | == | == | == | == | == | == | == | == | == | == | == | == | == |

Note:

The ratios for Sweden are probably overstated slightly because Sweden did not report corporate and selling expenses.

RATIO OF MAJOR COST ELEMENTS

Exhibit 2 presents the ratio of cost elements shown in Exhibit 1 and highlights their relative weight at the mill and delivered cost levels.

In Finland and Sweden, fibre costs are over 60% of total costs, whereas in North America, fibre costs range between 32% and 48% of total costs.

The ratio of delivery costs over total cost is largest for the B.C. Interior region, reflecting the distance of the interior mills to offshore markets.

FOREST SECTOR ADVISORY COUNCIL
STUDY OF THE MARKET PULP INDUSTRY

SUMMARY OF COSTS
(expressed in Canadian dollars)

| | CANADA | | | | | | U.S.A. | | | | FINLAND | | SWEDEN | |
|--|---------------|------------|------------------|------------|-------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| | B.C. Coast | | B.C. Interior | | Eastern Canada | | West | | South | | | | | |
| | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 |
| COST PER ADMT | | | | | | | | | | | | | | |
| Wood fibre | 146 | 138 | 135 | 126 | 204 | 200 | 164 | 148 | 165 | 156 | 270 | 265 | 220 | 205 |
| Chemicals | 48 | 44 | 58 | 53 | 54 | 54 | 52 | 51 | 62 | 56 | 46 | 43 | 30 | 33 |
| Energy | 60 | 53 | 45 | 39 | 37 | 36 | 79 | 77 | 55 | 51 | 5 | 16 | 9 | 16 |
| Labour | 112 | 106 | 88 | 78 | 77 | 73 | 76 | 75 | 94 | 80 | 36 | 41 | 53 | 50 |
| Other Mill Level | 90 | 81 | 82 | 75 | 52 | 50 | 63 | 55 | 52 | 45 | 25 | 24 | 31 | 27 |
| Mill Level Cost | <u>456</u> | <u>422</u> | <u>408</u> | <u>371</u> | <u>424</u> | <u>413</u> | <u>434</u> | <u>406</u> | <u>428</u> | <u>388</u> | <u>382</u> | <u>389</u> | <u>343</u> | <u>331</u> |
| Corporate and Selling Expenses | 29 | 21 | 13 | 10 | 22 | 19 | 9 | 8 | 5 | 5 | 16 | 16 | - | - |
| Delivery | 72 | 64 | 92 | 92 | 58 | 54 | 57 | 58 | 71 | 69 | 40 | 38 | 40 | 38 |
| Total Delivered Cost (before depreciation and Interest expense) | <u>557</u> | <u>507</u> | <u>513</u> | <u>473</u> | <u>504</u> | <u>486</u> | <u>500</u> | <u>472</u> | <u>504</u> | <u>462</u> | <u>438</u> | <u>443</u> | <u>383</u> | <u>369</u> |
| % Increase (Decrease) from 1983 | | | | | | | | | | | | | | |
| - Mill level | 8.1% | | 10.0% | | 2.7% | | 6.9% | | 10.3% | | (1.8%) | | 3.6% | |
| - Delivered cost | 9.9% | | 8.5% | | 3.7% | | 5.9% | | 9.1% | | (1.1%) | | 3.8% | |
| Reference: | | | | | | | | | | | | | | |
| Consumer prices - % change from 1983 | 4.3% | | 4.3% | | 4.3% | | 4.3% | | 4.3% | | 6.8% | | 7.5% | |
| Exchange rate % Inc.(dec.) from 1983 | - | | - | | - | | 5.1% | | 5.1% | | (2.6%) | | (2.6%) | |

SUMMARY OF COSTS (Expressed in Canadian dollars)

This exhibit expresses regional costs in Canadian dollars, using the average rate of exchange for the years 1983 and 1984.

The exhibit provides a basis for examining the relative cost positions. Ranked from the lowest cost to the highest in 1984, the relative position of each region is shown as follows:

| | 1984 | | | 1983 | | |
|----------------|-------------------|---------------------------------|------|-------------------|---------------------------------|------|
| | Delivered Cost | Advantage Over B.C. Coast | Rank | Delivered Cost | Advantage Over B.C. Coast | Rank |
| Sweden | 383 | 174 | 1 | 369 | 138 | 1 |
| Finland | 438 | 119 | 2 | 443 | 64 | 2 |
| U.S. West | 500 | 57 | 3 | 472 | 35 | 4 |
| U.S. South | 504 | 53 | 4 | 462 | 45 | 3 |
| Eastern Canada | 504 | 53 | 4 | 486 | 21 | 6 |
| B.C. Interior | 513 | 44 | 6 | 473 | 34 | 5 |
| B.C. Coast | 557 | - | 7 | 507 | - | 7 |

In 1984, the competitive advantage of Sweden and Finland over Canada increased significantly, partly because of the devaluation of the Scandinavian currencies relative to the Canadian dollar. The Swedish delivered cost may be understated because Swedish mills did not report corporate and selling expenses - the above rankings would not be affected, however.

In 1984, the U.S. Western region improved its position relative to other regions as its costs increased by less than 2%. Eastern Canada also improved its relative position as its cost increases were maintained below CPI levels and the value of the Canadian dollar fell relative to the U.S. Dollar.

FOREST SECTOR ADVISORY COUNCIL
STUDY OF THE MARKET PULP INDUSTRY

KEY ECONOMIC FACTORS

| | CANADA | U.S.A | | FINLAND | | SWEDEN | |
|-----------------------|--------|--------|---------------|---------|---------------|--------|---------------|
| | \$ | \$ | % Inc(Dec) | Markka | % Inc(Dec) | Krona | % Inc(Dec) |
| EXCHANGE RATES | | | | | | | |
| 1981 | 1.0000 | 1.1990 | | .2779 | | .2368 | |
| 1982 | 1.0000 | 1.2340 | 2.9% | .2560 | (7.9%) | .1964 | (17.1%) |
| 1983 | 1.0000 | 1.2320 | (.2%) | .2212 | (13.6%) | .1607 | (18.2%) |
| 1984 | 1.0000 | 1.2948 | 5.1% | .2154 | (2.6%) | .1565 | (2.6%) |

Exchange rates are based on daily averages of spot rates quoted on national markets.

CONSUMER PRICES
INDEX 1980 = 100

| | | | | |
|------------------------------------|-------|-------|-------|-------|
| 1982 | 124.6 | 117.1 | 123.0 | 122.0 |
| 1983 | 131.9 | 120.9 | 133.0 | 133.0 |
| 1984 | 137.6 | 126.1 | 142.0 | 143.0 |
| % Increase (Decrease) from 1982 | 5.9% | 3.2% | 8.1% | 9.0% |
| % Increase (Decrease) from 1983 | 4.3% | 4.3% | 6.8% | 7.5% |

SOURCE: Organization for Economic Co-operation and Development (OECD)
 Department of Economics and Statistics
 Main Economic Indicators

KEY ECONOMIC FACTORS

This exhibit summarizes the movement in exchange rates and consumer prices from 1981 to 1984. Relative to the Canadian dollar, the Scandinavian currencies have depreciated and the American dollar has appreciated.

Foreign exchange values have a significant impact on the relative competitiveness of each country. For example, the Swedish krona devaluation has contributed to the improved competitiveness of Sweden on world markets. Similarly, the drop in value of the Canadian dollar relative to the American currency in 1984 would have improved the competitiveness of the Canadian mills, other things being equal. This is the case for Eastern Canada, but B.C. experienced large cost increases which more than offset any advantages gained through this shift in value. (See Exhibit I)

FOREST SECTOR ADVISORY COUNCIL
STUDY OF THE MARKET PULP INDUSTRY

MILL CAPACITY

| | CANADA | | | | | | U.S.A. | | | | FINLAND | | SWEDEN | |
|---|---------------|------|------------------|------|-------------------|------|--------|------|-------|------|---------|------|--------|-------|
| | B.C. Coast | | B.C. Interior | | Eastern Canada | | West | | South | | 1984 | 1983 | 1984 | 1983 |
| | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | | | | |
| Number of Mills Included In the Study | 3 | 3 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 |
| Number of pulp lines (1) | 5 | 5 | 4 | 4 | 5 | 5 | 3 | 3 | 4 | 4 | 7 | N/A | N/A | N/A |
| Average age of pulping facilities (2) | 1960 | 1960 | 1972 | 1972 | 1970 | 1970 | 1974 | 1974 | 1973 | 1973 | 1980 | 1980 | 1978 | 1978 |
| Effective annual bleached softwood kraft market pulp capacity 100% (000's ADMT) (3) | 849 | 844 | 823 | 823 | 1005 | 988 | 284 | 246 | 394 | 383 | 289 | 347 | 880 | 880 |
| Average daily capacity (ADMT) | | | | | | | | | | | | | | |
| - per pulp line (4) | 465 | 462 | 639 | 634 | 632 | 628 | 541 | 541 | 550 | 561 | 540 | 532 | N/A | N/A |
| - per mill | 775 | 770 | 852 | 845 | 790 | 785 | 541 | 541 | 734 | 748 | 945 | 932 | 1,141 | 1,119 |
| Capacity utilization rate | 69 | 72 | 75 | 88 | 76 | 86 | 92 | 86 | 91 | 90 | 93 | 87 | 92 | 88 |

SOURCE: The operating statistics described above pertain to the survey participants and not to the entire industry of each country. As a result, these data cannot be compared directly to published sources.

Notes:

- (1) Includes all pulp lines not just the line allocated to the production of market pulp.
- (2) Arithmetic average of the age of the major facilities at each mill.
- (3) Includes only bleached softwood market pulp capacity.
- (4) Total daily pulp capacity including hardwood, softwood and sawdust pulp capacity.

N/A: not available.

MILL CAPACITY

Exhibit 5 shows the effective annual capacity utilization rate, the average age and the number of pulp lines for the mills included in the study. Identifying the age of the pulp making machinery is difficult as mills continually upgrade their equipment. In this exhibit, we have reported the age of the pulp line or the date of the last major rebuild. We also reported total integrated pulp capacity per pulp mill because of its impact on production costs.

Based on data collected, the B.C. Coastal mills have the oldest machines and the lowest average capacity per line. This explains to some extent the cost disadvantages of B.C. Coastal mills.

Other technical factors affecting production costs which were observed from the mill visits include:

- . The size and efficiency of the power and recovery boilers.
- . The size, capacity and types of pulp dryers and pulp machines. Generally, the newer and efficient mills use air float dryers and have pulp machines with a trim width exceeding 6.0 metres.
- . The size and efficiency of the lime kilns and the causticising plant.
- . The chemicals used in the process.
- . The level of environmental measures required by the government in the various regions. Most of the newer and efficient mills are also the most environmentally sound as emission control systems are built in. Similarly, most of the newer mills have primary and secondary effluent control treatment systems. The retrofit of older mills to meet environmental requirements can be an extremely expensive process, relative to the costs of providing the same level of control in a modern mill.

Each region generally included a cross section of mills and it is difficult to compare the regions on the basis of technical efficiency. On average, however, Canadian mills tend to have older machinery than mills in Finland, Sweden and the U.S.

REVIEW OF MAJOR COST ELEMENTS

(expressed in Canadian Dollars)

EXHIBIT
NUMBER

| | |
|----|---|
| 6 | WOOD FIBRE - CONSUMPTION |
| 7 | WOOD FIBRE AND CHEMICALS - COSTS |
| 8 | ENERGY - CONSUMPTION |
| 9 | ENERGY - COST |
| 10 | LABOUR - TOTAL |
| 11 | LABOUR - OPERATING PERSONNEL |
| 12 | LABOUR - ADMINISTRATIVE AND SUPERVISORY STAFF |
| 13 | OTHER MILL LEVEL COSTS (INCLUDES OTHER MATERIALS) |
| 14 | CORPORATE EXPENSES, DELIVERY COSTS AND DEPRECIATION |

FOREST SECTOR ADVISORY COUNCIL
STUDY OF THE MARKET PULP INDUSTRY

WOOD FIBRE

| | <u>B.C. Coast</u> | | <u>CANADA B.C. Interior</u> | | <u>Eastern Canada</u> | | <u>U.S.A. West</u> | | <u>South</u> | | <u>FINLAND</u> | | <u>SWEDEN</u> | |
|---|-----------------------|------------|-------------------------------------|------------|---------------------------|------------|------------------------|------------|--------------|------------|----------------|------------|---------------|------------|
| | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 |
| | | | | | | | | | | | | | | |
| CONSUMPTION | | | | | | | | | | | | | | |
| Expressed in % | | | | | | | | | | | | | | |
| Roundwood | 22 | 20 | - | - | 32 | 28 | - | - | 65 | 62 | 66 | 62 | 79 | 79 |
| Chips | 78 | 80 | 100 | 100 | 68 | 72 | 100 | 100 | 35 | 38 | 34 | 38 | 21 | 21 |
| | <u>100</u> | <u>100</u> | <u>100</u> | <u>100</u> | <u>100</u> | <u>100</u> | <u>100</u> | <u>100</u> | <u>100</u> | <u>100</u> | <u>100</u> | <u>100</u> | <u>100</u> | <u>100</u> |
| Expressed In Cubic Metres per ADMT | 5.7 | 5.6 | 6.0 | 5.9 | 5.2 | 5.3 | 5.9 | 6.0 | 5.2 | 5.2 | 5.1 | 5.2 | 5.0 | 5.0 |
| Bone Dry Weight (BDMT/M³) | 0.41 | 0.41 | 0.41 | 0.41 | 0.41 | 0.41 | 0.40 | 0.40 | 0.48 | 0.48 | N/A | N/A | N/A | N/A |
| SPECIES UTILIZED (%) | | | | | | | | | | | | | | |
| Pine | | | 21 | 22 | 42 | 36 | 25 | 19 | 100 | 100 | 92 | 89 | 75 | 75 |
| Hemlock - Balsam | 69 | 70 | 1 | 1 | 7 | 6 | | | | | | | | |
| Spruce | 2 | | 56 | 57 | 50 | 56 | | | | | 8 | 11 | 25 | 25 |
| Douglas Fir | 9 | 10 | 20 | 18 | | | 63 | 66 | | | | | | |
| Cedar | 20 | 20 | 2 | 2 | | | 4 | 8 | | | | | | |
| Other softwood | | | | | 1 | 2 | 8 | 7 | | | | | | |
| Total | <u>100</u> | <u>100</u> | <u>100</u> | <u>100</u> | <u>100</u> | <u>100</u> | <u>100</u> | <u>100</u> | <u>100</u> | <u>100</u> | <u>100</u> | <u>100</u> | <u>100</u> | <u>100</u> |

Note: The fluctuations in fibre yield are such that there may be inconsistencies in the reporting of fibre yield data, and no conclusions should be drawn concerning these data.

WOOD FIBRE

A description of wood fibre consumption and types of species utilized by each region is shown in Exhibit 6. For most mills with their own woodroom, roundwood transfer prices between wood and pulp divisions are based on the market price of purchased chips.

In 1984, the consumption of wood fibre ranges between 5m³ per ADMT for Sweden and 6m³ per ADMT for B.C. Interior mills. Most mills record fibre usage on the basis of weight rather than volume, and the equivalent fibre volume had to be estimated using an average bone dry weight for each mill. Further research is necessary to confirm the consistency of the reported data, as we did not expect the difference in fibre yield between regions to be as great as shown. No conclusions should therefore be drawn from these consumption data.

A factor affecting fibre yield is the density of the species utilized. Regions using cedar will consume more fibre per ADMT than regions that use only white wood. Another factor affecting fibre yield is the chip inventory policy. A low turnover in chip inventory can lead to fibre deterioration, which ultimately affects the yield. Generally, mills that did not operate their own woodroom kept larger inventories.

FOREST SECTOR ADVISORY COUNCIL
STUDY OF THE MARKET PULP INDUSTRY

WOOD FIBRE AND CHEMICALS

| | CANADA | | | | | | U.S.A. | | | | FINLAND | | SWEDEN | |
|--|---------------|------------|------------------|------------|-------------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|
| | B.C. Coast | | B.C. Interior | | Eastern Canada | | West | | South | | 1984 | 1983 | 1984 | 1983 |
| | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | | | | |
| COST PER ADMT | | | | | | | | | | | | | | |
| Wood Fibre | 146 | 138 | 135 | 126 | 204 | 200 | 164 | 148 | 165 | 156 | 270 | 265 | 220 | 205 |
| Chemicals - Cooking | 8 | 8 | 9 | 8 | 5 | 6 | 10 | 10 | 16 | 12 | 8 | 9 | 3 | 3 |
| - Bleaching | 40 | 36 | 49 | 45 | 49 | 48 | 42 | 41 | 46 | 44 | 38 | 34 | 27 | 30 |
| Total cost per ADMT | <u>194</u> | <u>182</u> | <u>193</u> | <u>179</u> | <u>258</u> | <u>254</u> | <u>216</u> | <u>199</u> | <u>227</u> | <u>212</u> | <u>316</u> | <u>308</u> | <u>250</u> | <u>238</u> |
| % Increase (Decrease) from 1983 | | | | | | | | | | | | | | |
| Wood Fibre | 5.8% | | 7.1% | | 2.0% | | 10.8% | | 5.8% | | 1.9% | | 7.3% | |
| Chemicals | 9.1 | | 9.4 | | - | | 2.0 | | 10.7 | | 7.0 | | (9.1%) | |
| Average | <u>6.6%</u> | | <u>7.8%</u> | | <u>1.6%</u> | | <u>8.5%</u> | | <u>7.1%</u> | | <u>2.6%</u> | | <u>5.0%</u> | |
| Reference: Exchange rate % from 1983 | | | | | | | 5.1% | | | | (2.6%) | | (2.6%) | |

NOTE: Costs expressed in Canadian dollars.

WOOD FIBRE AND CHEMICALS

Exhibit 7 shows the cost per ADMT of wood fibre and chemicals.

Finland has the highest fibre costs followed by Sweden and Eastern Canada while the two B.C. regions have the lowest.

Chemical costs do not vary significantly among regions and the difference in the breakdown between cooking and bleaching chemicals can partially be explained by differences in accounting for the chemical recovery process. Sweden has the lowest chemical costs followed by Finland and the B.C. Coast.

FOREST SECTOR ADVISORY COUNCIL
STUDY OF THE MARKET PULP INDUSTRY

ENERGY CONSUMPTION

| | CANADA | | | | | | U.S.A. | | | | FINLAND | | SWEDEN | |
|--|---------------|------|------------------|------|-------------------|------|--------|------|-------|------|---------|------|--------|------|
| | B.C. Coast | | B.C. Interior | | Eastern Canada | | West | | South | | 1984 | 1983 | 1984 | 1983 |
| | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | | | | |
| | | | | | | | | | | | | | | |
| ENERGY CONSUMPTION (expressed in GJ per ADMT) | | | | | | | | | | | | | | |
| Gross | 51 | 51 | 46 | 46 | 35 | 38 | 35 | 37 | 33 | 34 | - | - | | |
| Net of boiler inefficiencies | 32 | 32 | 30 | 30 | 24 | 26 | 25 | 26 | 24 | 24 | 16 | 17 | | |
| SOURCE % (Based on net heat values in GJ) | | | | | | | | | | | | | | |
| Purchased electric power | 6 | 5 | 5 | 5 | 8 | 8 | 13 | 12 | 3 | 3 | 3 | 11 | 16 | n/a |
| Purchased fuels | 35 | 36 | 39 | 38 | 28 | 29 | 24 | 25 | 37 | 33 | | | | |
| Purchased steam | | | | | 7 | 7 | | | | | | | | |
| Recoveries | 59 | 59 | 56 | 57 | 56 | 55 | 63 | 63 | 60 | 64 | 97 | 89 | 84 | n/a |
| Self generated hydro- electric power | | | | | 1 | 1 | | | | | | | | |
| Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Purchased Electric Power (kwh per ADMT) | 500 | 460 | 414 | 386 | 520 | 560 | 910 | 890 | 210 | 210 | n/a | n/a | n/a | n/a |

NOTE: n/a: not available

1984 energy sources for Sweden were estimated.

Purchased energy sources include purchased electrical power, oil, coal, lignite, coke, hog fuel, tires and in a few instances, steam.

Self-generated energy includes self-generated hydro-electric power and heat from burning black liquor and fines from the screening process.

For Finland and Sweden, purchased electric power includes a minimal amount of energy generated from purchased fuels.

ENERGY CONSUMPTION

Exhibit 8 shows:

- . The average electrical power and steam consumption expressed in Gj per ADMT before (gross) and after (net) the efficiency of the power and recovery boilers are taken into account.
- . The heat value from purchased and self-generated energy sources expressed as a percentage of total energy.

Some of the factors affecting electrical power consumption include:

- . The operating rate of the mills - during shutdowns, mills purchase all their power.
- . The number of electric boilers.
- . The cost of a substitute.

The following key observations can be made from these data:

- . B.C. has the highest energy consumption and the boilers with the lowest efficiencies.
- . The U.S. West purchases the most electric power and the U.S. South purchases the least.
- . Finland produces the largest proportion of its energy needs.

FOREST SECTOR ADVISORY COUNCIL
STUDY OF THE MARKET PULP INDUSTRY

ENERGY COST

| | CANADA | | | | | | U.S.A. | | | | FINLAND | | SWEDEN | |
|--|---------------|-------|------------------|-------|-------------------|-------|--------|-------|-------|-------|---------|---------|--------|---------|
| | B.C. Coast | | B.C. Interior | | Eastern Canada | | West | | South | | 1984 | 1983 | 1984 | 1983 |
| | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | | | | |
| COST PER ADMT | | | | | | | | | | | | | | |
| Purchased electric power | 14 | 13 | 13 | 11 | 12 | 11 | 43 | 37 | 11 | 10 | | | 5 | 6 |
| Purchased fuels | 46 | 40 | 32 | 28 | 21 | 22 | 36 | 40 | 42 | 41 | | | 4 | 10 |
| Purchased steam | | | | | 4 | 3 | | | | | | | | |
| Self-generated | | | | | | | | | 2 | | | | | |
| Total Cost per ADMT | 60 | 53 | 45 | 39 | 37 | 36 | 79 | 77 | 55 | 51 | 5 | 16 | 9 | 16 |
| % increase (decrease) from 1983 | | 13.2% | | 15.4% | | 2.8% | | 2.6% | | 7.8% | | (68.8%) | | (43.8%) |
| COST PER MWH | | | | | | | | | | | | | | |
| Purchased | 29 | 29 | 33 | 29 | 23 | 19 | 47 | 42 | 53 | 48 | 36 | 34 | | |
| Self-gen. hydro-electric power | - | - | - | - | 1 | 1 | - | - | - | - | - | - | | |
| Weighted Average cost per MWH | 29 | 29 | 33 | 29 | 20 | 18 | 47 | 42 | 53 | 48 | 36 | 34 | | |
| % Increase (Decrease) from 1983 | | 0% | | 13.8% | | 11.1% | | 11.9% | | 10.4% | | 5.9% | | |
| Cost per GJ (Net basis) | | | | | | | | | | | | | | |
| Purchased electric power | 8.0 | 8.0 | 9.0 | 8.0 | 6.3 | 5.4 | 13.1 | 11.6 | 14.8 | 13.2 | | | | |
| Purchased Fuels | 4.1 | 3.4 | 2.7 | 2.5 | 3.1 | 3.0 | 6.3 | 6.2 | 4.8 | 5.2 | | | | |
| Purchased Steam | | | | | 2.1 | 1.6 | | | | | | | | |
| Recoveries | | | | | | | | | .2 | | | | | |
| Self-generated hydro-electric power | | | | | .3 | .3 | | | | | | | | |
| Weighted average cost per GJ | 1.9 | 1.6 | 1.5 | 1.3 | 1.5 | 1.4 | 3.2 | 3.0 | 2.3 | 2.1 | 0.3 | 0.9 | | |
| % Increase (Decrease) from 1983 | | 18.8% | | 15.4% | | 7.1% | | 6.7% | | 9.5% | | (66.7%) | | |
| Reference: Exchange Rate % change from 1983 | | | | | | | | 5.1% | | | | | (2.6%) | |

NOTE: Costs expressed in Canadian dollars.

Cost per MWH times kwh per ADMT may not equal cost of purchased power per ADMT due to rounding.

ENERGY - COST

The cost of energy is summarized in Exhibit 9. Energy costs depend on the following factors:

- . Unit cost of purchased electric power, oil and other purchased fuels.
- . Government regulations regarding the sale of surplus power.
- . The efficiency of the recovery and power boilers.
- . The operating environment of the mill, i.e. the mean temperature and the moisture content of the hog fuel.
- . The relative use of biomass versus fossil fuel.

Based on our data, energy costs per ADMT in Finland and Sweden are substantially lower than those of other regions, and they are the only regions to experience a drop in energy costs from 1983 to 1984. The drop in energy costs results in part from major capital investments which also involve energy efficiencies.

Eastern Canada has the lowest cost per MWH largely because some of the mills in that region have signed favourable long term contracts with the regional utility companies. The western Canadian mills also pay less per MWH than other countries. The U.S. Western mills have on average the highest energy costs per ADMT because of their high use of purchased power and its high cost per MWH.

The average cost per GJ for purchased fuels also varies greatly between regions. The B.C. Interior region has the lowest cost per GJ generated from purchased fuels, largely because of low unit costs for natural gas and hog fuel.

In 1984, energy costs per ADMT for the B.C. Coast and Interior regions increased 13.2% and 15.4% respectively. Part of the increase in B.C.'s energy costs can be attributed to the 1984 shutdown. Mills closed down during the winter months and consequently, power requirements were relatively high.

FOREST SECTOR ADVISORY COUNCIL
STUDY OF THE MARKET PULP INDUSTRY

LABOUR

| | CANADA | | | | | | U.S.A. | | | | FINLAND | | SWEDEN | |
|--|---------------|------------|------------------|-----------|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| | B.C. Coast | | B.C. Interior | | Eastern Canada | | West | | South | | | | | |
| | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 |
| TOTAL LABOUR COST PER ADMT | | | | | | | | | | | | | | |
| Operating Personnel | 86 | 82 | 62 | 56 | 59 | 55 | 58 | 57 | 70 | 59 | 30 | 35 | 38 | 35 |
| Admin. and Supervisory Staff | 26 | 24 | 26 | 22 | 18 | 18 | 18 | 18 | 24 | 21 | 6 | 6 | 15 | 15 |
| Total Cost per ADMT | <u>112</u> | <u>106</u> | <u>88</u> | <u>78</u> | <u>77</u> | <u>73</u> | <u>76</u> | <u>75</u> | <u>94</u> | <u>80</u> | <u>36</u> | <u>41</u> | <u>53</u> | <u>50</u> |
| % Increase (Decrease) from 1983 | 5.7% | | 12.8% | | 5.5% | | 1.3% | | 17.5% | | (12.2%) | | 6.0% | |
| TOTAL HOURS WORKED PER ADMT | (1) 4.7 | 4.7 | 3.6 | 3.5 | 3.7 | 3.8 | 3.1 | 3.3 | 3.9 | 3.8 | 2.7 | 3.0 | 3.4 | 3.7 |
| LABOUR COST PER HOUR WORKED | | | | | | | | | | | | | | |
| Operating Personnel | 24 | 22 | 25 | 23 | 20 | 19 | 24 | 22 | 24 | 21 | 15 | 15 | 15 | 13 |
| Admin. and Supervisory Staff | 25 | 25 | 24 | 24 | 23 | 21 | 30 | 28 | 27 | 25 | 10 | 10 | 19 | 17 |
| Reference: Exchange Rate % change from 1983 | | | | | | | 5.1% | | | | (2.6%) | | (2.6%) | |

NOTE: Costs expressed in Canadian dollars.

(1) Includes hours worked from operating personnel, admin. and supervisory staff and employees at head office that are specifically assigned to pulp.

TOTAL LABOUR

Exhibit 10 shows the total labour cost per ADMT broken down into operating personnel and administrative and supervisory staff. Labour costs in Finland are less than half the labour costs anywhere else because of higher productivity and lower labour costs per hour worked. Labour costs in Finland are especially low for administrative and supervisory employees. Labour costs in Sweden are also lower than average. In North America, labour cost per hour worked is lowest in Eastern Canada and highest in B.C. for operating personnel and in the U.S. West for administrative and supervisory employees.

Some of the differences across the regions may be due to the following:

- . Companies contracting out such operations as maintenance will show lower labour cost and higher productivity per hour worked but their other materials and services costs will be higher; where data were available, we have adjusted labour costs to include the labour component of the contracting fees.
- . The level of integration of a mill affects labour productivity as economies of scale exist, particularly with respect to administrative and supervisory labour.
- . The age of the mill and mill capacity have a direct impact on labour costs and productivity as the size of the labour force does not vary very much with mill capacity, other things being equal. Generally, the newer the mill, the larger its capacity and the higher its labour productivity; B.C. Coast mills are ten years older on average than any other region mills, and this is reflected in the highest number of hours worked per ADMT of all Regions.
- . Companies located on tidewater using their own shiploading crews show higher labour costs and lower labour productivity. However, these mills generally have lower transportation costs. This is the case for B.C. Coastal mills.
- . Administrative, supervisory and service functions which are performed and recorded at the mill level in one company may be performed and recorded at the corporate level in another.
- . Operating personnel in one company may perform activities that are conducted by supervisory personnel in another.

The following Exhibits 11 and 12 summarize labour costs for operating personnel and supervisory staff, respectively. Because the breakdown between operating personnel and administrative and supervisory staff varies across mills and regions, data from one exhibit cannot be reviewed in isolation from the other data.

FOREST SECTOR ADVISORY COUNCIL
STUDY OF THE MARKET PULP INDUSTRY

LABOUR

| | CANADA | | | | | | U.S.A. | | | | FINLAND | | SWEDEN | |
|--|---------------|------------|------------------|------------|-------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| | B.C. Coast | | B.C. Interior | | Eastern Canada | | West | | South | | | | | |
| | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 |
| OPERATING PERSONNEL | | | | | | | | | | | | | | |
| Cost per ADMT | | | | | | | | | | | | | | |
| Pay for time worked | 61 | 60 | 46 | 44 | 44 | 42 | 42 | 42 | 51 | 43 | 19 | 22 | 23 | 22 |
| Benefits | | | | | | | | | | | | | | |
| - pay for time not worked | 14 | 12 | 8 | 6 | 6 | 5 | 6 | 5 | 7 | 6 | 6 | 7 | | |
| - social/welfare benefits | 11 | 10 | 8 | 6 | 9 | 8 | 10 | 10 | 12 | 10 | 5 | 6 | | |
| Total Cost per ADMT | 86 | 82 | 62 | 56 | 59 | 55 | 58 | 57 | 70 | 59 | 30 | 35 | 38 | 35 |
| % Increase (Decrease) from 1983 | 4.9% | | 10.7% | | 7.3% | | 1.8% | | 18.6% | | (14.3%) | | 8.6% | |
| Benefits - % of Pay for Time Worked | | | | | | | | | | | | | | |
| Pay for time not worked | 23 | 20 | 17 | 14 | 14 | 12 | 14 | 12 | 14 | 14 | 32 | 32 | | |
| Social/Welfare benefits | 18 | 17 | 17 | 13 | 20 | 19 | 24 | 24 | 23 | 23 | 26 | 27 | | |
| Total | 41 | 37 | 34 | 27 | 34 | 31 | 38 | 36 | 37 | 37 | 58 | 59 | 65 | 59 |
| Hours Worked per ADMT | 3.6 | 3.7 | 2.5 | 2.5 | 2.9 | 2.9 | 2.4 | 2.6 | 3.0 | 2.9 | 2.1 | 2.4 | 2.6 | 2.8 |
| Labour Cost per Hour Worked | 24 | 22 | 25 | 23 | 20 | 19 | 24 | 22 | 24 | 21 | 15 | 15 | 15 | 13 |
| Reference: Exchange rate % change from 1983 | | | | | | | 5.1% | | | | (2.6%) | | (2.6%) | |

NOTE: Costs expressed in Canadian dollars.

Hours worked per ADMT times cost per hour worked may not equal cost per ADMT due to rounding.

The breakdown between operating, administrative, and supervisory staff varies between mills and regions, and data from this exhibit should be reviewed together with Exhibit 12 data.

LABOUR - OPERATING PERSONNEL

Exhibit 11 summarizes labour cost data for operating personnel. Finland has the lowest labour costs per ADMT followed by Sweden.

In Sweden, pay for time not worked and other benefits were 65% of pay for time worked in 1984. In North America, that percentage does not exceed 41%. In B.C., the 1984 increase in benefit cost is partly caused by the shutdown.

FOREST SECTOR ADVISORY COUNCIL
STUDY OF THE MARKET PULP INDUSTRY

LABOUR

| | CANADA | | | | | | U.S.A. | | | | FINLAND | | SWEDEN | |
|---|---------------|------|------------------|------|-------------------|------|--------|------|-------|------|---------|--------|--------|------|
| | B.C. Coast | | B.C. Interior | | Eastern Canada | | West | | South | | | | | |
| | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 |
| ADMINISTRATIVE AND SUPERVISORY STAFF | | | | | | | | | | | | | | |
| Cost per ADMT | | | | | | | | | | | | | | |
| Salaries | 23 | 21 | 24 | 20 | 16 | 16 | 15 | 15 | 19 | 17 | 5 | 5 | | |
| Social/Welfare Benefits | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 5 | 4 | 1 | 1 | | |
| Total cost per ADMT | 26 | 24 | 26 | 22 | 18 | 18 | 18 | 18 | 24 | 21 | 6 | 6 | 15 | 15 |
| % Increase (Decrease) from 1983 | 8.3% | | 18.2% | | 0% | | 0% | | 14.3% | | 0% | | 0% | |
| Hours Worked per ADMT | 1.1 | 1.0 | 1.1 | 1.0 | .8 | .9 | .7 | .7 | .9 | .9 | .6 | .6 | .8 | .9 |
| Total Cost per Hour Worked | 25 | 25 | 24 | 24 | 23 | 21 | 30 | 28 | 27 | 25 | 10 | 10 | 19 | 17 |
| Reference: Exchange rate % change from 1983 | | | | | | | | | 5.1% | | | (2.6%) | (2.6%) | |

NOTE: Costs expressed in Canadian dollars.

Hours worked per ADMT times cost per hour worked may not equal cost per ADMT due to rounding.

Vacations, statutory holidays, and sickness costs are included in salaries.

The breakdown between operating, administrative, and supervisory staff varies between mills and regions, and data from this Exhibit should be reviewed together with Exhibit 11 data.

LABOUR - ADMINISTRATIVE AND SUPERVISORY

Exhibit 12 summarizes the data for administrative and supervisory employees.

The cost per ADMT for administrative and supervisory labour varies significantly across the regions:

- . The cost per hour worked ranges between \$10 for Finland and \$30 for the U.S. West.
- . Hours worked per ADMT varies between 0.6 hours for Finland and 1.0 and 1.1 hours for B.C. in 1983 and 1984, respectively. Part of the increase in hours worked for B.C. is caused by the relatively low capacity utilization rate in 1984.

As with operating personnel, Sweden and Finland offer the largest benefits package as a percentage of salaries.

FOREST SECTOR ADVISORY COUNCIL
STUDY OF THE MARKET PULP INDUSTRY

OTHER MILL LEVEL COSTS

| | CANADA | | | | | | U.S.A. | | | | FINLAND | | SWEDEN | |
|--|---------------|------|------------------|------|-------------------|------|--------|------|-------|------|---------|------|--------|------|
| | B.C. Coast | | B.C. Interior | | Eastern Canada | | West | | South | | | | | |
| | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 |
| OTHER MATERIALS AND SUPPLIES | | | | | | | | | | | | | | |
| Operation Materials | 39 | 36 | 44 | 41 | 35 | 31 | 37 | 30 | 29 | 21 | | | | |
| Machine Clothing | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | | | | |
| Maintenance Materials | 18 | 17 | 14 | 13 | 10 | 11 | 10 | 10 | 17 | 20 | | | | |
| Total Cost per ADMT | 58 | 54 | 60 | 56 | 46 | 43 | 48 | 41 | 48 | 43 | 23 | 18 | 25 | 24 |
| BY-PRODUCT REVENUES PER ADMT | 0 | 0 | 0 | 0 | (1) | (1) | (1) | (0) | (8) | (8) | (11) | (10) | (6) | (8) |
| MILL ADMIN. & OVERHEAD | | | | | | | | | | | | | | |
| Insurance | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | | | 2 | 2 |
| Property Taxes | 17 | 16 | 16 | 13 | 4 | 5 | 7 | 6 | 3 | 2 | 1 | 2 | | |
| Other Taxes | | | 1 | 1 | | | 1 | 1 | 1 | 1 | | | | |
| Other Mill Level Costs | 13 | 9 | 4 | 4 | 2 | 2 | 6 | 5 | 6 | 5 | 12 | 14 | 10 | 9 |
| Total Cost per ADMT | 32 | 27 | 22 | 19 | 7 | 8 | 16 | 14 | 12 | 10 | 13 | 16 | 12 | 11 |
| TOTAL OTHER MILL LEVEL (net of by-product revenues) | 90 | 81 | 82 | 75 | 52 | 50 | 63 | 55 | 52 | 45 | 25 | 24 | 31 | 27 |
| % Increase (Decrease) from 1983 | 11.1% | | 9.3% | | 4.0% | | 14.5% | | 15.6% | | 4.2% | | 14.8% | |

Reference: Exchange rate %
change from 1983

5.1%

(2.6%)

(2.6%)

NOTE: Costs expressed in Canadian dollars.

OTHER MILL LEVEL COSTS

Exhibit 13 summarizes the cost per ADMT of "other" mill level costs. Mill administration and overhead costs vary among regions, due partly to differing cost allocations between mill and corporate levels.

Maintenance materials costs include contracting fees for maintenance services. These costs are relatively high in the U.S. South where contracting out of maintenance and other services is very common. Maintenance costs are highest in the B.C. Coastal region in part due to the age of mill machinery and equipment.

Mill administration costs are highest in B.C. partly because of the 1984 shutdown but also because of high property taxes. Property taxes in Sweden are insignificant and none of the four participating mills reported any.

By-product revenues are lowest in Canada and the U.S. West because the wood species used in these regions are less suitable for turpentine and soap production.

FOREST SECTOR ADVISORY COUNCILSTUDY OF THE MARKET PULP INDUSTRYCORPORATE EXPENSES, DELIVERY COSTS AND DEPRECIATION

| | CANADA | | | | | | U.S.A. | | | | FINLAND | | SWEDEN | |
|---|---------------|------|------------------|------|-------------------|------|--------|------|-------|------|---------|------|--------|------|
| | B.C. Coast | | B.C. Interior | | Eastern Canada | | West | | South | | 1984 | 1983 | 1984 | 1983 |
| | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | 1984 | 1983 | | | | |
| CORPORATE EXPENSES | | | | | | | | | | | | | | |
| Cost per ADMT | | | | | | | | | | | | | | |
| Head Office | 7 | 6 | 4 | 4 | 14 | 13 | 4 | 4 | 2 | 2 | 11 | 11 | | |
| Research and Development | 1 | - | 1 | - | 1 | 1 | - | - | 1 | 1 | - | - | | |
| Selling Expenses | 21 | 15 | 8 | 6 | 7 | 5 | 5 | 4 | 2 | 2 | 5 | 5 | | |
| Total Cost per ADMT | 29 | 21 | 13 | 10 | 22 | 19 | 9 | 8 | 5 | 5 | 16 | 16 | | |
| DELIVERY COST PER ADMT | 72 | 64 | 92 | 92 | 58 | 54 | 57 | 58 | 71 | 69 | 40 | 38 | 40 | 38 |
| DEPRECIATION COST PER ADMT | 21 | 23 | 21 | 18 | 33 | 32 | 56 | 60 | 37 | 33 | 35 | 37 | 24 | 26 |
| F.A.S. SHIPMENTS (as a % of Total Shipments) | 9.6% | 6.4% | 6.2% | 5.6% | - | - | 7.5% | 6.7% | 6.9% | 6.7% | - | - | - | - |

Reference: Exchange rate %
change from 1983

5.1%

(2.6%)

(2.6%)

Note: Costs expressed in Canadian dollars.

CORPORATE EXPENSES, DELIVERY COSTS AND DEPRECIATION

Exhibit 14 provides of summary of corporate expenses, delivery costs and depreciation. The variations in corporate and depreciation costs were partly due to differences in organization and recording practices. For example, where pulp sales are handled by head office, selling expenses at the mill level are substantially reduced.

Delivery costs represent the average cost of delivery of all pulp shipments, including those to domestic markets, other company locations and shipments sold free along side. In this latter case, only the costs from the mill to the ship are included in total delivery costs. Delivery costs are highest for the B.C. Interior region, reflecting the distance of B.C. Interior mills to offshore markets, and the relatively high cost of rail transportation. Scandinavian mills have the lowest transportation costs because of their proximity to European markets.

Depreciation costs and interest expense have not been reported as part of the total cost of production because of the difficulty in obtaining comparative numbers. Accounting practices on depreciation differ significantly among companies and regions. Displayed in this exhibit are the costs for depreciation provided by the survey participants.

FOREST SECTOR ADVISORY COUNCIL
STUDY OF THE MARKET PULP INDUSTRY

SELECTED QUESTIONNAIRE DATA

Forest Sector Advisory Council
Study of the Market Pulp Industry

Appendix I-1

Selected Questionnaire Data

A. Plant And Production Data

| | B.C. Coast | B.C. Interior | Eastern Canada | U.S.A. Pacific Northwest | U.S.A. South | Finland | Sweden |
|----------------------------------|---------------|------------------|-------------------|--------------------------------|-----------------|---------|--------|
| 1. 1983 Capacity Utilization (%) | | | | | | | |
| Needle Kraft Pulp: | | | | I | | I | |
| -Full Bleach | 0.0 | 0.0 | 0.0 | I 0.0 | 0.0 | 0.0 I | 0.0 |
| -Semi Bleach | 0.0 | 0.0 | 0.0 | I 0.0 | 0.0 | 0.0 I | 0.0 |
| -Unbleached | 0.0 | 0.0 | 0.0 | I 0.0 | 0.0 | 0.0 I | 0.0 |
| -Other | 0.0 | 0.0 | 0.0 | I 0.0 | 0.0 | 0.0 I | 0.0 |
| Total | 71.9 | 87.8 | 86.3 | I 85.5 | 89.6 | 87.0 I | 87.5 |
| Hardwood Kraft Pulp | 0.0 | 0.0 | 0.0 | I 0.0 | 0.0 | 0.0 I | 0.0 |
| Groundwood Pulp | 0.0 | 0.0 | 0.0 | I 0.0 | 0.0 | 0.0 I | 0.0 |
| Mechanical Pulp | 0.0 | 0.0 | 0.0 | I 0.0 | 0.0 | 0.0 I | 0.0 |
| Sulphite Pulp | 0.0 | 0.0 | 0.0 | I 0.0 | 0.0 | 0.0 I | 0.0 |
| Other pulps | 0.0 | 0.0 | 0.0 | I 0.0 | 0.0 | 0.0 I | 0.0 |
| Total | 71.9 | 87.8 | 86.3 | I 85.5 | 89.6 | 87.0 I | 87.5 |

| | B.C. Coast | B.C. Interior | Eastern Canada | U.S.A. Pacific Northwest | U.S.A. South | Finland | Sweden |
|----------------------------------|---------------|------------------|-------------------|--------------------------------|-----------------|---------|--------|
| 2. 1984 Capacity Utilization (%) | | | | | | | |
| Needle Kraft Pulp: | | | | I | | I | |
| -Full Bleach | 0.0 | 0.0 | 0.0 | I 0.0 | 0.0 | 0.0 I | 0.0 |
| -Semi Bleach | 0.0 | 0.0 | 0.0 | I 0.0 | 0.0 | 0.0 I | 0.0 |
| -Unbleached | 0.0 | 0.0 | 0.0 | I 0.0 | 0.0 | 0.0 I | 0.0 |
| -Other | 0.0 | 0.0 | 0.0 | I 0.0 | 0.0 | 0.0 I | 0.0 |
| Total | 69.3 | 74.6 | 75.7 | I 92.1 | 90.5 | 93.0 I | 92.4 |
| Hardwood Kraft Pulp | 0.0 | 0.0 | 0.0 | I 0.0 | 0.0 | 0.0 I | 0.0 |
| Groundwood Pulp | 0.0 | 0.0 | 0.0 | I 0.0 | 0.0 | 0.0 I | 0.0 |
| Mechanical Pulp | 0.0 | 0.0 | 0.0 | I 0.0 | 0.0 | 0.0 I | 0.0 |
| Sulphite Pulp | 0.0 | 0.0 | 0.0 | I 0.0 | 0.0 | 0.0 I | 0.0 |
| Other pulps | 0.0 | 0.0 | 0.0 | I 0.0 | 0.0 | 0.0 I | 0.0 |
| Total | 69.3 | 74.6 | 75.7 | I 92.1 | 90.5 | 93.0 I | 92.4 |

Forest Sector Advisory Council
Study of the Market Pulp Industry

Appendix I-2

Selected Questionnaire Data

A. Plant And Production Data

| | B.C. Coast | B.C. Interior | Eastern Canada | U.S.A. Pacific Northwest | U.S.A. South | Finland | Sweden |
|------------------------------------|---------------|------------------|-------------------|--------------------------------|-----------------|---------|--------|
| 3. 1983 Oper. Days / Pulp Line (1) | | | | | | | |
| Actual days operated | 249 | 315 | 335 | I 313 | 341 | 315 I | 335 |
| Operating days lost due | | | | I | | I | |
| - statutory holidays | 7 | 7 | 6 | I 3 | 3 | 13 I | 5 |
| - production interruptions | 109 | 42 | 24 | I 49 | 20 | 37 I | 25 |
| | 116 | 49 | 30 | I 51 | 23 | 50 I | 30 |
| Reasons for interruptions: | | | | I | | I | |
| -Regular (operating) maintenance | 9 | 5 | 16 | I 5 | 10 | 0 I | 18 |
| -Major (extraordinary) maint. | 18 | 22 | 2 | I 3 | 5 | 0 I | 1 |
| -Strikes and labour disputes | 7 | 7 | 0 | I 0 | 0 | 0 I | 0 |
| -Market curtailment | 57 | 6 | 5 | I 41 | 3 | 23 I | 6 |
| -Acts of God/force majeure | 0 | 0 | 1 | I 0 | 0 | 0 I | 0 |
| -Other | 18 | 1 | 0 | I 0 | 2 | 14 I | 0 |
| | 109 | 42 | 24 | I 49 | 20 | 37 I | 25 |

| | B.C. Coast | B.C. Interior | Eastern Canada | U.S.A. Pacific Northwest | U.S.A. South | Finland | Sweden |
|------------------------------------|---------------|------------------|-------------------|--------------------------------|-----------------|---------|--------|
| 4. 1984 Oper. Days / Pulp Line (1) | | | | | | | |
| Actual days operated | 253 | 276 | 307 | I 353 | 337 | 338 I | 344 |
| Operating days lost due | | | | I | | I | |
| - statutory holidays | 7 | 8 | 6 | I 3 | 3 | 12 I | 0 |
| - production interruptions | 106 | 84 | 53 | I 11 | 24 | 16 I | 22 |
| | 113 | 92 | 59 | I 14 | 28 | 28 I | 22 |
| Reasons for interruptions: | | | | I | | I | |
| -Regular (operating) maintenance | 10 | 4 | 14 | I 5 | 16 | 0 I | 19 |
| -Major (extraordinary) maint. | 9 | 10 | 2 | I 4 | 6 | 0 I | 1 |
| -Strikes and labour disputes | 69 | 68 | 37 | I 0 | 0 | 0 I | 0 |
| -Market curtailment | 4 | 0 | 0 | I 2 | 0 | 6 I | 2 |
| -Acts of God/force majeure | 0 | 0 | 0 | I 0 | 0 | 0 I | 0 |
| -Other | 14 | 2 | 0 | I 0 | 2 | 10 I | 0 |
| | 106 | 84 | 53 | I 11 | 24 | 16 I | 22 |

(1) Actual days operated plus days lost may not equal the number of days in the calendar year because some mills operate on the basis of 364 days (52 weeks) for 5 years and 371 days (53 weeks) on the sixth year.

Appendix E-3

A. Plant and Production data

| | B.C. Coast | B.C. Interior | Eastern Canada | U.S.A. Pacific Northwest | U.S.A. South | Finland | Sweden | | |
|---|---------------|------------------|-------------------|--------------------------------|-----------------|---------|--------|---|------|
| 6. 1984 Hours Worked Per ADMT | | | | | | | | | |
| Operating employees | | | | 1 | | | 1 | | |
| -Direct production | 1.83 | 1.11 | 1.66 | 1 | 1.68 | 1.65 | 0.00 | 1 | 0.00 |
| -Maintenance | 1.33 | 1.05 | 1.08 | 1 | 0.75 | 1.04 | 0.00 | 1 | 0.00 |
| -Other (e.g. yard labour, watchmen, etc) | 0.42 | 0.34 | 0.16 | 1 | 0.00 | 0.25 | 0.00 | 1 | 0.00 |
| Total Operating | 3.58 | 2.50 | 2.89 | 1 | 2.43 | 2.95 | 2.09 | 1 | 2.57 |
| Administrative and supervisory employees | 1.02 | 1.06 | 0.77 | 1 | 0.62 | 0.89 | 0.58 | 1 | 0.80 |
| Head Office and sales employees | 0.04 | 0.05 | 0.04 | 1 | 0.03 | 0.05 | 0.00 | 1 | 0.00 |
| Total Hours Per ADMT | 4.64 | 3.61 | 3.70 | 1 | 3.08 | 3.89 | 2.67 | 1 | 3.37 |

Appendix I-4

A. Plant and Production data

Species Utilized

| | | | | | | | | | |
|--------------------|-------|-------|-------|---|-------|--------|-------|---|-------|
| - Pine | 0.00 | 22.41 | 36.28 | 1 | 19.40 | 100.00 | 89.00 | 1 | 75.00 |
| - Hemlock - Balsam | 69.70 | 0.73 | 5.69 | 1 | 0.00 | 0.00 | 0.00 | 1 | 0.00 |
| - Spruce | 0.00 | 56.66 | 56.36 | 1 | 0.00 | 0.00 | 11.00 | 1 | 25.00 |
| - Douglas-fir | 10.45 | 18.46 | 0.00 | 1 | 66.23 | 0.00 | 0.00 | 1 | 0.00 |
| - Cedar | 19.85 | 1.73 | 0.00 | 1 | 7.79 | 0.00 | 0.00 | 1 | 0.00 |
| - Other Softwood | 0.00 | 0.00 | 1.67 | 1 | 6.59 | 0.00 | 0.00 | 1 | 0.00 |
| - Birch | 0.00 | 0.00 | 0.00 | 1 | 0.00 | 0.00 | 0.00 | 1 | 0.00 |
| - Other Hardwood | 0.00 | 0.00 | 0.00 | 1 | 0.00 | 0.00 | 0.00 | 1 | 0.00 |

Total

Species Utilized

| | | | | | | | | | |
|--------------------|-------|-------|-------|---|-------|--------|-------|---|-------|
| - Pine | 0.00 | 21.34 | 41.99 | I | 24.65 | 100.00 | 92.00 | I | 75.00 |
| - Hemlock - Balsam | 69.09 | 0.66 | 6.70 | I | 0.00 | 0.00 | 0.00 | I | 0.00 |
| - Spruce | 1.67 | 56.09 | 50.04 | I | 0.00 | 0.00 | 8.00 | I | 25.00 |
| - Douglas-fir | 8.77 | 20.02 | 0.00 | I | 63.49 | 0.00 | 0.00 | I | 0.00 |
| - Cedar | 20.47 | 1.88 | 0.00 | I | 3.83 | 0.00 | 0.00 | I | 0.00 |
| - Other Softwood | 0.00 | 0.00 | 1.27 | I | 8.03 | 0.00 | 0.00 | I | 0.00 |
| - Birch | 0.00 | 0.00 | 0.00 | I | 0.00 | 0.00 | 0.00 | I | 0.00 |
| - Other Hardwood | 0.00 | 0.00 | 0.00 | I | 0.00 | 0.00 | 0.00 | I | 0.00 |

Total

Forest Sector Advisory Council
Study of the Market Pulp Industry

Appendix I-5

Selected Questionnaire Data

(Local Currency)

B. Energy Data

| 1. 1983 Purchased Energy Cost Cost Per ADMT | B.C. Coast | B.C. Interior | Eastern Canada | U.S.A. Pacific Northwest | U.S.A. South | Finland | Sweden |
|--|---------------|------------------|-------------------|--------------------------------|-----------------|---------|---------|
| ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- |
| Electricity for | | | | I | | | I |
| - Electric Boilers | 0.00 | 0.00 | 0.37 | I 0.00 | 0.00 | I | 0.00 |
| - Motive Power & Utility | 13.22 | 11.01 | 10.54 | I 30.24 | 8.05 | I | 0.00 |
| | ----- | ----- | ----- | I ----- | ----- | I ----- | ----- |
| Total Electricity | 13.22 | 11.01 | 10.91 | I 30.24 | 8.05 | I | 35.00 |
| | | | | I | | I | |
| Heavy Fuel Oil (bunker C) | 31.16 | 1.18 | 12.76 | I 3.52 | 21.87 | 0.00 | I 57.24 |
| Natural Gas - firm | 0.00 | 20.41 | 6.10 | I 16.23 | 7.34 | 0.00 | I 0.00 |
| Natural Gas - interruptable | 0.00 | 0.01 | 0.00 | I 9.23 | 0.00 | 0.00 | I 0.00 |
| Coal, Lignite and Coke | 0.00 | 0.00 | 0.00 | I 0.00 | 0.56 | 0.00 | I 0.00 |
| Hog Fuel - purchased | 8.42 | 6.64 | 3.39 | I 2.43 | 2.96 | 0.00 | I 0.71 |
| Purchased steam - internal source | 0.00 | 0.00 | 0.00 | I 1.03 | 0.00 | 0.00 | I 0.00 |
| Purchased steam - external source | 0.00 | 0.00 | 2.96 | I 0.00 | 0.00 | 0.00 | I 0.00 |
| Other Oils (non motor oils) | 0.06 | 0.25 | 0.14 | I 0.00 | 0.05 | 0.00 | I 4.70 |
| Other ----- | 0.00 | 0.00 | 0.00 | I 0.18 | 0.28 | 0.00 | I 0.00 |
| | ----- | ----- | ----- | I ----- | ----- | I ----- | ----- |
| Purchased Energy Cost Per ADMT | 52.85 | 39.49 | 36.25 | I 62.87 | 41.11 | 71.00 | I 97.65 |
| | ===== | ===== | ===== | I ===== | ===== | ===== | I ===== |

| 2. 1984 Purchased Energy Cost Per ADMT | B.C. Coast | B.C. Interior | Eastern Canada | U.S.A. Pacific Northwest | U.S.A. South | Finland | Sweden |
|---|---------------|------------------|-------------------|--------------------------------|-----------------|---------|---------|
| ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- |
| Electricity for | | | | I | | | I |
| - Electric Boilers | 0.00 | 0.00 | 0.79 | I 0.00 | 0.00 | I | 0.00 |
| - Motive Power & Utility | 14.32 | 13.48 | 11.00 | I 32.93 | 8.66 | I | 0.00 |
| | ----- | ----- | ----- | I ----- | ----- | I ----- | ----- |
| Total Electricity | 14.32 | 13.48 | 11.79 | I 32.93 | 8.66 | I | 27.48 |
| | | | | I | | I | |
| Heavy Fuel Oil (bunker C) | 40.91 | 0.82 | 10.95 | I 2.14 | 16.00 | 0.00 | I 27.80 |
| Natural Gas - firm | 0.00 | 22.53 | 7.41 | I 14.96 | 12.05 | 0.00 | I 0.00 |
| Natural Gas - interruptable | 0.00 | 1.23 | 0.00 | I 7.65 | 0.00 | 0.00 | I 0.00 |
| Coal, Lignite and Coke | 0.00 | 0.00 | 0.00 | I 0.00 | 0.84 | 0.00 | I 0.00 |
| Hog Fuel - purchased | 5.44 | 7.02 | 3.05 | I 2.67 | 2.73 | 0.00 | I 0.50 |
| Purchased steam - internal source | 0.00 | 0.00 | 0.00 | I 0.89 | 0.00 | 0.00 | I 0.00 |
| Purchased steam - external source | 0.00 | 0.00 | 3.56 | I 0.00 | 0.00 | 0.00 | I 0.00 |
| Other Oils (non motor oils) | 0.06 | 0.08 | 0.13 | I 0.00 | 0.13 | 0.00 | I 4.49 |
| Other ----- | 0.00 | 0.00 | 0.00 | I 0.16 | 0.06 | 0.00 | I 0.00 |
| | ----- | ----- | ----- | I ----- | ----- | I ----- | ----- |
| Purchased Energy Cost Per ADMT | 60.73 | 45.15 | 36.88 | I 61.41 | 40.46 | 21.00 | I 60.27 |
| | ===== | ===== | ===== | I ===== | ===== | ===== | I ===== |

Forest Sector Advisory Council
Study of the Market Pulp Industry

Appendix I-6

Selected Questionnaire Data

(Local Currency)

B. Energy Data

| | B.C. Coast | B.C. Interior | Eastern Canada | U.S.A. Pacific Northwest | U.S.A. South | Finland | Sweden |
|--|---------------|------------------|-------------------|--------------------------------|-----------------|---------|--------|
| 3. 1983 Self-Generated Energy Cost Per ADMT | | | | | | | |
| Spent Pulping (Black) liquor | 0.00 | 0.00 | 0.00 | 0.00 | 0.35 | 0.00 | 0.00 |
| Hog Fuel - own | 0.00 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hydraulic Power - Electricity | 0.00 | 0.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hydraulic Power - Mechanical | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Other | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Self-Gen. Energy Cost Per ADMT | 0.00 | 0.20 | 0.05 | 0.00 | 0.35 | 0.00 | 0.00 |

4. 1984 Self-Generated Energy
Cost Per ADMT

| | | | | | | | |
|--------------------------------|------|------|------|------|------|------|------|
| Spent Pulping (Black) liquor | 0.00 | 0.00 | 0.00 | 0.00 | 1.83 | 0.00 | 0.00 |
| Hog Fuel - own | 0.00 | 0.18 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hydraulic Power - Electricity | 0.00 | 0.00 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hydraulic Power - Mechanical | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Other | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Self-Gen. Energy Cost Per ADMT | 0.00 | 0.18 | 0.09 | 0.00 | 1.83 | 0.00 | 0.00 |

| | B.C. Coast | B.C. Interior | Eastern Canada | U.S.A. Pacific Northwest | U.S.A. South | Finland | Sweden |
|---------------------------------|---------------|------------------|-------------------|--------------------------------|-----------------|---------|--------|
| 5. Average Energy Cost Per ADMT | | | | | | | |
| 1983 - Purchased | 52.85 | 39.49 | 36.25 | 62.87 | 41.11 | 71.00 | 97.65 |
| - Self Generated | 0.00 | 0.20 | 0.05 | 0.00 | 0.35 | 0.00 | 0.00 |
| Total Energy Cost Per ADMT | 52.85 | 39.69 | 36.30 | 62.87 | 41.46 | 71.00 | 97.65 |
| 1984 - Purchased | 60.73 | 45.15 | 36.88 | 61.41 | 40.46 | 21.00 | 60.27 |
| - Self Generated | 0.00 | 0.18 | 0.09 | 0.00 | 1.83 | 0.00 | 0.00 |
| Total Energy Cost Per ADMT | 60.73 | 45.33 | 36.97 | 61.41 | 42.29 | 21.00 | 60.27 |

Forest Sector Advisory Council
Study of the Market Pulp Industry

Appendix I-7

Selected Questionnaire Data

B. Energy Data

| | B.C. | B.C. | Eastern | U.S.A. | U.S.A. | | |
|--|-------|----------|---------|----------------------|--------|---------|--------|
| 6. 1983 Gross Heat Value (MJ) Per Volume Unit | Coast | Interior | Canada | Pacific Northwest | South | Finland | Sweden |
| Electricity (MJ/MWH) | 3602 | 3602 | 3602 | I 3602 | 3602 | | I |
| Heavy Fuel Oil (MJ/Kl) | 36898 | 40608 | 41339 | I 41991 | 41803 | | I |
| Natural Gas (MJ/ 000's m3) | 0 | 38816 | 37644 | I 38039 | 39321 | | I |
| Coal, Lignite and Coke (MJ/MT) | 0 | 0 | 0 | I 0 | 28376 | | I |
| Purchased Hog Fuel (MJ/m3) | 2520 | 3556 | 6747 | I 8679 | 4499 | | I |
| Own Hog Fuel (MJ/m3) | 6377 | 2737 | 3941 | I 0 | 4166 | | I |
| Purchased Steam (MJ/MT) | 0 | 0 | 0 | I 2981 | 0 | | I |
| Other Oils (MJ/Kl) | 45280 | 40183 | 41776 | I 0 | 39276 | | I |
| Spent Pulping Liquor (MJ/MT) | 14217 | 14056 | 13795 | I 13728 | 13852 | | I |
| Other ----- | 0 | 0 | 0 | I 34888 | 13999 | | I |
| | ===== | ===== | ===== | ===== | ===== | ===== | ===== |

7. 1984 Gross Heat Value
(MJ) Per Volume Unit

| | | | | | | | |
|--------------------------------|-------|-------|-------|---------|-------|-------|-------|
| Electricity (MJ/MWH) | 3602 | 3602 | 3602 | I 3602 | 3602 | | I |
| Heavy Fuel Oil (MJ/Kl) | 37019 | 41405 | 41388 | I 41778 | 41802 | | I |
| Natural Gas (MJ/ 000's m3) | 0 | 38910 | 37648 | I 38039 | 38697 | | I |
| Coal, Lignite and Coke (MJ/MT) | 0 | 0 | 0 | I 0 | 28376 | | I |
| Purchased Hog Fuel (MJ/m3) | 2529 | 3713 | 6599 | I 8679 | 4509 | | I |
| Own Hog Fuel (MJ/m3) | 4229 | 2689 | 3463 | I 0 | 4082 | | I |
| Purchased Steam (MJ/MT) | 0 | 0 | 0 | I 2981 | 0 | | I |
| Other Oils (MJ/Kl) | 45280 | 40183 | 41719 | I 0 | 39288 | | I |
| Spent Pulping Liquor (MJ/MT) | 14196 | 13682 | 14006 | I 13675 | 13784 | | I |
| Other ----- | 0 | 0 | 0 | I 35365 | 15386 | | I |
| | ===== | ===== | ===== | ===== | ===== | ===== | ===== |

8. Average Efficiency Of
Recovery And Power Boilers (%)

| | | | | | | | |
|------------------------|------|------|------|------|------|--|--|
| Electricity | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Heavy Fuel Oil | 0.81 | 0.86 | 0.84 | 0.83 | 0.82 | | |
| Natural Gas | 0.85 | 0.80 | 0.82 | 0.74 | 0.79 | | |
| Purchased Steam | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Coal, Lignite and Coke | 0.85 | 0.85 | 0.85 | 0.85 | 0.80 | | |
| Hog Fuel | 0.63 | 0.61 | 0.69 | 0.65 | 0.69 | | |
| Other Oils | 0.85 | 0.86 | 0.82 | 0.85 | 0.81 | | |
| Spent Pulping Liquor | 0.57 | 0.59 | 0.59 | 0.64 | 0.67 | | |
| Other ----- | 0.85 | 0.85 | 0.85 | 0.66 | 0.80 | | |

Appendix I-8

(Local Currency)

9. 1983 Purchased Energy Cost
Per GJ (Net Heat Value)

| 1983 Purchased Energy Cost Per GJ (Net Heat Value) | B.C. Coast | B.C. Interior | Eastern Canada | U.S.A. Pacific Northwest | U.S.A. South | Finland | Sweden |
|---|---------------|------------------|-------------------|--------------------------------|-----------------|---------|--------|
| Electricity for | | | | I | | | I |
| - Electric Boilers | 0.00 | 0.00 | 4.79 | I 0.00 | 0.00 | | I |
| - Motive Power & Utility | 8.03 | 7.91 | 5.39 | I 9.39 | 10.72 | | I |
| Total Electricity | 8.03 | 7.91 | 5.37 | I 9.39 | 10.72 | | I |
| Heavy Fuel Oil (bunker C) | 5.43 | 4.30 | 5.41 | I 5.00 | 4.64 | | I |
| Natural Gas - firm | 0.00 | 3.67 | 4.28 | I 6.53 | 5.34 | | I |
| Natural Gas - interruptable | 0.00 | 4.05 | 0.00 | I 6.41 | 0.00 | | I |
| Coal, Lignite and Coke | 0.00 | 0.00 | 0.00 | I 0.00 | 2.52 | | I |
| Hog Fuel - purchased | 1.44 | 1.22 | 0.94 | I 2.51 | 2.17 | | I |
| Purchased steam - internal source | 0.00 | 0.00 | 0.00 | I 1.33 | 0.00 | | I |
| Purchased steam - external source | 0.00 | 0.00 | 1.56 | I 0.00 | 0.00 | | I |
| Other Oils (non motor oils) | 7.96 | 1.28 | 8.78 | I 0.00 | 8.48 | | I |
| Other | 0.00 | 0.00 | 0.00 | I 2.94 | 1.25 | | I |
| Average Cost Per GJ | 3.99 | 3.07 | 3.20 | I 6.51 | 4.75 | | I |

10. 1984 Purchased Energy Cost
Per GJ (Net Heat Value)

| 0. 1984 Purchased Energy Cost Per GJ (Net Heat Value) | B.C. Coast | B.C. Interior | Eastern Canada | U.S.A. Pacific Northwest | U.S.A. South | Finland | Sweden |
|--|---------------|------------------|-------------------|--------------------------------|-----------------|---------|--------|
| Electricity for | | | | I | | | I |
| - Electric Boilers | 0.00 | 0.00 | 5.16 | I 0.00 | 0.00 | | I |
| - Motive Power & Utility | 8.02 | 9.03 | 6.34 | I 10.08 | 11.43 | | I |
| Total Electricity | 8.02 | 9.03 | 6.25 | I 10.08 | 11.43 | | I |
| Heavy Fuel Oil (bunker C) | 6.66 | 4.83 | 6.50 | I 5.31 | 5.30 | | I |
| Natural Gas - firm | 0.00 | 3.95 | 4.38 | I 5.95 | 4.33 | | I |
| Natural Gas - interruptable | 0.00 | 3.98 | 0.00 | I 6.31 | 0.00 | | I |
| Coal, Lignite and Coke | 0.00 | 0.00 | 0.00 | I 0.00 | 2.11 | | I |
| Hog Fuel - purchased | 1.07 | 1.30 | 0.88 | I 2.45 | 2.13 | | I |
| Purchased steam - internal source | 0.00 | 0.00 | 0.00 | I 1.43 | 0.00 | | I |
| Purchased steam - external source | 0.00 | 0.00 | 2.08 | I 0.00 | 0.00 | | I |
| Other Oils (non motor oils) | 8.20 | 2.60 | 10.42 | I 0.00 | 7.25 | | I |
| Other | 0.00 | 0.00 | 0.00 | I 2.95 | 0.05 | | I |
| Average Cost Per GJ | 4.66 | 3.45 | 3.53 | I 6.70 | 4.31 | | I |

Forest Sector Advisory Council
Study of the Market Pulp Industry

Appendix I-9

Selected Questionnaire Data

(Local Currency)

B. Energy Data

| | B.C. Coast | B.C. Interior | Eastern Canada | U.S.A. Pacific Northwest | U.S.A. South | Finland | Sweden |
|---|---------------|------------------|-------------------|--------------------------------|-----------------|---------|--------|
| 11. 1983 Self-Gen. Energy Cost Per GJ (Net Heat Value) | | | | | | | |
| Spent Pulping (Black) liquor | 0.00 | 0.00 | 0.00 | I 0.00 | 0.03 | I | |
| Hog Fuel - own | 0.00 | 0.25 | 0.00 | I 0.00 | 0.00 | I | |
| Hydraulic Power - Electricity | 0.00 | 0.00 | 0.30 | I 0.00 | 0.00 | I | |
| Hydraulic Power - Mechanical | 0.00 | 0.00 | 0.00 | I 0.00 | 0.00 | I | |
| Other ----- | 0.00 | 0.00 | 0.00 | I 0.00 | 0.00 | I | |
| | ----- | ----- | ----- | I ----- | ----- | I ----- | |
| Average Cost Per GJ | 0.00 | 0.01 | .00 | I 0.00 | 0.02 | I | |
| | ===== | ===== | ===== | I ===== | ===== | I ===== | |

| | | | | | | | |
|---|-------|-------|-------|---------|-------|---------|--|
| 12. 1984 Self-Gen. Energy Cost Per GJ (Net Heat Value) | | | | | | | |
| Spent Pulping (Black) liquor | 0.00 | 0.00 | 0.00 | I 0.00 | 0.15 | I | |
| Hog Fuel - own | 0.00 | 0.28 | 0.00 | I 0.00 | 0.00 | I | |
| Hydraulic Power - Electricity | 0.00 | 0.00 | 0.29 | I 0.00 | 0.00 | I | |
| Hydraulic Power - Mechanical | 0.00 | 0.00 | 0.00 | I 0.00 | 0.00 | I | |
| Other ----- | 0.00 | 0.00 | 0.00 | I 0.00 | 0.00 | I | |
| | ----- | ----- | ----- | I ----- | ----- | I ----- | |
| Average Cost Per GJ | 0.00 | 0.01 | 0.01 | I 0.00 | 0.13 | I | |
| | ===== | ===== | ===== | I ===== | ===== | I ===== | |

| | | | | | | | |
|--|---------------|------------------|-------------------|--------------------------------|-----------------|---------|--------|
| 13. Average Energy Cost Per GJ (Net Heat Value) | | | | U.S.A. Pacific Northwest | U.S.A. South | Finland | Sweden |
| | B.C. Coast | B.C. Interior | Eastern Canada | | | | |
| 1983 - Purchased | 3.99 | 3.07 | 3.20 | I 6.51 | 4.75 | I | |
| - Self Generated | 0.00 | 0.01 | .00 | I 0.00 | 0.02 | I | |
| | ----- | ----- | ----- | I ----- | ----- | I ----- | |
| Total Energy Cost Per GJ | 1.64 | 1.33 | 1.40 | I 3.00 | 2.10 | I | |
| | ===== | ===== | ===== | I ===== | ===== | I ===== | |
| 1984 - Purchased | 4.66 | 3.45 | 3.53 | I 6.70 | 4.31 | I | |
| - Self Generated | 0.00 | 0.01 | 0.01 | I 0.00 | 0.13 | I | |
| | ----- | ----- | ----- | I ----- | ----- | I ----- | |
| Total Energy Cost Per GJ | 1.90 | 1.51 | 1.50 | I 3.20 | 2.30 | I | |
| | ===== | ===== | ===== | I ===== | ===== | I ===== | |

Appendix I-10

B. Energy Data

| 15. 1984 GJ Per ADMT (Purchased) (Net Heat Value) | B.C. Coast | B.C. Interior | Eastern Canada | Pacific Northwest | U.S.A. South | Finland | Sweden |
|--|---------------|------------------|-------------------|----------------------|-----------------|---------|--------|
| Electricity for | | | | I | | | I |
| - Electric Boilers | 0.00 | 0.00 | 0.15 | I 0.00 | 0.00 | | I |
| - Motive Power & Utility | 1.79 | 1.49 | 1.73 | I 3.27 | 0.76 | | I |
| Total Electricity | 1.79 | 1.49 | 1.89 | I 3.27 | 0.76 | | I |
| Heavy Fuel Oil (bunker C) | 6.15 | 0.17 | 1.68 | I 0.40 | 3.02 | | I |
| Natural Gas - firm | 0.00 | 5.70 | 1.69 | I 2.52 | 2.78 | | I |
| Natural Gas - interruptable | 0.00 | 0.31 | 0.00 | I 1.21 | 0.00 | | I |
| Coal, Lignite and Coke | 0.00 | 0.00 | 0.00 | I 0.00 | 0.40 | | I |
| Hog Fuel - purchased | 5.10 | 5.40 | 3.45 | I 1.09 | 1.28 | | I |
| Purchased steam - internal source | 0.00 | 0.00 | 0.00 | I 0.63 | 0.00 | | I |
| Purchased steam - external source | 0.00 | 0.00 | 1.71 | I 0.00 | 0.00 | | I |
| Other Oils (non motor oils) | 0.01 | 0.03 | 0.01 | I 0.00 | 0.02 | | I |
| Other | 0.00 | 0.00 | 0.00 | I 0.06 | 1.14 | | I |
| Average GJ Per ADMT | 13.04 | 13.10 | 10.44 | I 9.17 | 9.39 | | I |

Forest Sector Advisory Council
Study of the Market Pulp Industry

Appendix I-11

Selected Questionnaire Data

B. Energy Data

| 16. 1983 GJ Per ADMT (Self-Gen) (Net Heat Value) | U.S.A. | | | | | | |
|---|---------------|------------------|-------------------|----------------------|-----------------|---------|--------|
| | B.C. Coast | B.C. Interior | Eastern Canada | Pacific Northwest | U.S.A. South | Finland | Sweden |
| Spent Pulping (Black) liquor | 17.99 | 16.09 | 11.93 | I 16.11 | 13.81 | I | |
| Hog Fuel - own | 0.91 | 0.79 | 2.41 | I 0.00 | 1.83 | I | |
| Hydraulic Power - Electricity | 0.00 | 0.00 | 0.18 | I 0.00 | 0.00 | I | |
| Hydraulic Power - Mechanical | 0.00 | 0.00 | 0.00 | I 0.00 | 0.00 | I | |
| Other | 0.00 | 0.00 | 0.00 | I 0.00 | 0.00 | I | |
| | ----- | ----- | ----- | I ----- | ----- | ----- | ----- |
| Average GJ Per ADMT | 18.90 | 16.88 | 14.51 | I 16.11 | 15.65 | I | |
| | ===== | ===== | ===== | I ===== | ===== | ===== | ===== |

| 17. 1984 GJ Per ADMT (Self-Gen) (Net Heat Value) | U.S.A. | | | | | | |
|---|---------------|------------------|-------------------|----------------------|-----------------|---------|--------|
| | B.C. Coast | B.C. Interior | Eastern Canada | Pacific Northwest | U.S.A. South | Finland | Sweden |
| Spent Pulping (Black) liquor | 18.53 | 16.19 | 11.26 | I 15.62 | 11.95 | I | |
| Hog Fuel - own | 0.45 | 0.64 | 2.40 | I 0.00 | 2.19 | I | |
| Hydraulic Power - Electricity | 0.00 | 0.00 | 0.29 | I 0.00 | 0.00 | I | |
| Hydraulic Power - Mechanical | 0.00 | 0.00 | 0.00 | I 0.00 | 0.00 | I | |
| Other | 0.00 | 0.00 | 0.00 | I 0.00 | 0.00 | I | |
| | ----- | ----- | ----- | I ----- | ----- | ----- | ----- |
| Average GJ Per ADMT | 18.98 | 16.83 | 13.96 | I 15.62 | 14.14 | I | |
| | ===== | ===== | ===== | I ===== | ===== | ===== | ===== |

| 18. Total Energy - Ave. GJ / ADMT (Net Heat Value) | U.S.A. | | | | | | |
|---|---------------|------------------|-------------------|----------------------|-----------------|---------|--------|
| | B.C. Coast | B.C. Interior | Eastern Canada | Pacific Northwest | U.S.A. South | Finland | Sweden |
| 1983 - Purchased | 13.24 | 12.88 | 11.32 | I 9.66 | 8.66 | I | |
| - Self Generated | 18.90 | 16.88 | 14.51 | I 16.11 | 15.65 | I | |
| | ----- | ----- | ----- | I ----- | ----- | I | ----- |
| Average GJ Per ADMT | 32.14 | 29.77 | 25.83 | I 25.78 | 24.30 | I | |
| | ===== | ===== | ===== | I ===== | ===== | ===== | ===== |
| 1984 - Purchased | 13.04 | 13.10 | 10.44 | I 9.17 | 9.39 | I | |
| - Self Generated | 18.98 | 16.83 | 13.96 | I 15.62 | 14.14 | I | |
| | ----- | ----- | ----- | I ----- | ----- | I | ----- |
| Average GJ Per ADMT | 32.02 | 29.93 | 24.39 | I 24.79 | 23.53 | I | |
| | ===== | ===== | ===== | I ===== | ===== | ===== | ===== |

Appendix I-12

B. Energy Data

| 20. 1984 % Net Heat Value (Purchased) | B.C. Coast | B.C. Interior | Eastern Canada | U.S.A. Pacific Northwest | U.S.A. South | Finland | Sweden |
|--|---------------|------------------|-------------------|--------------------------------|-----------------|---------|--------|
| Electricity for | | | | 1 | | | 1 |
| - Electric Boilers | 0.00 | 0.00 | 0.62 | 1 | 0.00 | 0.00 | 1 |
| - Motive Power & Utility | 5.58 | 4.99 | 7.11 | 1 | 13.18 | 3.22 | 1 |
| Total Electricity | 5.58 | 4.99 | 7.74 | 1 | 13.18 | 3.22 | 1 |
| Heavy Fuel Oil (bunker C) | 19.19 | 0.56 | 6.90 | 1 | 1.63 | 12.84 | 1 |
| Natural Gas - firm | 0.00 | 19.04 | 6.94 | 1 | 10.15 | 11.81 | 1 |
| Natural Gas - interruptable | 0.00 | 1.03 | 0.00 | 1 | 4.89 | 0.00 | 1 |
| Coal, Lignite and Coke | 0.00 | 0.00 | 0.00 | 1 | 0.00 | 1.69 | 1 |
| Hog Fuel - purchased | 15.93 | 18.04 | 14.14 | 1 | 4.39 | 5.44 | 1 |
| Purchased steam - internal source | 0.00 | 0.00 | 0.00 | 1 | 2.52 | 0.00 | 1 |
| Purchased steam - external source | 0.00 | 0.00 | 7.03 | 1 | 0.00 | 0.00 | 1 |
| Other Oils (non motor oils) | 0.02 | 0.10 | 0.05 | 1 | 0.00 | 0.07 | 1 |
| Other | 0.00 | 0.00 | 0.00 | 1 | 0.22 | 4.84 | 1 |
| Total Purchased Energy (%) | 40.72 | 43.76 | 42.79 | 1 | 36.99 | 39.91 | 1 |

Appendix I-13

B. Energy Data

| 23. Total Energy - % Net Heat Value | B.C. Coast | B.C. Interior | Eastern Canada | U.S.A. Pacific Northwest | U.S.A. South | Finland | Sweden |
|--|---------------|------------------|-------------------|--------------------------------|-----------------|---------|--------|
| 1983 - Purchased | 41.20 | 43.28 | 43.82 | I 37.48 | 35.62 | I | |
| - Self Generated | 58.80 | 56.72 | 56.18 | I 62.52 | 64.38 | I | |
| | | | | I | | I | |
| Total | 100.00 | 100.00 | 100.00 | I 100.00 | 100.00 | I | |
| | ===== | ===== | ===== | I ===== | ===== | ===== | ===== |
| | | | | I | | I | |
| | | | | I | | I | |
| 1984 - Purchased | 40.72 | 43.76 | 42.79 | I 36.99 | 39.91 | I | |
| - Self Generated | 59.28 | 56.24 | 57.21 | I 63.01 | 60.09 | I | |
| | | | | I | | I | |
| Total | 100.00 | 100.00 | 100.00 | I 100.00 | 100.00 | I | |
| | ===== | ===== | ===== | I ===== | ===== | ===== | ===== |

Appendix I-14

(Local Currency)

1. 1983 Operating Labour Cost/ADMT

| | B.C. Coast | B.C. Interior | Eastern Canada | U.S.A. Pacific Northwest | U.S.A. South | Finland | Sweden |
|---|---------------|------------------|-------------------|--------------------------------|-----------------|---------|--------|
| 2. 1983 Admin and Supervisory Labour Cost Per ADMT | | | | | | | |
| Pay for time worked | 19.22 | 17.63 | 13.96 | 10.76 | 11.84 | | |
| Pay for time not worked | 1.77 | 1.93 | 1.79 | 0.99 | 1.87 | | |
| Total pay Per ADMT | 20.99 | 19.56 | 15.76 | 11.75 | 13.71 | 21.00 | 57.00 |

Forest Sector Advisory Council
Study of the Market Pulp Industry

Appendix I-15

Selected Questionnaire Data

(Local Currency)

C. Labour costs

| | B.C. Coast | B.C. Interior | Eastern Canada | U.S.A. Pacific Northwest | U.S.A. South | Finland | Sweden |
|---|---------------|------------------|-------------------|--------------------------------|-----------------|---------|----------|
| 3. 1984 Operating Labour Cost/ADMT | | | | | | | |
| Pay for time worked | | | | I | | | I |
| Straight time pay | | | | I | | | I |
| - Direct production | 25.35 | 19.55 | 24.74 | I 18.49 | 20.80 | | I |
| - Maintenance | 21.99 | 16.99 | 14.25 | I 9.00 | 13.33 | | I |
| - Other (e.g. yard labour, watchmen, etc.) | 7.65 | 4.87 | 2.28 | I 0.00 | 2.95 | | I |
| Premiums for time worked | | | | I | | | I |
| - Overtime premiums | 4.85 | 2.49 | 2.78 | I 4.57 | 2.45 | | I |
| - Other premiums | 1.39 | 1.76 | 0.12 | I 0.12 | 0.07 | | I |
| Total pay for time worked | | | | I | | | I |
| - Direct production | 28.49 | 21.53 | 25.62 | I 21.97 | 22.04 | | I |
| - Maintenance | 23.56 | 18.88 | 16.06 | I 10.21 | 14.40 | | I |
| - Other | 9.17 | 5.26 | 2.49 | I 0.00 | 3.16 | | I |
| Total pay for time worked | 61.22 | 45.67 | 44.18 | I 32.18 | 39.61 | 90.00 | I 149.28 |
| Pay for time not worked | | | | I | | | I |
| - Stat. and local holidays | 4.12 | 2.61 | 2.02 | I 1.77 | 1.70 | 6.00 | I 0.00 |
| - Vacation pay (including long service vac. pay) | 9.19 | 5.46 | 3.81 | I 2.63 | 3.42 | 17.00 | I 21.49 |
| - Other allowances (jury duty, funeral and health leave) | 0.90 | 0.30 | 0.34 | I 0.08 | 0.05 | 4.00 | I 0.00 |
| Total pay for time not worked | 14.20 | 8.37 | 6.17 | I 4.48 | 5.17 | 27.00 | I 21.49 |
| Total Pay Per ADMT | 75.42 | 54.03 | 50.34 | I 36.66 | 44.78 | 117.00 | I 170.76 |

| | B.C. Coast | B.C. Interior | Eastern Canada | U.S.A. Pacific Northwest | U.S.A. South | Finland | Sweden |
|---|---------------|------------------|-------------------|--------------------------------|-----------------|---------|---------|
| 4. 1984 Admin and Supervisory Labour Cost Per ADMT | | | | | | | |
| Pay for time worked | 20.55 | 21.36 | 13.86 | I 8.82 | 12.95 | | I |
| Pay for time not worked | 2.00 | 2.17 | 1.81 | I 3.22 | 1.90 | | I |
| Total Pay Per ADMT | 22.55 | 23.53 | 15.67 | I 12.03 | 14.84 | 20.00 | I 58.23 |

Appendix I-16

C. Labour costs

.(Local Currency)

| 6. 1983 Admin and Supervisory Labour Cost Per Hour Worked | B.C. Coast | B.C. Interior | Eastern Canada | U.S.A. Pacific Northwest | U.S.A. South | Finland | Sweden |
|--|---------------|------------------|-------------------|--------------------------------|-----------------|---------|--------|
| Pay for time worked | 20.04 | 18.86 | 16.50 | 16.73 | 13.88 | | |
| Pay for time not worked | 1.84 | 2.07 | 2.12 | 1.54 | 2.19 | | |
| Total Pay Per Hour Worked | 21.88 | 20.93 | 18.61 | 18.27 | 16.07 | 34.81 | 64.84 |

Appendix I-17

(Local Currency)

7. 1984 Operating Labour Cost
Per Hour Worked

| 1984 Operating Labour Cost Per Hour Worked | B.C. Coast | B.C. Interior | Eastern Canada | U.S.A. Pacific Northwest | U.S.A. South | Finland | Sweden |
|---|---------------|------------------|-------------------|--------------------------------|-----------------|---------|---------|
| Pay for time worked | | | | I | | | I |
| Straight time pay | | | | I | | | I |
| - Direct production | 13.85 | 17.58 | 14.93 | I 11.00 | 12.59 | | I |
| - Maintenance | 16.56 | 16.25 | 13.23 | I 12.06 | 12.76 | | I |
| - Other (e.g. yard labour, watchmen, etc.) | 18.16 | 14.25 | 14.45 | I 0.00 | 11.89 | | I |
| Premiums for time worked | | | | I | | | I |
| - Overtime premiums | 1.35 | 1.00 | 0.96 | I 1.88 | 0.83 | | I |
| - Other premiums | 0.39 | 0.70 | 0.04 | I 0.05 | 0.02 | | I |
| Total pay for time worked | | | | I | | | I |
| - Direct production | 15.57 | 19.35 | 15.47 | I 13.07 | 13.33 | | I |
| - Maintenance | 17.74 | 18.05 | 14.91 | I 13.68 | 13.79 | | I |
| - Other | 21.77 | 15.39 | 15.75 | I 0.00 | 12.77 | | I |
| Total pay for time worked | 17.10 | 18.27 | 15.27 | I 13.26 | 13.45 | 43.06 | I 58.01 |
| Pay for time not worked | | | | I | | | I |
| - Stat. and local holidays | 1.15 | 1.04 | 0.70 | I 0.73 | 0.58 | 2.87 | I 0.00 |
| - Vacation pay (including long service vac. pay) | 2.57 | 2.18 | 1.32 | I 1.08 | 1.16 | 8.13 | I 8.35 |
| - Other allowances (jury duty, funeral and health leave) | 0.25 | 0.12 | 0.12 | I 0.03 | 0.02 | 1.91 | I 0.00 |
| Total pay for time not worked | 3.97 | 3.35 | 2.13 | I 1.85 | 1.76 | 12.92 | I 8.35 |
| Total Pay Per Hour Worked | 21.07 | 21.62 | 17.41 | I 15.11 | 15.20 | 55.97 | I 66.36 |

| B. 1984 Admin and Supervisory Labour Cost Per Hour Worked | U.S.A. | | | | U.S.A. | | |
|--|---------------|------------------|-------------------|----------------------|--------|---------|--------|
| | B.C. Coast | B.C. Interior | Eastern Canada | Pacific Northwest | South | Finland | Sweden |
| Pay for time worked | 20.13 | 20.22 | 17.96 | 14.32 | 14.60 | I | I |
| Pay for time not worked | 1.96 | 2.05 | 2.35 | 5.22 | 2.14 | I | I |
| Total Pay Per Hour Worked | 22.08 | 22.27 | 20.31 | 19.55 | 16.74 | 34.55 | 72.94 |

Forest Sector Advisory Council
Study of the Market Pulp Industry

Appendix I-18

Selected Questionnaire Data

(Local Currency)

C. Labour costs

| 9. 1983 Social / Welfare benefits Operating Employees Cost/ADMT | B.C. Coast | B.C. Interior | Eastern Canada | U.S.A. | | U.S.A. South | Finland | Sweden |
|---|---------------|------------------|-------------------|----------------------|-------|-----------------|---------|----------|
| | | | | Pacific Northwest | I | | | |
| Employment Support | 2.64 | 1.55 | 1.99 | I | 1.32 | 0.47 | I | |
| Pension | 2.79 | 1.59 | 2.10 | I | 3.75 | 4.24 | I | |
| Health And Social Benefits | 4.14 | 2.36 | 3.50 | I | 2.68 | 3.24 | I | |
| Other Benefits | 0.30 | 0.31 | 0.19 | I | 0.26 | 0.07 | I | |
| | | | | I | | | I | |
| Total Social & Welfare Benefits | 9.88 | 5.82 | 7.78 | I | 8.01 | 8.02 | 27.00 | I 63.34 |
| | | | | I | | | | I |
| Total Wages and Social & Welfare Benefits Per ADMT | 82.46 | 56.22 | 55.56 | I | 46.20 | 48.28 | 158.00 | I 217.81 |
| | ===== | ===== | ===== | I | ===== | ===== | ===== | ===== |
| | | | | | | | | |
| 10. 1984 Social / Welfare benefits Operating Employees Cost/ADMT | B.C. Coast | B.C. Interior | Eastern Canada | U.S.A. | | U.S.A. South | Finland | Sweden |
| | | | | Pacific Northwest | I | | | |
| Employment Support | 2.81 | 2.22 | 2.51 | I | 1.23 | 0.55 | I | |
| Pension | 3.42 | 2.26 | 2.33 | I | 3.54 | 4.94 | I | |
| Health And Social Benefits | 4.43 | 2.96 | 3.28 | I | 2.89 | 3.80 | I | |
| Other Benefits | 0.30 | 0.35 | 0.23 | I | 0.22 | 0.17 | I | |
| | | | | I | | | I | |
| Total Social & Welfare Benefits | 10.95 | 7.79 | 8.34 | I | 7.88 | 9.46 | 24.00 | I 71.52 |
| | | | | I | | | | I |
| Total Wages and Social & Welfare Benefits Per ADMT | 86.38 | 61.82 | 58.68 | I | 44.54 | 54.24 | 141.00 | I 242.28 |
| | ===== | ===== | ===== | I | ===== | ===== | ===== | ===== |

Appendix I-19

(Local Currency)

11. 1983 Social / Welfare benefits
Operating Emp. Cost/Hr. Worked

| 1. 1983 Social / Welfare benefits Operating Emp. Cost/Hr. Worked | U.S.A. | | | | U.S.A. | | | |
|---|---------------|------------------|-------------------|----------------------|--------|---------|---------|--|
| | B.C. Coast | B.C. Interior | Eastern Canada | Pacific Northwest | South | Finland | Sweden | |
| Employment Support | 0.72 | 0.63 | 0.68 | I 0.51 | 0.16 | I | | |
| Pension | 0.76 | 0.64 | 0.71 | I 1.43 | 1.47 | I | | |
| Health And Social Benefits | 1.13 | 0.95 | 1.19 | I 1.02 | 1.12 | I | | |
| Other Benefits | 0.08 | 0.13 | 0.06 | I 0.10 | 0.03 | I | | |
| Total Social & Welfare Benefits | 2.69 | 2.34 | 2.64 | I 3.06 | 2.78 | 11.39 | I 22.70 | |
| Total Wages and Social & Welfare Benefits Per Hour Worked | 22.43 | 22.66 | 18.87 | I 17.64 | 16.73 | 66.66 | I 78.06 | |

Employment Support
Pension
Health And Social Benefits
Other Benefits

| | | | | | | | | |
|----------------------------------|-------|-------|-------|---|-------|-------|-------|---------|
| Employment Support | 0.78 | 0.89 | 0.87 | I | 0.51 | 0.19 | I | |
| Pension | 0.95 | 0.90 | 0.80 | I | 1.46 | 1.68 | I | |
| Health And Social Benefits | 1.24 | 1.18 | 1.13 | I | 1.19 | 1.29 | I | |
| Other Benefits | 0.08 | 0.14 | 0.08 | I | 0.09 | 0.06 | I | |
| | ----- | ----- | ----- | I | ----- | ----- | I | ----- |
| Total Social & Welfare Benefits | 3.06 | 3.12 | 2.88 | I | 3.25 | 3.21 | 11.48 | I 27.79 |
| | ----- | ----- | ----- | I | ----- | ----- | I | ----- |
| Total Wages and Social & Welfare | | | | I | | | | I |
| Benefits Per Hour Worked | 24.13 | 24.73 | 20.29 | I | 18.36 | 18.41 | 67.45 | I 94.15 |
| | ----- | ----- | ----- | I | ----- | ----- | I | ----- |

Selected Questionnaire Data

(Local Currency)

C. Labour costs

| | B.C. Coast | B.C. Interior | Eastern Canada | U.S.A. Pacific Northwest | U.S.A. South | Finland | Sweden |
|---|---------------|------------------|-------------------|--------------------------------|-----------------|---------|----------|
| 13. 1983 Social / Welfare benefits Admin & Sup Employees Cost/ADMT | | | | | | | |
| Employment Support | 0.83 | 0.68 | 0.47 | I 0.32 | 0.10 | I | |
| Pension | 0.72 | 1.38 | 0.80 | I 1.29 | 2.04 | I | |
| Health And Social Benefits | 1.45 | 0.74 | 0.85 | I 0.92 | 1.21 | I | |
| Total Social & Welfare Benefits | 3.00 | 2.80 | 2.11 | I 2.53 | 3.36 | I 6.00 | I 36.31 |
| Total Wages and Social & Welfare Benefits Per ADMT | 23.99 | 22.36 | 17.87 | I 14.28 | 17.07 | I 27.00 | I 93.31 |
| 14. 1984 Social / Welfare benefits Admin & Sup Employees Cost/ADMT | | | | | | | |
| Employment Support | 0.86 | 0.90 | 0.59 | I 0.30 | 0.12 | I | |
| Pension | 0.70 | 0.47 | 0.87 | I 1.12 | 2.29 | I | |
| Health And Social Benefits | 1.35 | 0.98 | 0.75 | I 0.93 | 1.23 | I | |
| Total Social & Welfare Benefits | 2.91 | 2.35 | 2.21 | I 2.35 | 3.64 | I 6.00 | I 38.73 |
| Total Wages and Social & Welfare Benefits Per ADMT | 25.47 | 25.88 | 17.88 | I 14.38 | 18.48 | I 26.00 | I 96.96 |
| 15. 1983 Social / Welfare benefits Admin & Sup Emp. Cost/Hr Worked | | | | | | | |
| Employment Support | 0.87 | 0.73 | 0.55 | I 0.50 | 0.12 | I | |
| Pension | 0.75 | 1.48 | 0.94 | I 2.01 | 2.39 | I | |
| Health And Social Benefits | 1.51 | 0.79 | 1.00 | I 1.43 | 1.42 | I | |
| Total Social & Welfare Benefits | 3.13 | 3.00 | 2.49 | I 3.93 | 3.94 | I 9.94 | I 41.31 |
| Total Wages and Social & Welfare Benefits Per Hour Worked | 25.00 | 23.93 | 21.11 | I 22.20 | 20.01 | I 44.75 | I 106.15 |
| 16. 1984 Social / Welfare benefits Admin & Sup Emp. Cost/Hr Worked | | | | | | | |
| Employment Support | 0.84 | 0.85 | 0.77 | I 0.48 | 0.14 | I | |
| Pension | 0.68 | 0.45 | 1.13 | I 1.81 | 2.58 | I | |
| Health And Social Benefits | 1.33 | 0.93 | 0.97 | I 1.52 | 1.39 | I | |
| Total Social & Welfare Benefits | 2.85 | 2.23 | 2.87 | I 3.81 | 4.11 | I 10.36 | I 48.50 |
| Total Wages and Social & Welfare Benefits Per Hour Worked | 24.94 | 24.50 | 23.18 | I 23.36 | 20.84 | I 44.91 | I 121.44 |

Appendix I-21

D. Delivery Data

2. 1983 Percent of Total Shipments By Continent

3. 1984 Percent of Total Shipments By Continent

| | | | | | | | | | |
|------------------------|--------|--------|--------|---|--------|--------|--------|---|--------|
| North America - U.S.A. | 9.69 | 12.65 | 48.92 | I | 60.17 | 56.94 | 1.15 | I | |
| - Canada | 2.11 | 0.44 | 37.92 | I | | | | I | |
| Europe - Scandinavia | | | | I | | | 14.89 | I | 13.00 |
| - E.E.C. | 48.05 | 45.71 | 12.89 | I | 6.12 | 25.10 | 71.56 | I | 63.40 |
| - Non - E.E.C. | 0.00 | 0.00 | 0.00 | I | 0.00 | 0.00 | 3.05 | I | 0.00 |
| Rest Of World | 40.15 | 41.20 | 0.27 | I | 33.71 | 17.96 | 9.34 | I | 23.60 |
| | ----- | ----- | ----- | I | ----- | ----- | ----- | I | ----- |
| Total Shipments | 100.00 | 100.00 | 100.00 | I | 100.00 | 100.00 | 100.00 | I | 100.00 |
| | ===== | ===== | ===== | I | ===== | ===== | ===== | I | ===== |

Selected Questionnaire Data

E. Mill Administration, Corporate Level

(Local Currency)

Expenses And Depreciation

| Cost Per ADMT | B.C. Coast | B.C. Interior | Eastern Canada | U.S.A. Pacific Northwest | U.S.A. South | Finland | Sweden |
|------------------------------------|---------------|------------------|-------------------|--------------------------------|-----------------|---------|----------|
| 1. 1983 Mill Administration | | | | I | | I | |
| Insurance | 2.08 | 1.20 | 1.33 | I 1.48 | 1.57 | 0.00 | I 11.79 |
| Property Taxes | | | 0.00 | I | | | I |
| - Paid to municipality | 15.15 | 13.42 | 4.40 | I 3.47 | 0.60 | 0.00 | I 0.00 |
| - Paid to Prov/State government | 0.55 | 0.00 | 0.00 | I 1.67 | 1.49 | 10.00 | I 0.00 |
| Other Taxes | 0.00 | 0.69 | 0.04 | I 1.00 | 0.57 | 0.00 | I 0.00 |
| Other | 9.43 | 3.44 | 1.78 | I 3.96 | 3.99 | 64.00 | I 54.95 |
| Total Mill Administration | 27.21 | 18.76 | 7.54 | I 11.57 | 8.22 | 74.00 | I 66.74 |
| | ===== | ===== | ===== | ===== | ===== | ===== | ===== |
| 2. 1983 Corporate Level Expenses | | | | | | | |
| Head Office/Corporate | | | | I | | I | |
| Administration and Services | 6.02 | 3.44 | 13.37 | I 3.45 | 1.36 | 50.00 | I 0.00 |
| Research and Development | 0.35 | 0.21 | 0.49 | I 0.00 | 0.44 | 0.00 | I 0.00 |
| Selling Expense (includes salaries | | | | I | | | I |
| and benefits of all sales staff, | | | | I | | | I |
| travelling expenses, operating | | | | I | | | I |
| costs of the sales companies | | | | I | | | I |
| and all commissions paid to | | | | I | | | I |
| agents and sales offices) | 15.14 | 5.95 | 5.23 | I 3.17 | 2.18 | 21.00 | I 0.00 |
| Total Corporate Expenses | 21.51 | 9.60 | 19.08 | I 6.62 | 3.98 | 71.00 | I 0.00 |
| | ===== | ===== | ===== | ===== | ===== | ===== | ===== |
| 3. 1983 Depreciation | 23.43 | 18.09 | 32.07 | I 48.95 | 27.11 | 165.00 | I 147.26 |
| | ----- | ----- | ----- | I ----- | ----- | ----- | I ----- |

Selected Questionnaire Data

(Local Currency)

E. Mill Administration, Corporate Level

Expenses And Depreciation

| Cost Per ADMT | B.C. Coast | B.C. Interior | Eastern Canada | U.S.A. Pacific Northwest | U.S.A. South | Finland | Sweden |
|------------------------------------|---------------|------------------|-------------------|--------------------------------|-----------------|---------|----------|
| 6. 1984 Mill Administration | | | | I | | | I |
| | | | | I | | | I |
| Insurance | 1.70 | 1.21 | 1.17 | I 1.56 | 1.60 | 0.00 | I 12.53 |
| Property Taxes | | | 0.00 | I | | | I |
| - Paid to municipality | 16.81 | 16.10 | 4.09 | I 3.80 | 0.70 | 0.00 | I 0.00 |
| - Paid to Prov/State government | 0.40 | 0.00 | 0.00 | I 1.30 | 1.36 | 5.00 | I 0.00 |
| Other Taxes | 0.00 | 0.72 | 0.08 | I 1.25 | 0.68 | 0.00 | I 0.00 |
| Other | 12.58 | 3.52 | 1.64 | I 4.80 | 5.03 | 57.00 | I 63.43 |
| | | | | I | | | I |
| Total Mill Administration | 31.48 | 21.55 | 6.98 | I 12.72 | 9.37 | 62.00 | I 75.96 |
| | ===== | ===== | ===== | ===== | ===== | ===== | ===== |
| 7. 1984 Corporate Level Expenses | | | | | | | |
| Head Office/Corporate | | | | I | | | I |
| Administration and Services | 7.28 | 4.37 | 14.16 | I 3.15 | 1.37 | 50.00 | I 0.00 |
| Research and Development | 1.00 | 0.51 | 0.45 | I 0.00 | 0.47 | 0.00 | I 0.00 |
| Selling Expense (includes salaries | | | | I | | | I |
| and benefits of all sales staff, | | | | I | | | I |
| travelling expenses, operating | | | | I | | | I |
| costs of the sales companies | | | | I | | | I |
| and all commissions paid to | | | | I | | | I |
| agents and sales offices) | 20.32 | 8.50 | 7.12 | I 4.04 | 1.96 | 23.00 | I 0.00 |
| | | | | I | | | I |
| Total Corporate Expenses | 28.60 | 13.38 | 21.72 | I 7.20 | 3.80 | 73.00 | I 0.00 |
| | ===== | ===== | ===== | ===== | ===== | ===== | ===== |
| 3. 1984 Depreciation | 21.40 | 20.92 | 32.89 | I 43.48 | 28.80 | 163.00 | I 165.13 |
| | | | | I | | | I |

Forest Sector Advisory Council
Study of the Market Pulp Industry

Appendix I-24

Selected Questionnaire Data

F. Total Manufacturing Costs

(Local Currency)

And By-Product Revenues

| | B.C. Coast | B.C. Interior | Eastern Canada | U.S.A. Pacific Northwest | U.S.A. South | Finland | Sweden |
|---|---------------|------------------|-------------------|--------------------------------|-----------------|---------|-----------|
| 1. 1983 Manufacturing Cost Per ADMT | | | | | | | |
| Fibre | 138.37 | 125.67 | 200.12 | I 120.40 | 126.48 | 1199.00 | I 1273.96 |
| Chemicals | | | | I | | | I |
| - Cooking | 8.17 | 8.27 | 5.81 | I 7.90 | 9.95 | 40.00 | I 20.74 |
| - Bleaching | 35.89 | 45.29 | 48.13 | I 33.23 | 35.24 | 156.00 | I 185.96 |
| Other Materials | 53.59 | 55.59 | 41.39 | I 32.65 | 28.24 | 38.00 | I 103.22 |
| Energy | | | | I | | | I |
| - Purchased | 52.85 | 39.49 | 36.25 | I 62.87 | 41.11 | 71.00 | I 97.65 |
| - Self-generated | 0.00 | 0.20 | 0.05 | I 0.00 | 0.35 | 0.00 | I 0.00 |
| Total Wages and Social & Welfare Benefits | | | | I | | | I |
| - Operating employees | 82.46 | 56.22 | 55.56 | I 46.20 | 48.28 | 158.00 | I 217.81 |
| - Administrative and supervisory employees | 23.99 | 22.36 | 17.87 | I 14.28 | 17.07 | 27.00 | I 93.31 |
| Administration | 27.21 | 18.76 | 7.54 | I 11.57 | 8.22 | 74.00 | I 66.74 |
| Corporate expenses | 21.51 | 9.60 | 19.08 | I 6.62 | 3.98 | 71.00 | I 0.00 |
| | ----- | ----- | ----- | I ----- | ----- | ----- | I ----- |
| Total Costs before Transportation | | | | I | | | I |
| Depreciation and Depletion | 444.03 | 381.45 | 431.80 | I 335.70 | 318.92 | 1834.00 | I 2059.38 |
| | ----- | ----- | ----- | I ----- | ----- | ----- | I ----- |
| Transportation | 63.46 | 92.30 | 53.72 | 47.10 | 55.72 | 169.95 | 238.84 |
| | ----- | ----- | ----- | I ----- | ----- | ----- | I ----- |
| Total Delivered Costs before Depreciation, Depletion and Interest Expense | | | | I | | | I |
| | | | | I | | | I |
| Interest Expense | 507.49 | 473.76 | 485.51 | I 382.80 | 374.65 | 2003.95 | I 2298.23 |
| | ----- | ----- | ----- | I ----- | ----- | ----- | I ----- |
| Interest | 0.00 | 0.00 | 0.00 | I 0.00 | 0.00 | 0.00 | I 0.00 |
| Depreciation | 23.43 | 18.09 | 32.07 | I 48.95 | 27.11 | 165.00 | I 147.26 |
| Depletion | 0.00 | 0.00 | 0.00 | I 0.00 | 0.00 | 0.00 | I 0.00 |
| | ----- | ----- | ----- | I ----- | ----- | ----- | I ----- |
| Total Costs Before Income Taxes | 530.93 | 491.85 | 517.58 | I 431.75 | 401.76 | 2168.95 | I 2445.49 |
| | ===== | ===== | ===== | I ===== | ===== | ===== | I ===== |
| 2. 1983 By-Product Revenues Per ADMT (Deducted From Other Materials) | | | | | | | |
| Turpentine | 0.00 | 0.01 | 0.14 | I 0.08 | 4.15 | 0.00 | I 0.00 |
| Soap (for tall oil) | 0.00 | 0.10 | 0.78 | I 0.71 | 1.94 | 0.00 | I 0.00 |
| Other | 0.00 | 0.02 | 0.27 | I 0.00 | 0.08 | 0.00 | I 0.00 |
| | ----- | ----- | ----- | I ----- | ----- | ----- | I ----- |
| Total By-Product Revenues | 0.00 | 0.13 | 1.19 | I 0.79 | 6.17 | 47.00 | I 46.45 |
| | ===== | ===== | ===== | I ===== | ===== | ===== | I ===== |

Appendix I-25

(Local Currency)

And By-Product Revenues

4. 1984 By-Product Revenues Per ADMT
(Deducted From Other Materials)

| | | | | | | | | | |
|---------------------------|-------|-------|-------|---|-------|-------|-------|---|-------|
| Turpentine | 0.00 | .00 | 0.18 | 1 | 0.09 | 4.21 | 0.00 | 1 | 0.00 |
| Soap (for tall oil) | 0.00 | 0.09 | 0.99 | 1 | 0.56 | 2.20 | 0.00 | 1 | 0.00 |
| Other ----- | 0.00 | 0.02 | 0.06 | 1 | 0.00 | 0.09 | 0.00 | 1 | 0.00 |
| | ----- | ----- | ----- | 1 | ----- | ----- | ----- | 1 | ----- |
| Total By-Product Revenues | 0.00 | 0.11 | 1.22 | 1 | 0.65 | 6.50 | 51.00 | 1 | 43.34 |
| | ===== | ===== | ===== | | ===== | ===== | ===== | | ===== |

Forest Sector Advisory Council
Study of the Market Pulp Industry

Appendix I-26

Selected Questionnaire Data

F. Total Manufacturing Costs

And By-Product Revenues

| 5. 1983 Manufacturing Cost Percent of Total Cost | B.C. Coast | B.C. Interior | Eastern Canada | U.S.A. Pacific Northwest | U.S.A. South | Finland | Sweden |
|---|---------------|------------------|-------------------|--------------------------------|-----------------|---------|----------|
| Fibre | 25.95 | 25.76 | 38.68 | I 28.06 | 31.45 | 55.71 | I 52.09 |
| Chemicals | | | | I | | | I |
| - Cooking | 1.53 | 1.70 | 1.12 | I 1.84 | 2.48 | 1.86 | I 0.85 |
| - Bleaching | 6.72 | 9.19 | 9.07 | I 7.74 | 8.76 | 7.25 | I 7.60 |
| Other Materials | 10.05 | 11.39 | 8.00 | I 7.61 | 7.02 | 1.77 | I 4.22 |
| Energy | | | | I | | | I |
| - Purchased | 9.91 | 8.09 | 7.01 | I 14.65 | 10.22 | 3.30 | I 3.99 |
| - Self-generated | 0.00 | 0.04 | 0.01 | I 0.00 | 0.09 | 0.00 | I 0.00 |
| Total Wages and Social & Welfare Benefits | | | | I | | | I |
| - Operating employees | 15.46 | 11.52 | 10.74 | I 10.77 | 12.00 | 7.34 | I 8.91 |
| - Administrative and supervisory employees | 4.50 | 4.58 | 3.45 | I 3.33 | 4.24 | 1.25 | I 3.82 |
| Administration | 5.10 | 3.84 | 1.46 | I 2.70 | 2.05 | 3.44 | I 2.73 |
| Corporate expenses | 4.03 | 1.97 | 3.69 | I 1.54 | 0.99 | 3.30 | I 0.00 |
| | ----- | ----- | ----- | I ----- | ----- | ----- | I ----- |
| Total Costs before Transportation | | | | I | | | I |
| Depreciation and Depletion | 83.26 | 78.09 | 83.21 | I 78.23 | 79.30 | 85.21 | I 84.21 |
| Transportation | 12.34 | 18.20 | 10.59 | I 10.37 | 13.96 | 7.12 | I 9.77 |
| | ----- | ----- | ----- | I ----- | ----- | ----- | I ----- |
| Total Delivered Costs before Depreciation, Depletion and Interest Expense | 95.61 | 96.29 | 93.80 | I 88.59 | 93.26 | 92.33 | I 93.98 |
| Interest | 0.00 | 0.00 | 0.00 | I 0.00 | 0.00 | 0.00 | I 0.00 |
| Depreciation | 4.39 | 3.71 | 6.20 | I 11.41 | 6.74 | 7.67 | I 6.02 |
| Depletion | 0.00 | 0.00 | 0.00 | I 0.00 | 0.00 | 0.00 | I 0.00 |
| | ----- | ----- | ----- | I ----- | ----- | ----- | I ----- |
| Total Costs Before Income Taxes | 100.00 | 100.00 | 100.00 | I 100.00 | 100.00 | 100.00 | I 100.00 |
| | ===== | ===== | ===== | I ===== | ===== | ===== | I ===== |

Forest Sector Advisory Council
Study of the Market Pulp Industry

Appendix I-27

Selected Questionnaire Data

F. Total Manufacturing Costs

And By-Product Revenues

| 6. 1984 Manufacturing Cost Percent of Total Cost | B.C. Coast | B.C. Interior | Eastern Canada | U.S.A. Pacific Northwest | U.S.A. South | Finland | Sweden |
|---|---------------|------------------|-------------------|--------------------------------|-----------------|---------|----------|
| Fibre | 25.35 | 25.38 | 38.35 | I 29.49 | 30.49 | 58.61 | I 53.85 |
| Chemicals | | | | I | | | I |
| - Cooking | 1.50 | 1.64 | 0.89 | I 1.73 | 2.98 | 1.87 | I 0.74 |
| - Bleaching | 6.89 | 9.05 | 9.13 | I 7.56 | 8.46 | 8.33 | I 6.64 |
| Other Materials | 10.12 | 11.11 | 8.46 | I 8.40 | 7.49 | 2.62 | I 4.44 |
| Energy | | | | I | | | I |
| - Purchased | 10.57 | 8.48 | 6.92 | I 14.33 | 9.68 | 0.98 | I 2.30 |
| - Self-generated | 0.00 | 0.03 | 0.02 | I 0.00 | 0.44 | 0.00 | I 0.00 |
| Total Wages and Social & Welfare Benefits | | | | I | | | I |
| - Operating employees | 15.03 | 11.61 | 11.01 | I 10.40 | 12.98 | 6.60 | I 9.26 |
| - Administrative and supervisory employees | 4.43 | 4.86 | 3.35 | I 3.36 | 4.42 | 1.22 | I 3.71 |
| Administration | 5.48 | 4.05 | 1.31 | I 2.97 | 2.24 | 2.90 | I 2.90 |
| Corporate expenses | 4.98 | 2.51 | 4.07 | I 1.68 | 0.91 | 3.42 | I 0.00 |
| | ----- | ----- | ----- | I ----- | ----- | ----- | I ----- |
| Total Costs before Transportation | | | | I | | | I |
| Depreciation and Depletion | 84.34 | 78.73 | 83.51 | I 79.91 | 80.09 | 86.56 | I 83.86 |
| | ----- | ----- | ----- | I ----- | ----- | ----- | I ----- |
| Transportation | 11.94 | 17.34 | 10.32 | I 9.94 | 13.02 | 5.81 | I 9.83 |
| | ----- | ----- | ----- | I ----- | ----- | ----- | I ----- |
| Total Delivered Costs before Depreciation, Depletion and Interest Expense | | | | I | | | I |
| | | | | I | | | I |
| | 96.28 | 96.07 | 93.83 | I 89.85 | 93.11 | 92.37 | I 93.69 |
| | ----- | ----- | ----- | I ----- | ----- | ----- | I ----- |
| Interest | 0.00 | 0.00 | 0.00 | I 0.00 | 0.00 | 0.00 | I 0.00 |
| Depreciation | 3.72 | 3.93 | 6.17 | I 10.15 | 6.89 | 7.63 | I 6.31 |
| Depletion | 0.00 | 0.00 | 0.00 | I 0.00 | 0.00 | 0.00 | I 0.00 |
| | ----- | ----- | ----- | I ----- | ----- | ----- | I ----- |
| Total Costs Before Income Taxes | 100.00 | 100.00 | 100.00 | I 100.00 | 100.00 | 100.00 | I 100.00 |
| | ===== | ===== | ===== | I ===== | ===== | ===== | I ===== |

FOREST SECTOR ADVISORY COUNCIL
STUDY OF THE MARKET PULP INDUSTRY
IMPACT ON B.C. INTERIOR
PRODUCTION COSTS OF THE 1984 SHUTDOWN

| | <u>Actual Costs</u> | | <u>Estimated Costs without Strike</u> | <u>Estimated Impact of Strike</u> |
|---|---------------------|------|---------------------------------------|-----------------------------------|
| | 1984 | 1983 | 1984 | 1984 |
| <u>COST PER AIR DRY METRIC TONNE (ADMT)</u> | | | | |
| Wood fibre | 135 | 126 | 135 | - |
| Chemicals | 58 | 53 | 58 | - |
| Energy | 45 | 39 | 44 | 1 |
| Labour | 88 | 78 | 82 | 6 |
| Other Mill Level | | | | |
| - other materials | 60 | 56 | 58 | 2 |
| - mill administration | 22 | 19 | 19 | 3 |
| Mill Level Cost | 408 | 371 | 396 | 12 |
| Corporate and Selling Expenses | 13 | 10 | 11 | 2 |
| Delivery | 92 | 92 | 92 | - |
| Total Delivered Cost (before depreciation and Interest expense) | 513 | 473 | 499 | 14 |
| % Increase (Decrease) from 1983 | | | | |
| - Mill level | 10.0% | | 6.7% | |
| - Delivered cost | 8.5% | | 5.5% | |
| Reference: Consumer prices - % change from 1983 | 4.3% | | 4.3% | |

Appendix 2 summarizes our estimate of the impact on B.C. Interior production costs of the 1984 nine week shutdown resulting from labour disputes.

In estimating the impact of the strike, the following adjustments were made to the 1984 actual data:

| | <u>Actual Data</u> | <u>Revised Data</u> |
|---|--------------------|---------------------|
| Capacity utilization rate | 75% | 88% |
| Hours worked/ADMT for administrative and supervisory staff | 1.06 | .94 |
| Cost/hour worked operating personnel | 24.73 | 23.46 |
| Electrical power consumption (Kwh/ADMT) | 414 | 386 |

MINISTRY OF STATE
LIBRARY

JUN 28 1986

LIBRARY
SCIENCE AND TECHNOLOGY
SCIENCES ET TECHNOLOGIE

36 340

HD
9750
P741
1985

36340

DATE DUE
DATE DE RETOUR

~~Aug 22 1985~~ *R. Raynes*

LOWE-MARTIN No. 1137

INDUSTRY CANADA/INDUSTRIE CANADA



60697