

12/11/79

OPEN FILE

QUINSAM COAL PROJECT

A Joint-Venture Proposal
by
Weldwood of Canada Limited
&
Luscar Ltd.

00065 (1)

TABLE OF CONTENTS

	Page
PART I - OVERVIEW.....	1
INTRODUCTION.....	1
CONCEPT.....	2
Reserves.....	2
Production.....	4
Transportation.....	5
Marketing.....	5
SOCIO-ECONOMIC CONSIDERATIONS.....	7
ENVIRONMENTAL ASPECTS.....	11
SURFACE OWNERSHIP.....	11
PART II - GEOLOGY.....	14
PHYSIOGRAPHY.....	14
REGIONAL GEOLOGY.....	15
STRUCTURE.....	15
COAL MEASURES.....	17
QUANTITY AND QUALITY OF COAL RESERVES.....	19
Reserves.....	19
Coal Quality.....	21
EXPLORATION.....	21
PART III - MINING.....	24
OVERVIEW OF THE MINING PROPOSAL.....	24
FUTURE MINING CONSIDERATIONS.....	24
High Ratio.....	24

Quinsam East.....27
Auger and Underground.....27
MINING OPERATIONS.....27
 General.....27
MINING FUNCTIONS.....28
 Pit Design Parameters.....28
 Drilling and Blasting.....29
 Loading and Hauling.....29
WATER MANAGEMENT.....32
RECLAMATION.....32
COAL PROCESSING.....33

PART IV - IMPLEMENTATION OF THE PROJECT.....34

PART V - JOINT-VENTURE PARTICIPANTS.....36
 THE JOINT-VENTURE.....36
 WELDWOOD OF CANADA LIMITED.....36
 LUSCAR LTD.....37

LIST OF FIGURES

	Page
FIGURE I - Location Plan.....	3
FIGURE II - Surface Ownership Map.....	13
FIGURE III - Stratigraphic Column Comox Formation.....	18
FIGURE IV - In Place Coal Reserves.....	20
FIGURE V - Phase I Exploration Plan.....	22
FIGURE VI - Pit & Facilities Plan.....	25
FIGURE VII - Haul Route to Dock Facility.....	31
FIGURE VIII - Location Map of the Luscar Mines.....	40

LIST OF TABLES

	Page
TABLE I - RESERVE SUMMARY.....	26
TABLE II - MAJOR MINING EQUIPMENT.....	30

PREFACE

This report has been prepared following the "Guidelines for Coal Development" established by the Environment and Land Use Committee of British Columbia. It represents the Prospectus phase of the Four-Stage Assessment Procedure.

The report is based upon preliminary resource information, conceptual plans and estimated costs. In addition to requiring Government approval, the project is dependent upon completing a final feasibility study confirming satisfactory economics, obtaining firm sales contracts based on world prices for the coal and receiving the approval of the Foreign Investment Review Agency.

PART I - OVERVIEW

INTRODUCTION:

Weldwood of Canada Limited, owners of certain coal rights on Vancouver Island, and Luscar Ltd., a major coal mining company, as Joint-Venture participants propose to establish coal mining operations in the Quinsam Lakes area, 17 miles inland from Campbell River (see Figure I). The results obtained from the preliminary exploration programs conducted by the Joint-Venture participants indicate that surface mining over approximately 4,000 acres of the Quinsam Property would be economically feasible.

Although formal sales contracts are yet to be finalized, it is envisioned that the coal will be used primarily in industrial applications along the Pacific Coast. In investigating potential markets, preliminary discussions have been held with British Columbia Hydro, utility companies located in the Gulf States, and various cement manufacturers located in both Canada and the United States.

Since beginning exploration, the Joint-Venture participants have endeavoured to keep the local public aware of its activities by way of press reports, meetings with the Town of Campbell River, the Campbell River

Environmental Council and the Regional Development Board of Comox-Strathcona. In addition, all surface owners have been kept abreast of any activities on their land holdings and the participants have sought the co-operation and advice of agencies connected with mining in the Provincial Government.

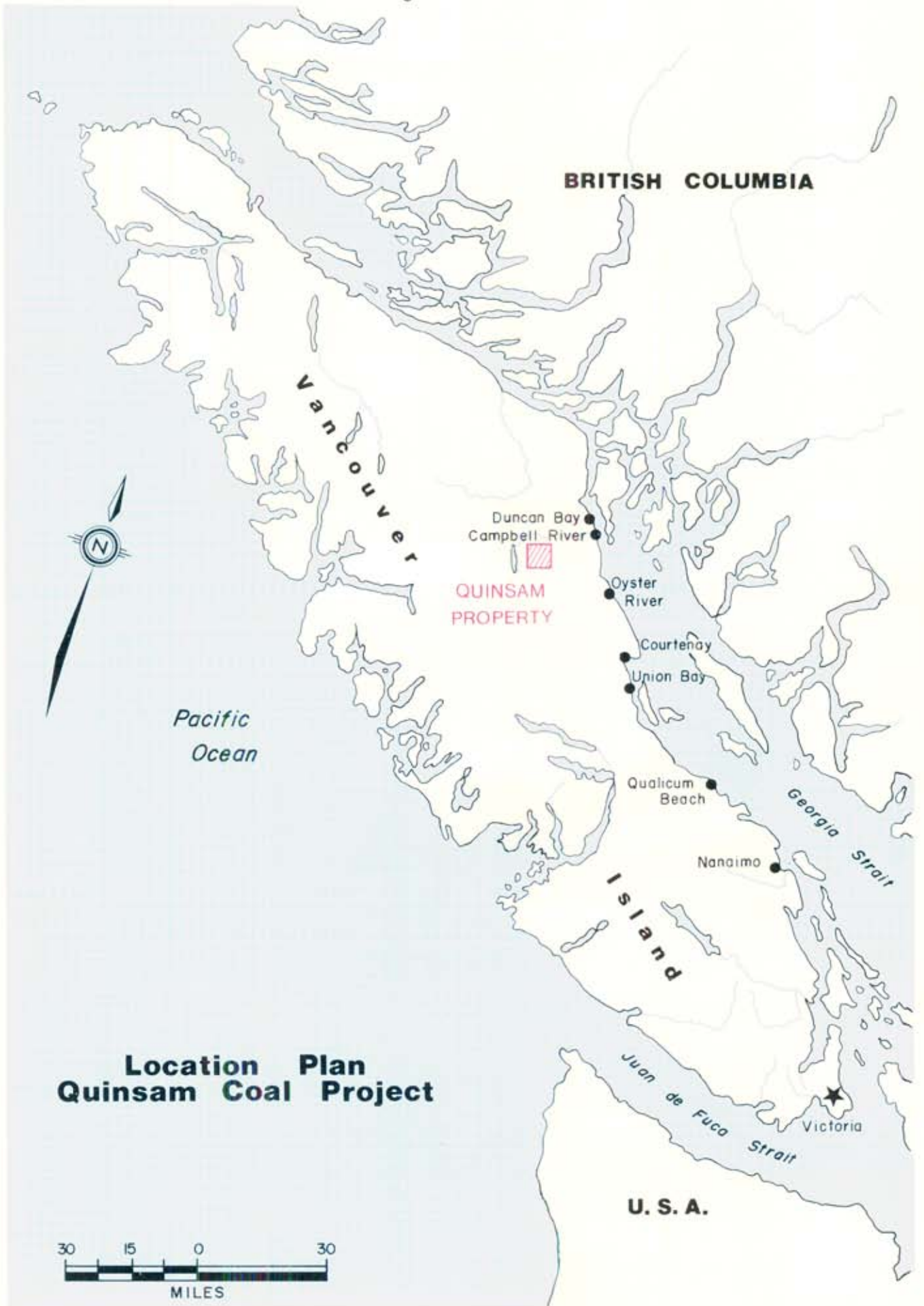
CONCEPT

The initial feasibility study has been based upon the following preliminary resource data and conceptual plans:

Reserves

The immediate area proposed for development comprises 4,000 acres and has proven surface mineable reserves of 15.2 million tons. If future surface mineable reserves, underground reserves and auger reserves are included (18.0 million tons), the indicated reserves will be more than doubled (33.0 million tons).

In addition, a future development area, the Quinsam East Block, has possible surface mineable reserves of approximately 9.45 million tons. Additional drilling in this area is required in order to "prove" the reserve and to permit the development of detailed mine plans.



**Location Plan
Quinsam Coal Project**



Production

It is estimated that 1.3 million short tons of coal will have to be mined in order to attain the projected clean coal production of 1.0 million short tons per year.

An on-site preparation plant will be built to clean and process the coal before it is shipped. Cleaning of the coal is necessary for the following reasons:

- 1) to ensure quality control;
- 2) to upgrade the quality by reducing the content of non-combustible material and thereby raising the calorific value;
- 3) to reduce the sulphur content;
- 4) to ensure maximum recovery of saleable coal from the deposit.

After cleaning, the coal will have the following specifications: see: CX - QUINSAM 77(4)A
CONFIDENTIAL ANALYSIS FILE

Transportation

Seven coal haulers, each capable of hauling 100 tons, will be employed to move the clean coal from the preparation plant to the dock facility. The entire haul route, approximately 20 miles in length, will be over existing off-highway roads. Upgrading in the form of road widening and improving visibility on curves will be necessary. At the dock facility, the coal will be loaded onto ocean-going barges or ships.

Weldwood, on behalf of the Joint-Venture participants, has an agreement in principle with Western Mines Ltd. to jointly use the Campbell River Spit for dock facilities. However, recognizing the environmental concerns regarding industrial expansion on the Campbell River Estuary, investigations are currently underway to determine the feasibility of utilizing Duncan Bay for the dock facilities.

Marketing

Markets which currently exist for the type of coal available from the Quinsam property include:

- 1) Cement Industry - numerous cement manufacturers located along the Pacific Coast (both in Canada and the United States) are either presently using coal as a fuel supply or anticipating conversion from oil and gas

to coal by the early 1980's. The majority of these cement plants are accessible by barge.

- 2) Power Industries - thermal electric generating stations located in the U.S. Gulf are already underway in their conversion from oil and gas to coal as a fuel source. Expansions to existing plants will undoubtedly be coal-fired. The low-sulphur coal available from the Quinsam property could be used as a "blend coal" to achieve acceptable air quality emissions.
- 3) Japan - the Japanese market for high quality thermal coal is rapidly expanding. Potential also exists for Quinsam coal in the "formed coal and coke" markets.

SOCIO-ECONOMIC CONSIDERATIONS

Significant benefits will be derived, both provincially and nationally, from the proposed mining project. These are:

1) Capital and Operating Expenditure

The project will require a capital investment of approximately \$50 million, of which some 71% or approximately \$35.6 million would be for equipment and services purchased in Canada. Annual operating expenditures, almost all for supplies and services originating in British Columbia would total approximately \$13 million, of which approximately \$5.1 million would be for wages and salaries.

2) Sales Revenue

At the planned scale of production and given allowance for continuing inflation, the project can be expected to generate sales revenue, F.O.B. dock, in the order of \$300 - 400 million during the first 11.5 years of operation.

3) Revenue to Shipping Companies

Shipping companies stand to gain, perhaps \$50.0 million from the movement of coal from the mine.

4) Revenue to Governments

The three types of government - Municipal, Provincial and Federal, stand to gain the following forms of revenue from the project:

- a) municipal taxes
- b) equipment licences
- c) corporate income tax to provincial and federal governments
- d) personal income tax from both direct and secondary employment
- e) tax on fuel consumed at the mine
- f) coal licence fees and/or mineral land taxes
- g) coal production royalties and/or mineral taxes
- h) mining tax

5) Employment

The project will generate both direct and indirect employment:

- a) permanent direct employment at the mine for approximately 235 employees, and
- b) continuing secondary employment in the following areas:
 - goods and services
 - shipping
 - trucking
 - production of supplies
 - machine shops
 - consultants

6) Diversification of Economic Growth

The project will generate economic growth in the Campbell River area and more importantly, it will diversify and stabilize the economic base of that area. To a certain extent it would relieve the community from forestry industry cycles. It is intended that the workforce will reside in Campbell River. In addition, it is expected that private contractors will take advantage of the increased demand for housing and accomodation.

7) Development of Alternative Energy Sources

From an energy users' point of view, the proposed development would offer industrial concerns the option to replace oil and natural gas as their fuel source.

8) Security of Supply

It should be noted that the proposed development avoids the instability that characterized previous days of coal mining, when operations were on a small scale and coal was sold by the carload at fluctuating spot prices. Today, the customers need the assurance of a reliable supply. The scale of operations, the consequent financial requirements and government regulations ensure careful conception and execution of projects.

9) Expansion of British Columbia's Coal Industry

The proposed thermal coal project will constitute a significant expansion to the British Columbia coal industry. It is important to note that Quinsam Coal is a steam coal; therefore, not affected by the depressed market which currently exists for coking coal.

The Joint-Venture participants will be initiating a detailed study on the socio-economic aspects of the Quinsam Project. This report will be submitted at the Stage I phase of the assessment process.

ENVIRONMENTAL ASPECTS

It is recognized that prior to proceeding with the development of the Quinsam Project, assurances must be given regarding:

- 1) protection of the environment both during construction and operations;
- 2) reclamation of the disturbed lands to ensure a productive end use.

The Joint-Venture participants are prepared to give these assurances and both can offer broad and diverse experience in the areas of reclamation and resource management. Environmental information is now being gathered on the Campbell River area, particularly with regard to fisheries, water management and land reclamation. After determining potential impacts and identifying data gaps, the necessary field investigations and studies will be initiated. Prior to proceeding with the environmental program, the Joint-Venture participants would seek the concurrence of the appropriate government agencies.

SURFACE OWNERSHIP

The total area held under coal licence by Weldwood amounts to approximately 56,000 acres. Surface rights over the area are presently held by Elk River Timber Company, Crown Zellerbach, McMillan Bloedel, the Province of British Columbia and others. Negotiations

are currently underway to obtain the surface rights in the development area. Figure 2 illustrates the surface ownership in the area.

PART II - GEOLOGY

PHYSIOGRAPHY

The Quinsam Property is part of the Nanaimo Lowlands belt. It is bounded to the west by the Insular Mountain Range, to the north by Campbell Lake, to the south by the Oyster River and to the east by the Straits of Georgia. The topography consists of a series of low rolling hills and plateaus separated by narrow valleys. A large glacial valley occupied by Beavertail, Snakehead, Gooseneck and Middle Quinsam Lakes forms the north-western boundary of the property.

Three major river systems drain the area. In the northern part of the property, the Campbell River drains Campbell Lake into the Straits of Georgia. The Quinsam River and Iron River drain the central part of the area. The Oyster River drains the southern part of the property.

The area is covered by a dense growth of vegetation, typical of the northwest Pacific coast. Outcroppings of bedrock are almost entirely restricted to steep river gorges and man-made roads and excavations.

REGIONAL GEOLOGY

Coal seams of economic importance occur in the Late Cretaceous Comox Formation. The sedimentary sequence consists mainly of medium-grained, thick bedded arkosic sandstones, interbedded with minor shale and coal seams. Locally, a coarse conglomerate unit known as the Benson Member occurs at the base of the formation.

The base of the Comox Formation lies with angular unconformity on top of the Jurassic to Triassic Vancouver Group. It consists of a typical eugeosyncline sequence of alternating marine shales and limestones interbedded with a thick series of pillow lava basalts and andesitic pyroclastics.

A thick layer of glacial deposits covers most of the northwestern and eastern parts of the Quinsam Property. These deposits thin out south of the Quinsam River. The bedrock extending from here to the Oyster River is covered by a thin mantle of weathered rock.

STRUCTURE

In the Quinsam area, tectonic activity has produced a series of down faulted blocks of Comox sediments trending northwest and dipping from 3° to 17° northeast. A series of secondary transverse faults

branch off from the main northwest trending normal faults and dissect the Comox formation in a radial fashion, primarily aligned in an east-west orientation. Minor high angle reverse faulting occurs along the western boundary of the area where the Comox formation has been affected by an uplift of the granitic Insular Mountain Range. In these situations, the footwall has been rotated downward to a greater dip than the hanging wall.

Four major factors have affected seam continuity within the Quinsam Property:

1) Normal Faulting

At least seven major normal faults have disrupted the coal measures causing displacements ranging from 5 to 50 feet. In all cases the downthrown block has been rotated, causing a steeper dip on the footwall. This style of brittle fracture is dominant; folding and thrust faulting are insignificant.

2) Glacial Erosion

Erosion by moving glacial ice has truncated the coal seams in the middle and northern blocks to depths ranging from 60 to 150 feet. This has effectively reduced the amount of shallow recoverable coal in these areas.

3) Irregular Surface of Deposition

The coal measures were deposited on an irregular paleotopographic surface. As a consequence, the lower No. 1 seam pinches out and shales out along these old basement highs. The stratigraphically higher seams are not affected.

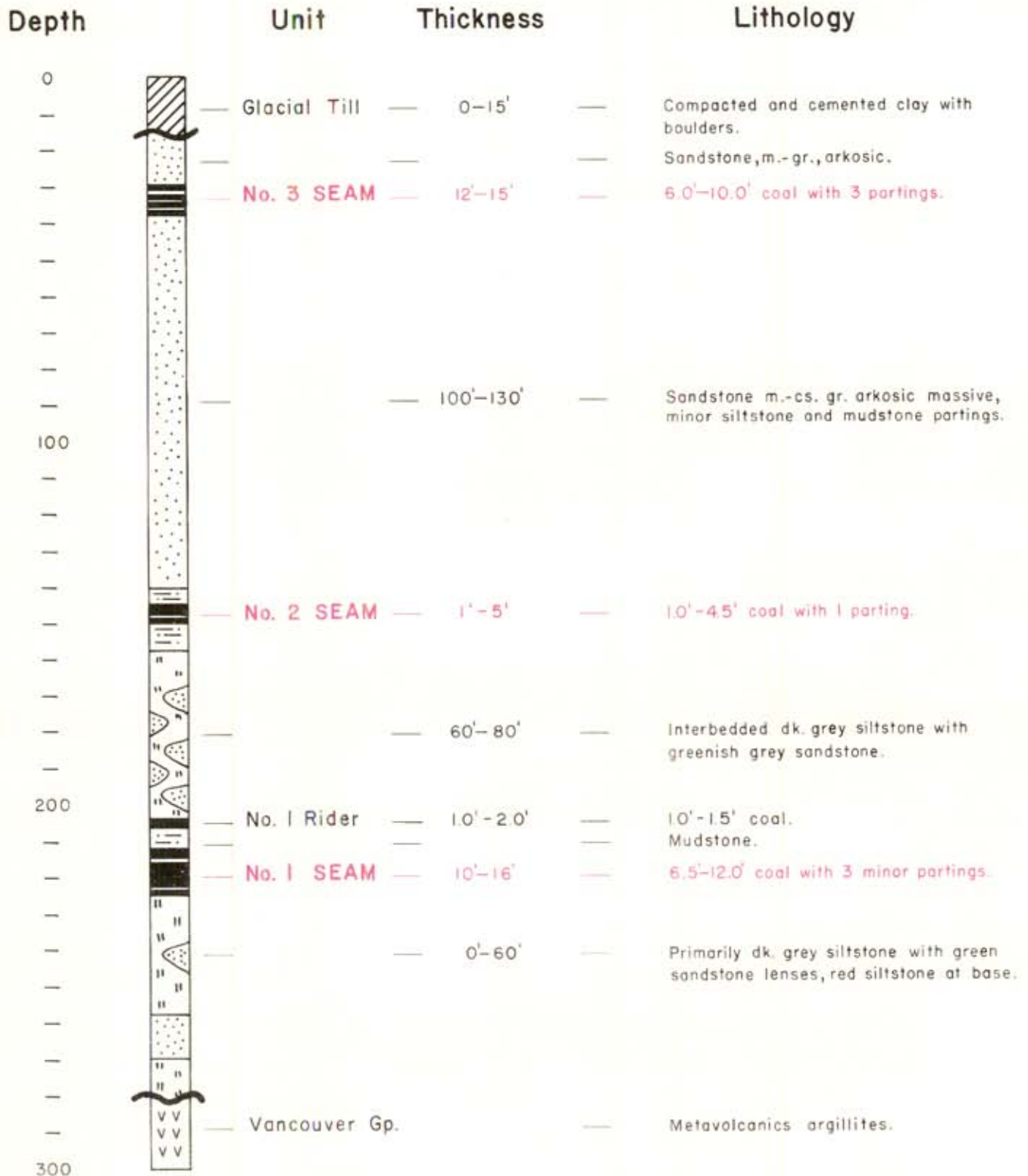
4) Plutonic Intrusion

Intrusion of plutonic rocks (commonly dacites) through the coal measures has caused local metamorphic upgrading in the rank of the coal seams and a metasomatic increase in the inorganic sulphur content up to a maximum of 5%. It appears that these effects are limited to the southern block where the sediments are in contact with intrusive rocks.

COAL MEASURES

Within the study area, the coal measures are concentrated within a 300 foot interval of the Late Cretaceous section. Because no significant outcroppings occur on the property a stratigraphic sequence has been reconstructed on the basis of drill hole information as illustrated in Fig. 3. Three coal seams are present in the area; their thickness and relative stratigraphic positions are listed in descending order as follows.

Stratigraphic Column Comox Formation Quinsam Coal Project



Seam	Thickness	Stratigraphic Separation
No. 3	5.8ft-8.2ft	100ft-130ft
No. 2	1.4ft-4.2ft	60ft- 80ft
No. 1	9.1ft-12.0ft	
Total Coal Zone Thickness		160ft-210ft

The No. 1 and No. 2 seams persist throughout the area. The No. 3 seam is known only to occur in the southern structural block between the Quinsam and Iron Rivers.

QUANTITY AND QUALITY OF COAL RESERVES

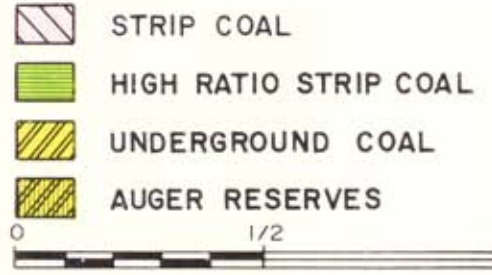
Reserves

The in place strip reserves for the Quinsam mining area have been calculated to a depth of 200 feet of cover. Auger reserves will occur in a zone 150 feet wide, down dip of the final highwall. Potential in place underground reserves are defined beyond the auger limit within major known geological boundaries. Figure 4 illustrates the location of these reserve areas on the property. The reserves are summarized as follows:

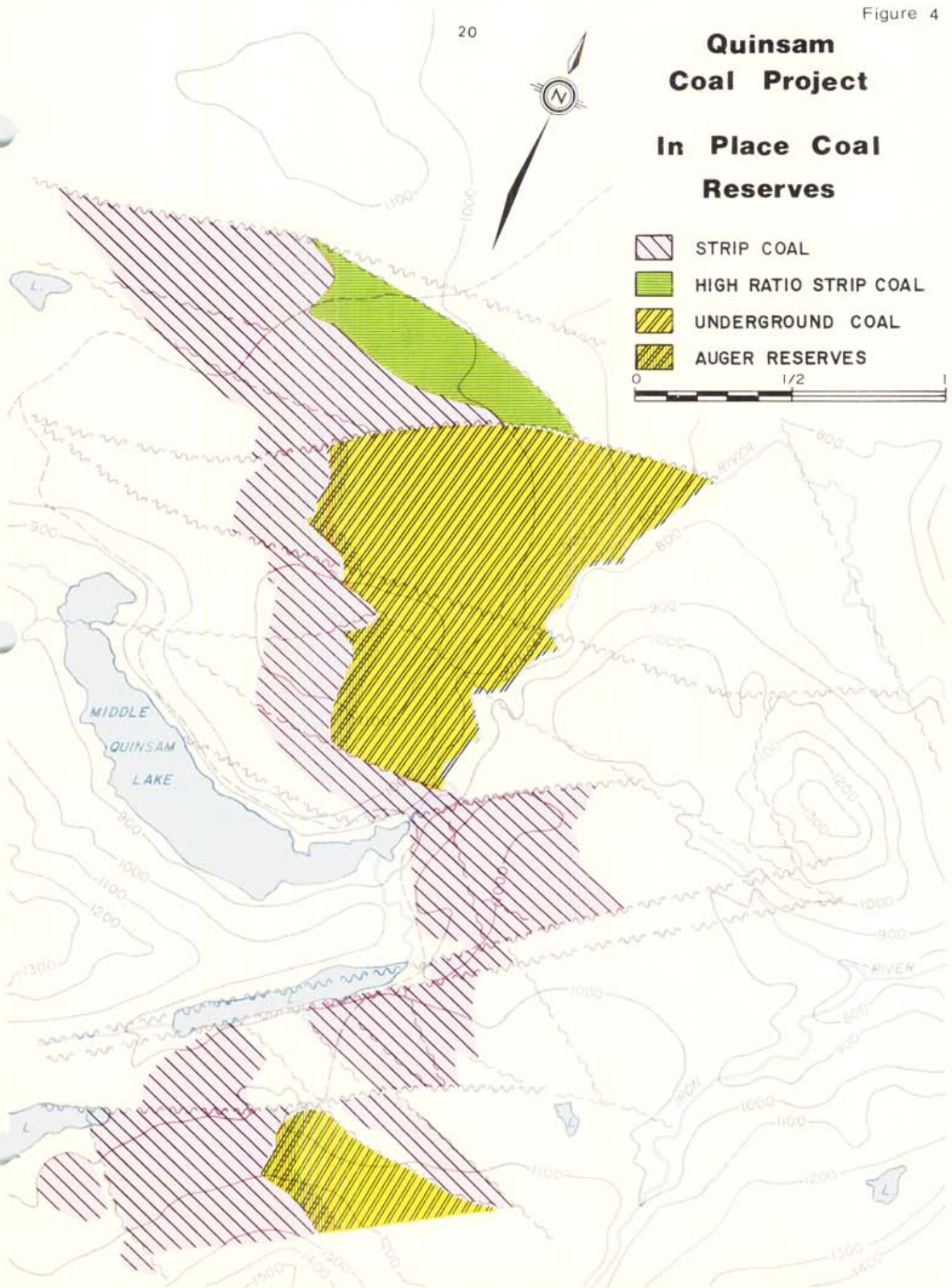
Strip Reserves	20.80 million tons
High Ratio Strip Reserves	4.00 million tons
Auger Reserves	0.36 million tons
Underground Reserves	<u>8.26 million tons</u>
TOTAL	33.42 million tons

Quinsam Coal Project

In Place Coal Reserves



20



Coal Quality

Coal from this region is classified as a high volatile, bituminous "A", steam coal. It has the following analytical characteristics on an "air dry basis".

For: ANALYTICAL DATA ON SEAM No'S 1, 2, AND 3

See: CX - QUINSAM 77 (4)A

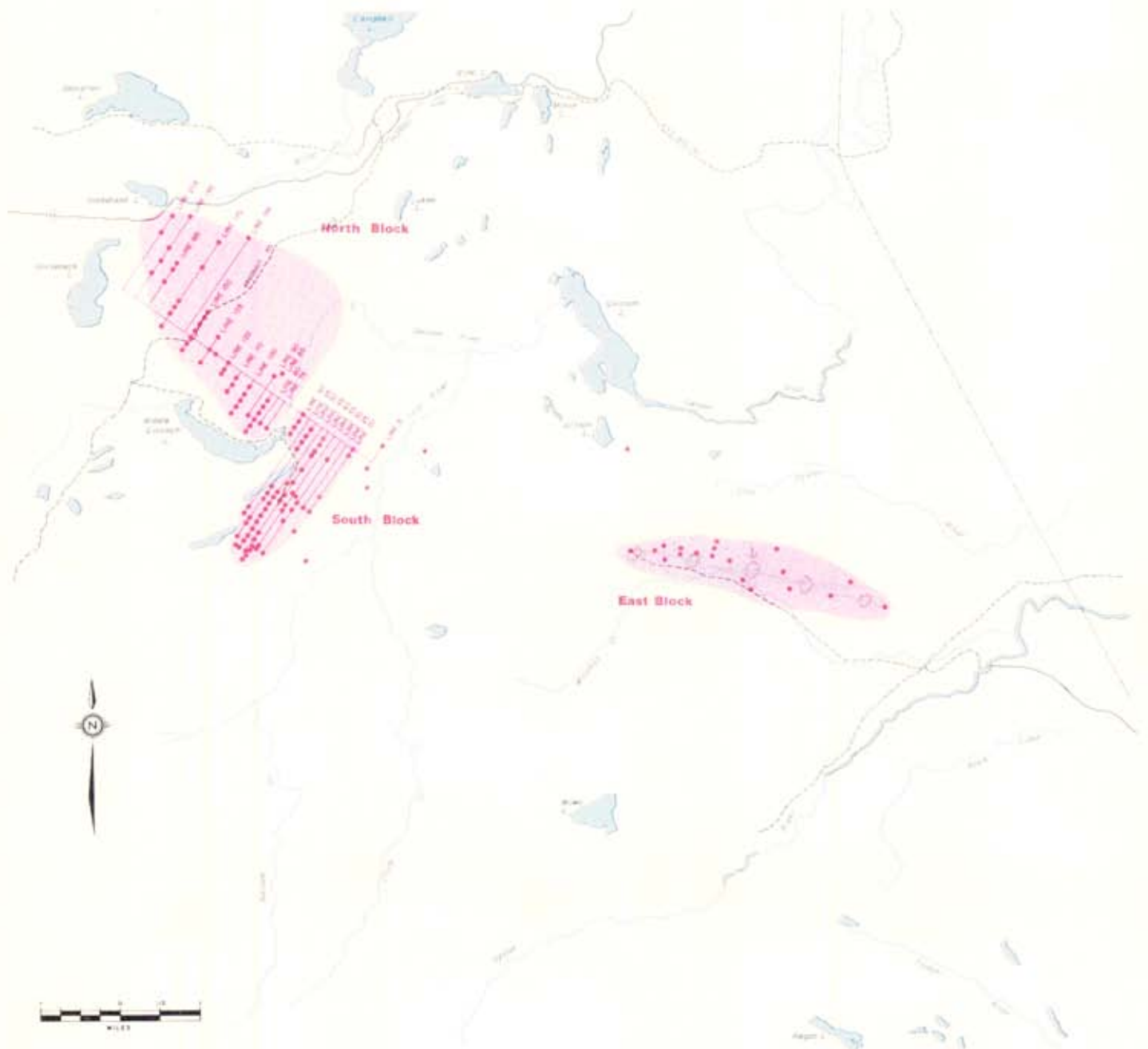
CONFIDENTIAL ANALYSIS FILE

Washability tests conducted on only the coal indicate that greater than 90% of the raw coal can be recovered at less than 10% ash with a calorific value ranging from 12,500 to 13,000 Btu/lb.*

EXPLORATION

During the period commencing October, 1976, through to June, 1977, 158 test holes were drilled for a total logged footage of 34,600 feet. The test holes were spaced at 500 foot intervals along cut lines trending at 90° to the strike of the formation. The lines were arranged 1,000 to 1,500 feet apart along regional strike from the northern to the southern boundaries of the area. Figure 5 illustrates the extent of the exploration program.

* Washability tests are presently being conducted on "as mined" samples which will produce different yields.



Quinsam Coal Project Exploration Plan

- DRILL HOLE
- CROSS SECTION/BASELINE

A wire line coring system was used to recover coal samples. All test holes were geophysically logged by utilizing a three curve gamma-density-resistance sonde. Additional projects included:

- 1) an aeromagnetic survey designed to outline intrusive bodies and map the structure of the volcanic basement rocks;
- 2) surficial geologic mapping designed to outline the glacial erosional edge of the coal measures.

Future exploration programs will mainly consist of infill drilling to more precisely define the structure and to permit the formulation of detailed mine plans. In addition, bulk sample coal tests will be required for washability studies.

PART III - MINING

OVERVIEW OF THE MINING PROPOSAL

The initial area proposed for development has been divided into two mining blocks; the North Block and the South Block. Both areas would be developed by standard surface mining techniques. The mine pits have been planned with respect to the geological conditions which exist in the area. Figure 6 shows the proposed location of mine pits and facilities.

A truck haul is proposed as the main means of conveyance to transport the coal from the mining areas to the preparation plant. A truck haul is also proposed for transporting the clean coal from the preparation plant to the dock facilities.

Initially the project is designed for a life of 11.5 years. It is estimated that an average of 1.3 million raw short tons per year will have to be mined in order to achieve the projected clean coal production of 1.0 million tons per year. The quantity of overburden which has to be handled to uncover the coal will total approximately 180 million cubic yards over current mine life. The overall mining ratio will be 15.6:1. Data pertaining to reserves and recoveries are tabulated in Table I.

FUTURE MINING CONSIDERATIONS

High Ratio

The downward extension of the coal seams, beyond the present pit limits, could be developed in the future by

Quinsam Coal Project

Pit & Facilities Plan

Legend:

- MINE PIT
- HAUL ROAD
- WASTE DUMP

Scale: 0 to 1 mile, with 1/2 mile marked.

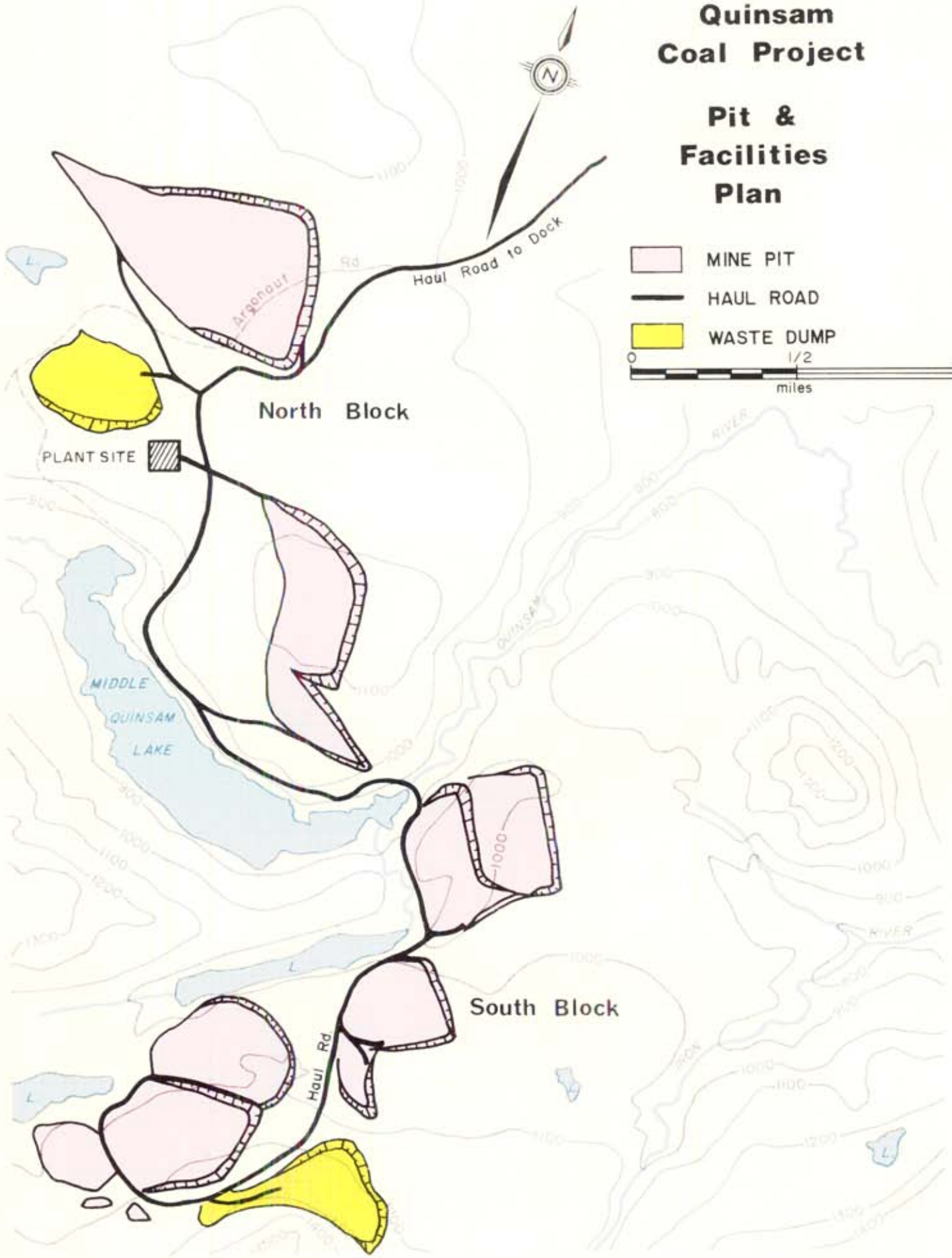


TABLE I
"RESERVE SUMMARY"

	Coal (tons) (x 10 ⁶)	O/B (yd ³) (x 10 ⁶)	Mining Total yd. ³ *A Clean tons
Development Area			
1) Initial Development	15.2	152	15.6:1
2) Possible Future Developments	9.6	-	-
3) Auger Reserves	0.36	-	n/a
4) U/G Reserves	8.26	n/a	n/a

TOTAL RESERVES 33.42 x 10⁶ raw in place tons

Quinsam East *B

Raw in place reserves	9.45	-	-
-----------------------	------	---	---

Note *A - Assumes 30% dragline rehandle

Note *B - Limited drill hole information

surface mining methods. The financial viability of such further development would depend on the following factors:

- 1) an increase in price levels which would permit the recovery of coal deemed to be too deep under present economic circumstances;
- 2) increased sophistication of surface mining techniques and technology;
- 3) reduction of coal output and maintenance of the overburden production within the capabilities of the existing equipment.

Quinsam East

To prolong mine life, operations could be extended to the Quinsam East Block. Present indications are that surface mineable reserves in the order of 9.45 million tons exist in this block. However, due to the complexity of the area, additional exploration work is required to determine what recoveries can be expected.

Auger and Underground

Auger and/or underground mining methods could be utilized to supplement surface mining production, or to extend the life of the mine.

MINING OPERATIONS

General

Clearing of vegetation will take place 6 months to 1 year in advance of the stripping operation. Disposal of

debris will be in accordance with government regulations. Prior to commencement of mining, material suitable for the establishment of vegetation, will be stockpiled for later use in the reclamation program. For purposes of quality control and equipment availability, it will be necessary to operate two or three mine pits simultaneously.

A 44 cubic yard capacity dragline equipped with a 250 foot boom and a 21 cubic yard capacity mining shovel will comprise the major stripping equipment. Table II lists the major equipment to be utilized in the mining operation. Overburden removal will be to a maximum depth of 180 feet above the lowermost coal seam. Because the digging depth of the dragline is limited to 100 feet, prestripping by a truck/shovel operation will be necessary to recover the higher ratio coal.

MINING FUNCTIONS

Pit Design Parameters

The following parameters have been used in preliminary pit design*:

- | | |
|------------------------------|-----|
| 1) Overall pit wall angle | 45° |
| 2) Dragline highwall angle | 60° |
| 3) Truck/shovel bench angle | 60° |
| 4) Truck/shovel bench height | 35' |

* Pit parameters are based on preliminary information.

5) Spoil Dumps	maximum height	110'
	angle of repose	36°
	reclaim angle	26°
	swell factor	30%
6) Overall Yield	76% of mineable reserves	
7) Coal Density	1.2 short tons per bank cubic yard	

Drilling and Blasting

Except for those areas where till overlies the coal, it is expected that overburden will have to be drilled and blasted. Coal will also be shot in order to permit easier loading.

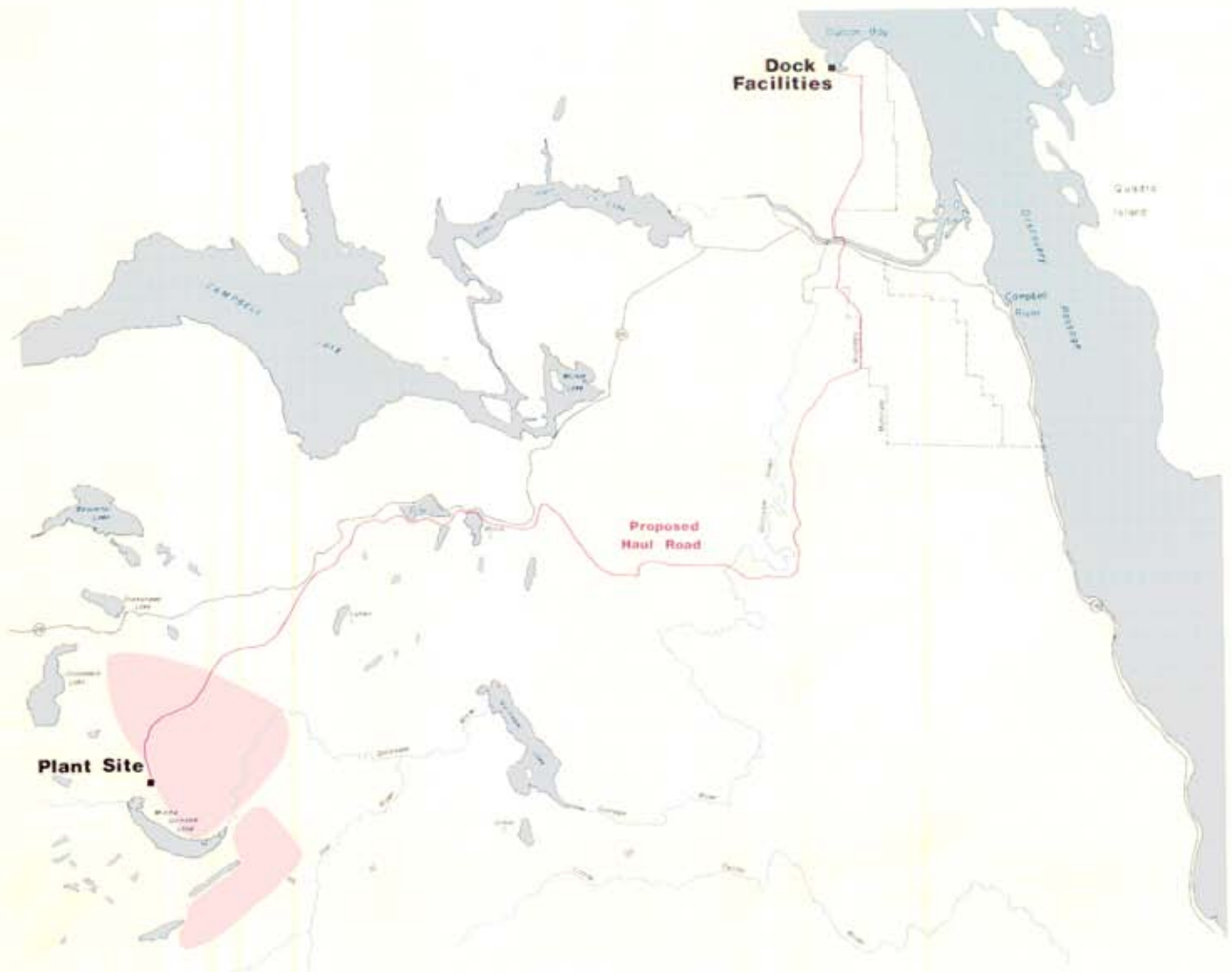
Loading and Hauling

Coal removal will be accomplished by an 8 cubic yard backhoe and a 15 cubic yard front end loader. The backhoe will be employed in those areas where greater selectivity in removing partings is required.

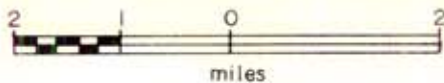
Three different types of trucks are envisaged for hauling. One hundred ton capacity rear dump trucks will be used to haul overburden material. Eighty-five ton capacity rear dump trucks will be employed to haul coal from the mine pits to the preparation plant. Faster and larger capacity (100 tons) tractor-trailer units are proposed for the haul of clean coal from the preparation plant to the dock facility. (See Figure 7)

TABLE II
 "MAJOR MINING EQUIPMENT"

<u>Quantity</u>	<u>Description</u>
1	44 yd ³ Dragline
1	21 yd ³ Shovel
7	100 ton Truck (rear dump)
2	Rotary Drills
7	100 ton Coal Hauler (bottom dump)
1	Backhoe (9 cu. yd.)
5	Dozer
1	Water/Sand Truck
1	Scraper
2	Grader
1	F.E.Loader
1	Fuel/Lube Truck
1	Dump Truck 10 ton
1	Backhoe
1	35 ton Crane
1	Welding Truck
1	Coal Drill
20	Small Vehicles
1	Farm Tractor (40 h.p.)
1	Fire Truck
1	Farm Tractor with Equipment
1	Compactor (Pull type vibrating)
1	Ambulance and Safety Equipment
-	Dewatering Equipment
-	Pit Lighting
-	Radio Communication
3	F.E. Loader (10 cu. yd.)
4	Coal Hauler (85 ton)



Quinsam Coal Project Haul Route to Dock



WATER MANAGEMENT

Throughout the construction phase of the project and during operations, a water management program will be in force. Detailed study in this regard is required however, it is anticipated that surface runoff waters, mine waters and plant process waters will all be handled through a system of ditches and settling ponds.

The Joint-Venture participants recognize the importance of water management and are committed to ensuring that all waters leaving the minesite are within acceptable quality standards.

RECLAMATION

Approximately 163 million cubic yards (90%) of the total waste will be dumped as backfill into the mined-out portions of the pits. Due to operating restrictions, it is not practical to return all of the waste material to the mine pits, thereby necessitating the establishment of two out-of-pit dumps. The two dumps will contain approximately 18.0 million cubic yards of material in total.

Spoil dumps and backfilled areas will be contoured to a configuration which will promote good surface drainage, permit the establishment of a vegetative cover and be harmonious with the regional landform. After contouring, the disturbed areas will be capped with a suitable cover of regolith material.

Although a detailed seed/fertilizer prescription has not yet been prepared, it is envisioned that initially pioneer crops of grasses and legumes will be employed to curtail erosion and to provide necessary soil fibre and plant nutrients. Reclamation will be a continuing operation so that only 200-300 acres will be disturbed at any given time.

The ultimate land use objective for the reclaimed area is one of commercial timber production. On-going studies and field trials will yield the information required in order to attain the objective.

COAL PROCESSING

The main reason for processing Quinsam Coal is to produce a uniform specification product. Detailed washability studies will yield the information required to determine the best manner in which to process the coal. It is anticipated that a conceptual design for the plant will be ready for review at the Stage I phase of the assessment process.

PART IV - IMPLEMENTATION OF THE PROJECT

The Joint-Venture participants recognize that in order to meet the targeted production date of mid - 1981, a number of actions must be taken. Among them:

- 1) Regulatory Process - The project is subject to approval in each stage of the Province's four step Assessment Process. As part of the approval process, (a) necessary environmental, socio-economic and engineering studies must be completed; (b) arrangements for surface rights must be obtained; (c) design of facilities such as the preparation plant, maintenance buildings, offices and wash houses, power, water, sewage, and coal storage and dock facilities must be finalized.
- 2) Definitive Mine Design - A development drilling program must be completed to more precisely establish the quantity and quality of the "proven" reserve and to permit the formulation of detailed mine plans.
- 3) Purchase Mining Equipment - It is estimated that approximately \$21,000,000 worth of surface mining equipment must be purchased.
- 4) Construction - The construction phase of the project will last approximately 18 months and will require 500 man years of employment. The following major projects will be undertaken during the construction phase:

- (a) establishing a 500 man construction camp,
 - (b) constructing the plant, shop/office and dock facility,
 - (c) establishing road systems,
 - (d) providing power,
 - (e) establishing water and sewer systems,
 - (f) assembling major mining equipment (one year is required to erect the dragline).
- 5) Housing - Living quarters to accomodate the mine workforce will have to be constructed in the town of Campbell River.
- 6) Workforce - A permanent workforce of approximately 235 people will be recruited. Preference will be given to those area and provincial residents who have the necessary skills. Many of these people will come from the construction phase of the project.
- 7) Operations - Prestripping of the mine zones and commissioning of the plant and major equipment will take place during the construction phase.

PART V - JOINT-VENTURE PARTICIPANTS

THE JOINT-VENTURE

Upon confirmation of the existence of sufficient quantities of surface mineable coal reserves on the Quinsam Property, Luscar Ltd. and Weldwood of Canada Limited commenced detailed negotiations on the terms of a Joint-Venture agreement, to set forth their respective rights, duties and obligations relative to future development, the construction of the required mine facilities and the operation of the mine.

The Joint-Venture agreement will provide that Luscar Ltd. will be designated as "Project Manager" until completion of construction and thereafter will be designated as "Operator" of the mine. However, certain policy decisions will require the approval of a "Management Committee" composed of an equal number of representatives of each party. It is anticipated that all of the terms of the Joint-Venture agreement will be settled between the participants within the near future.

Weldwood of Canada Limited is one of B.C.'s largest manufacturers of plywood, lumber and pulp and is a leader in the distribution of building materials needs across Canada. Luscar Ltd. is a major Western Canadian coal producer and is headquartered in Edmonton, Alberta. A brief description of each of the companies follows:

WELDWOOD OF CANADA LIMITED

Weldwood of Canada Limited was formed in 1964 to consolidate the manufacturing and distribution complex of its

predecessor companies under one name. Its three predecessor companies were Western Plywood Company Limited, based in Vancouver; Hay and Company, a hardwood and plywood manufacturer, based in Woodstock; and Weldwood Plywood Limited, a Montreal based distributor of building materials. All three were owned by U.S. Plywood, now part of Champion International Corporation.

Weldwood of Canada is a public company owned 26% by Canadian shareholders.

The consolidation facilitated the purchase of Canadian Collieries Resources, a major B.C. forest products company. Canadian Collieries Resources, as the name suggests, started as a coal mining company on Vancouver Island in 1910. It didn't enter the forest products business until 1955, using profits it had earned through the sale of its Alberta oil and natural gas interests.

Through aquisition of Canadian Collieries Resources, Weldwood also came to own the coal rights of the area proposed for development.

LUSCAR LTD.

Luscar Ltd. was incorporated in 1967 through the amalgamation of two predecessor companies: Luscar Coals Ltd. (established in 1921) and Mountain Park Collieries Ltd. (established in 1912). Both predecessors were pioneers of the Alberta Coal Industry.

Together with its wholly-owned subsidiaries Luscar Ltd. is actively engaged in the exploration, mining and marketing of Western Canadian coal. The subsidiary companies currently mine lignite, sub-bituminous and bituminous coking coal in Western Canada. A bituminous thermal coal mine is presently being developed. The Luscar Companies currently produce approximately 5 million tons of coal per year. By the early 1980's, this production is expected to increase to 10 million tons per year. The location of the operating Luscar mines is shown in Figure 8.

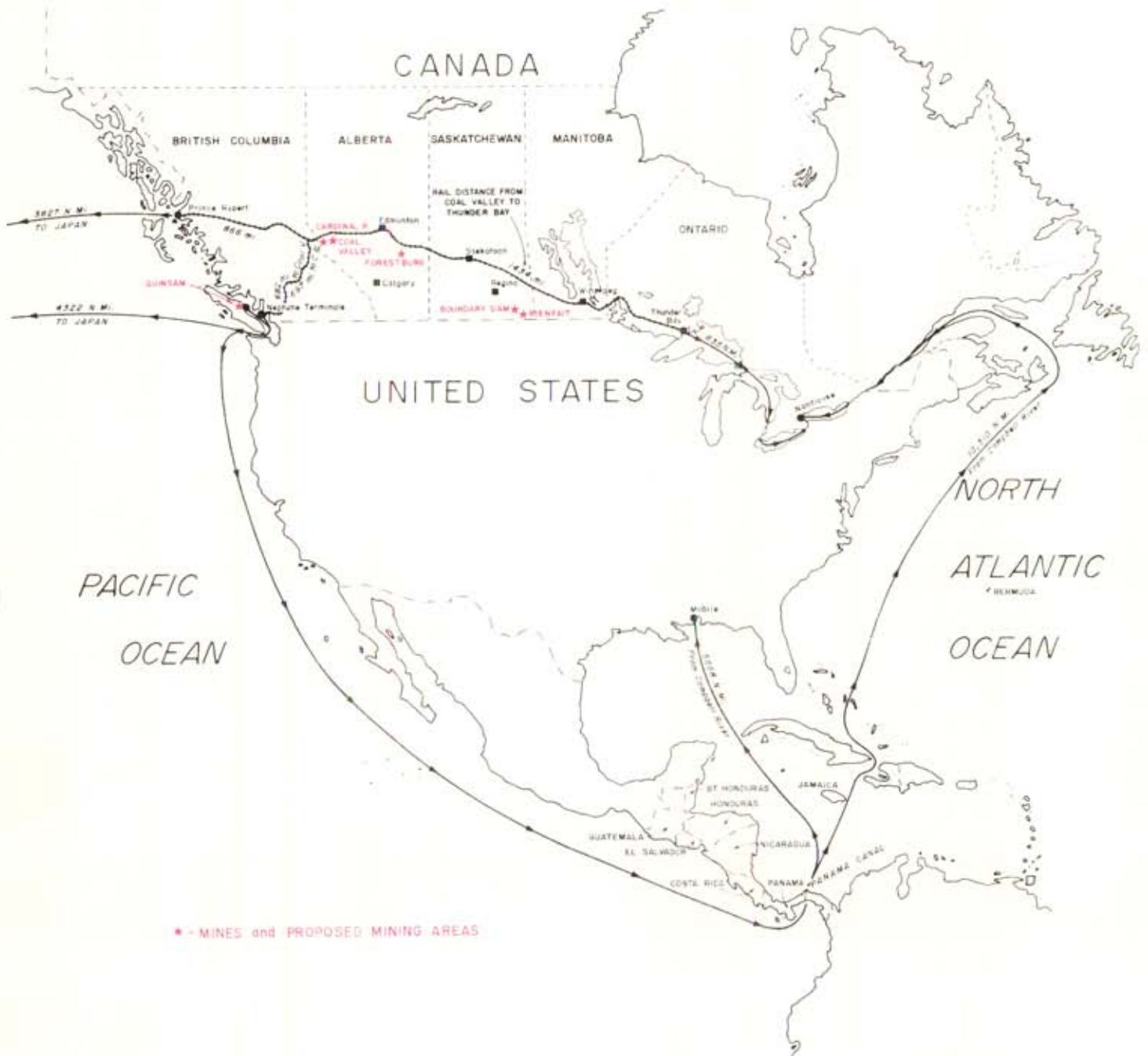
In developing the Quinsam property, Luscar can draw upon the following experience within the Luscar companies:

- 1) The companies have more than 60 years of experience in mining coal.
- 2) The companies are experienced in surface mining and reclamation in both the mountains and the plains regions.
- 3) The companies are experienced in negotiating and administering long-term coal supply contracts; they have, for instance, existing long-term contracts with
 - a) the Japanese steel mills,
 - b) Alberta Power Limited/Canadian Utilities Limited,
 - c) Saskatchewan Power Corporation,
 - d) Manitoba Hydro and
 - e) Ontario Hydro

- 4) Luscar is experienced and favourably recognized in international coal markets.

The existence of the other mining operations of the Luscar companies will facilitate in two ways the recruiting and training of staff that will be required for the Quinsam project:

- 1) It will be possible to transfer some key operating personnel from other operations.
- 2) It will be possible to train employees new to the company at the other existing mines in advance of start-up of the Quinsam mine.



**Location Map of the
Luscar Ltd. Mines**

QUINSAM COAL PROJECT

A Joint-Venture Proposal
GEOLOGICAL BRANCH by
ASSESSMENT REPORT
Weldwood of Canada Limited
&
Luscar Ltd.

00 065 (2)

Production

It is estimated that 1.3 million short tons of coal will have to be mined in order to attain the projected clean coal production of 1.0 million short tons per year.

An on-site preparation plant will be built to clean and process the coal before it is shipped. Cleaning of the coal is necessary for the following reasons:

- 1) to ensure quality control;
- 2) to upgrade the quality by reducing the content of non-combustible material and thereby raising the calorific value;
- 3) to reduce the sulphur content;
- 4) to ensure maximum recovery of saleable coal from the deposit.

After cleaning, the coal will have the following specifications:

BTU's/lb.	12,200 - 12,500
Ash	8.0 - 10.0%
Moisture	6.0%
Volatiles	31.0 - 37.0%
Sulphur	0.7% (No. 1 seam)
	2.0 - 3.0% (No. 2 & 3 seams)

* Coal Quality

Coal from this region is classified as a high volatile, bituminous "A", steam coal. It has the following analytical characteristics on an "air dry basis".

Seam	Moisture %	Ash %	Sulphur %	Btu/lb.	FSI
No. 1	2.63	16.13	0.56	11,489	1½
No. 2	2.58	16.44	3.99	11,515	2½
No. 3	2.19	23.01	3.81	10,742	2

Washability tests conducted on only the coal indicate that greater than 90% of the raw coal can be recovered at less than 10% ash with a calorific value ranging from 12,500 to 13,000 Btu/lb.*

EXPLORATION

During the period commencing October, 1976, through to June, 1977, 158 test holes were drilled for a total logged footage of 34,600 feet. The test holes were spaced at 500 foot intervals along cut lines trending at 90° to the strike of the formation. The lines were arranged 1,000 to 1,500 feet apart along regional strike from the northern to the southern boundaries of the area. Figure 5 illustrates the extent of the exploration program.

* Washability tests are presently being conducted on "as mined" samples which will produce different yields.