

PR-QUINETTE 76(1)A

CONFIDENTIAL
OPEN FILE

QUINETTE COAL LIMITED

INFORMATION SUMMARY

AUGUST 1976

VOLUME I

**GEOLOGICAL BRANCH
ASSESSMENT REPORT**

00 608

Pages 1-21 to 1-23 of this report contain coal quality data, and remain confidential under the terms of the *Coal Act Regulation*, Section 2(1). They have been removed from the public version.

http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/10_251_2004

QUINTETTE COAL LIMITED

INFORMATION SUMMARY

AUGUST, 1976

VOLUME 1

INDEX

OPEN
CONFIDENTIAL
FILL

	<u>Page No.</u>
1.0 <u>QUINTETTE COAL LIMITED</u>	
1.1 Corporate Structure	1-1
1.2 Corporate Objectives	1-3
1.3 Management Functions of Denison Coal Limited	1-7
1.4 Coal Markets	1-13
2.0 <u>LOCATION OF MINE SITE, ACCESS, AND INFRASTRUCTURE</u>	
2.1 Location of Mine and Access	2-1
2.2 Infrastructure Requirements	
2.2.1 Roads	2-3
2.2.2 Townsite	2-4
2.2.3 Power	2-8
2.2.4 Rail	2-8
2.2.5 Port	2-11
2.3 Other Potential - Industrial and Recreational	2-15
3.0 <u>DESCRIPTION OF COAL PROPERTY</u>	
3.1 Area of Coal Licences Held from B.C. Government	3-1
3.2 Quintette Topography	3-3
3.3 Geological Summary	3-4
3.4 Summary - Coal Reserves, Quality, and Specifications of Processed Saleable Coking Coal	3-8
4.0 <u>PROPOSED DEVELOPMENT AND PRODUCTION PLANS</u>	
4.1 Schedule and Outline - Preproduction Development	4-1
4.2 Schedule and Outline - Production Period	4-2
4.3 Schedule and Outline - Infrastructure Development	4-3

5.0 GOVERNMENTAL REQUIREMENTS AND INVOLVEMENT

- 5.1 B.C. Government
 - Applications for Approvals and Permits 5-1
- 5.2 B.C. Government
 - Involvement in Infrastructure and N.E. Regional Development of B.C. 5-10
- 5.3 Canadian Government
 - Involvement with B.C. Government for: 5-13
 - Development N.E. Region of B.C.
 - Port Development
 - Rail
 - Labour Training
 - Townsite

6.0 DENISON MINES (B.C.) LIMITED MANAGEMENT PROGRAM

- 6.1 Work to Date
 - 6.1.1 Exploration 6-1
 - 6.1.2 Consultants 6-3
 - 6.1.3. Preliminary Feasibility Study 6-8
 - 6.1.4 Negotiations with B.C. Government 6-14
- 6.2 1976 Program 6-15
 - Schedule
 - Consultants
 - Feasibility Study
 - 6.2.1 Negotiations with B.C. Government and Agencies 6-16
 - 6.2.2 Commercial Negotiations 6-17
 - 6.2.3 Negotiations with Railroads 6-17
 - 6.2.4 Approval of Quintette Board of Directors 6-18

7.0 LABOUR REQUIREMENTS AND SCHEDULE OF BUILD UP

- 7.1 Construction Forces 7-1
- 7.2 Operating Work Force 7-2
- 7.3 Recruiting and Training 7-3

8.0 REFERENCE DRAWINGS

CONFIDENTIAL

1.0 QUINETTE COAL LIMITED

1.1 CORPORATE STRUCTURE

1.1.1 Quintette Coal Limited (hereinafter referred to as Quintette) is the corporate body which has been formed to carry out the development of the Quintette property. Quintette Coal Limited was incorporated under the laws of the Province of British Columbia on December 20, 1971.

1.1.2 Until recently the shareholders of Quintette were as follows:

Denison Mines Limited	38.25%
Alco Standard Corporation	36.75%
Mitsui Mining Co. Ltd.	12.50%
Tokyo Boeki Ltd.	12.50%

Following a decision by Alco Standard Corporation to withdraw from the project, arrangements have been made for Mitsui Mining and Tokyo Boeki to acquire Alco Standard's shareholdings of 36.75%, subject to the approval of the governmental authorities in Canada to the transaction.

Assuming such governmental approval is received, the shareholders of Quintette will be as follows:

Denison Mines Limited	38.250%
Mitsui Mining Co. Ltd.	30.875%
Tokyo Boeki Ltd.	30.875%

Denison Mines Limited is a corporation incorporated under the laws of the Province of Ontario.

CONFIDENTIAL

Alco Standard Corporation is a corporation incorporated under the laws of Ohio.

Mitsui Mining Co. and Tokyo Boeki Ltd. are corporations incorporated under the laws of Japan.

1.1.3 Upon the successful completion of the transaction set forth in Section 1.1.2, it is the intention that the 36.75% originally held by Alco Standard will be resold to a Canadian corporation and the Japanese steel mills respectively.

1.1.4 By agreement between the shareholders of Quintette, Denison Coal Limited, a wholly owned subsidiary of Denison Mines Limited, has been appointed to manage the exploration and feasibility studies required to bring Quintette to the point of making a decision to proceed with the proposed development.

By similar agreement, Denison Coal Limited will manage the construction and initial operating phases of the project subject to Quintette deciding to proceed with the development as aforementioned.

CONFIDENTIAL**1.2 CORPORATE OBJECTIVES**

- 1.2.1 It is the ultimate objective of Quintette to develop and bring into production a coal mining operation at its property in northeastern British Columbia. The coal so produced, after mining and processing, will be a metallurgical coking coal of a quality suitable for purchase by steel mills for conversion to coke and utilization in their blast furnaces.

Quintette is planning to produce 92,500,000 tonnes of coking coal product over a 20 year mining period, as the initial phase of development of the property. The operation will be a combination of surface and underground mining, with a maximum annual production of 5 million tonnes. Total "Indicated in place of Reserves" on the property are estimated to be in excess of 1 billion tonnes.

- 1.2.2 The primary objective of Quintette is to complete during 1976 exploration, engineering and economic studies, and to arrange sales, financing commitments and government permits sufficient to permit a decision to be made as to whether or not to proceed with the development of the project. The target date for making this decision is December, 1976. Should the decision be made to proceed with the development, subsequent specific objectives will be established in the light of the final results of engineering and economic studies. Current studies contemplate commencement of production in the last quarter of 1979, with the designed maximum production level of 5 million tonnes per year being achieved in 1984.

Concurrently with the aforementioned 1976 program, it is the intention that Quintette will continue its negotiations with the B.C. Government - including the submission of information

CONFIDENTIAL

required by the government - in support of Applications for Development and Mining Approvals and Permits for the Quintette coal mine. It is anticipated that such Approvals and Permits will be forthcoming by the end of 1976. Assurance has been received from the B.C. Government of full cooperation to achieve this objective.

Negotiations will continue throughout 1976 with the relevant governmental and other authorities with a view to concluding satisfactory arrangements for the provision of the related infrastructure, which will include road and rail access, port facilities, power supply, townsite, communication facilities, etc.

Several alternative rail access routes to the mine site are under consideration by the B.C. Government, who will make the final route selection by October 1976.

A new port facility, to be provided by others, will be required on the west coast of British Columbia. Two sites are under consideration: one served by the British Columbia Railway (B.C.R.) at Britannia, near Vancouver, B.C., and the other served by the Canadian National Railway (C.N.R.) near Prince Rupert, B.C.

It is proposed to establish a new townsite within 20 miles of the mine, to accommodate the mining staff and their families. The B.C. Government is giving consideration to making this a multi-use town: that is, to provide the facilities to support a town, not only for Quintette personnel but sufficient for others who may be involved in other potential developments - mining and industrial - in the same vicinity. This is in

CONFIDENTIAL

accord with the B.C. Government's policy of giving high priority to the development of the northeastern region of British Columbia.

Road access from existing towns, at Dawson Creek and Chetwynd to the new townsite and thence to Quintette mine, is the subject of current engineering studies by the B.C. Department of Highways.

B. C. Hydro is similarly studying the location of a transmission line to supply electric power to the new townsite and the Quintette mine.

1.2.3 Negotiations are under way and will continue through 1976 with the relevant departments of the Government relating to the recruitment and training of the manpower required to develop and operate the Quintette mine.

1.2.4 Commercial negotiations for the sale of Quintette coking coal are being entered into with the Japanese steel mills. Initially this will be for two-thirds of the production tonnage. The sale of the remaining one-third production is open for discussion, either with the Japanese steel mills or with others.

It is the intention to execute a Basic Sales Agreement between Quintette and the Japanese steel mills by the end of 1976.

1.2.5 It is the intention to complete project financing arrangements to the extent necessary to permit a production decision to be made on the Quintette project by the end of 1976.

CONFIDENTIAL

- 1.2.6 The objective of Quintette's 1976 program as outlined in items 1.2.1 to 1.2.5 inclusive, is to provide sufficient information, including the Final Feasibility Study, to enable Quintette to make its decision by the end of 1976 to proceed with the project or otherwise.

- 1.2.7 Provided all matters as outlined in this Section 1.0 have been satisfactorily resolved and Quintette decides to proceed, it is the intention that preproduction mine development work would start as early as possible in 1977, and that coking coal production would start at the Quintette mine late in 1979.

CONFIDENTIAL

1.3 MANAGEMENT FUNCTIONS OF DENISON COAL LIMITED

1.3.1 Section 1.1.4 of this Volume I describes the appointment of Denison Coal Limited, by Quintette, to manage the program of exploration and feasibility studies, and, following Quintette's decision to proceed with the development, to manage the construction and initial operating phases of the Quintette project.

1.3.2 By the terms of the aforementioned agreements, Denison's management functions are as follows:

- a) Prior to a determination by the Board of Directors of Quintette to bring the mine into commercial production -
 - Denison shall direct, control and supervise:
 - the preparation of a feasibility study or studies;
 - all exploration work;
 - the preparation of overall design specifications and detailed estimates with respect to:
 - i) underground and open pit workings;
 - ii) mining plant and equipment;
 - iii) washing and preparation plant;
 - iv) all other related structures and buildings necessary in connection with the project; and
 - v) all facilities required to be supplied by Quintette for transportation, power and townsite.

CONFIDENTIAL

- Denison may call on Mitsui for advice, information and recommendations, and the services of technical personnel to assist in the preparation of specifications and estimates relating to the washing and preparation plant.
 - Denison shall undertake negotiations with governments, government agencies and public bodies, railways and utilities to determine what facilities (such as rail, ocean terminals, townsites, roads and electricity) can be made available, the cost thereof, and the time when such can be provided.
 - Denison shall, on behalf of Quintette, prepare and submit all information and conduct negotiations as required by the British Columbia Government and its agencies in accordance with procedures, Acts and Statutes relating to the application for and governmental approval of the necessary licences, permits and leases permitting the Quintette mining project to be developed and operated.
- b) After the determination by the Board of Directors of Quintette to bring the mine into commercial production, and they have approved the aforementioned specifications and estimates -
- Denison shall (during the construction period):
 - negotiate on behalf of Quintette contracts to implement the approved specifications subject

CONFIDENTIAL

to such modifications as Quintette may from time to time require;

- supervise the implementation of the approved specifications, subject to such modifications as Quintette may from time to time require, such implementation to include, without limitation, construction of the workings by which mining is to be carried out and the constructing, equipping, supplying and installing of all buildings, plant equipment and facilities in connection with the project;
 - negotiate on behalf of Quintette with, and carry on close liaison with, governments and government agencies and public bodies, railways and utilities to ensure, if possible, the provision and timely completion of such railway lines (including spur lines), roads, port facilities, townsite, power and communication facilities as are necessary for the bringing of the mine or mines into commercial production; and
 - negotiate on behalf of Quintette power rates to be borne by it, port and handling charges, transportation rates and other charges and liens to be borne by Quintette.
- Denison may call on Mitsui from time to time for such services and technical personnel as may be necessary to assist Denison in the supervision of

CONFIDENTIAL

the implementation of the approved specifications as they relate to the washing and preparation plant, and to ensure that such plant is constructed in accordance with such specifications, and in accordance with the latest engineering knowledge.

No contract shall be entered into on behalf of Quintette without the approval of the Board of Directors of Quintette.

- c) After construction of the washing and preparation plant and other surface facilities and the preproduction facilities, Denison shall manage the operations of Quintette for a period not to exceed five years from the commencement of commercial production, and as such manager Denison shall:
- manage and supervise the overall operation thereof including (without limitation) the operation of the mine and of the washing and preparation plant, the transportation of the coal produced and the loading thereof at any port of export;
 - manage and supervise the operation of the following services at the mine or mines:
 - i) administration office services;
 - ii) accounting services;
 - iii) purchasing services;
 - iv) personnel and labour relations services;
 - v) such additional services as may be agreed upon by Quintette and Denison.

CONFIDENTIAL

- supervise the activities of all sales agents of Quintette; and
- provide head or principal business offices for Quintette in Calgary, Vancouver or Toronto, as may be selected by Quintette, which facilities shall include office space and personnel and normal operating facilities, such as telephone, stationery and supplies;
- procure senior supervisory and management personnel (but not officers of Quintette). The overall management and supervision of the work and shall not include direct detailed supervision of the men actually employed in carrying out the work or liability for work carried out by independent contractors.
- Denison may call on Mitsui from time to time to provide the services of its technical personnel in connection with the work. If, however, Mitsui is obligated to provide such services under the provisions of the Hydraulic Mining Agreement dated April 9, 1975 between Mitsui and Quintette, then such services shall be provided under that Agreement.

Upon termination of its management obligations and rights, Denison shall use its best efforts to ensure that Quintette will have competent trained personnel capable of managing the operations of Quintette, and Denison shall cooperate with such personnel and the directors of

CONFIDENTIAL

Quintette to ensure to the greatest possible extent that such personnel will be able to assume the management of such operations without any delay after such termination.

CONFIDENTIAL

1.4 COAL MARKETS

There is a strong demand for high grade coking coal, by the steel industry, on the world market, and although initial sales negotiations will be made in the traditional Japanese market, other markets are being investigated in Canada, Europe, Central and South America, and Korea.

As mentioned previously, Quintette is initially offering two-thirds of its total coking coal production to the Japanese steel mills, leaving one-third for disposal either to Japan or to other markets.

CONFIDENTIAL

2.0 LOCATION OF MINE SITE, ACCESS AND INFRASTRUCTURE

2.1 LOCATION OF MINE AND ACCESS

- 2.1.1 The Quintette coal properties are located in the northeastern region of the Province of British Columbia, Canada, and are in the eastern foothills of the Rocky Mountains. The nearest existing communities are Chetwynd and Dawson Creek. (Ref. Location Maps, Figure 1 and Appendix III).

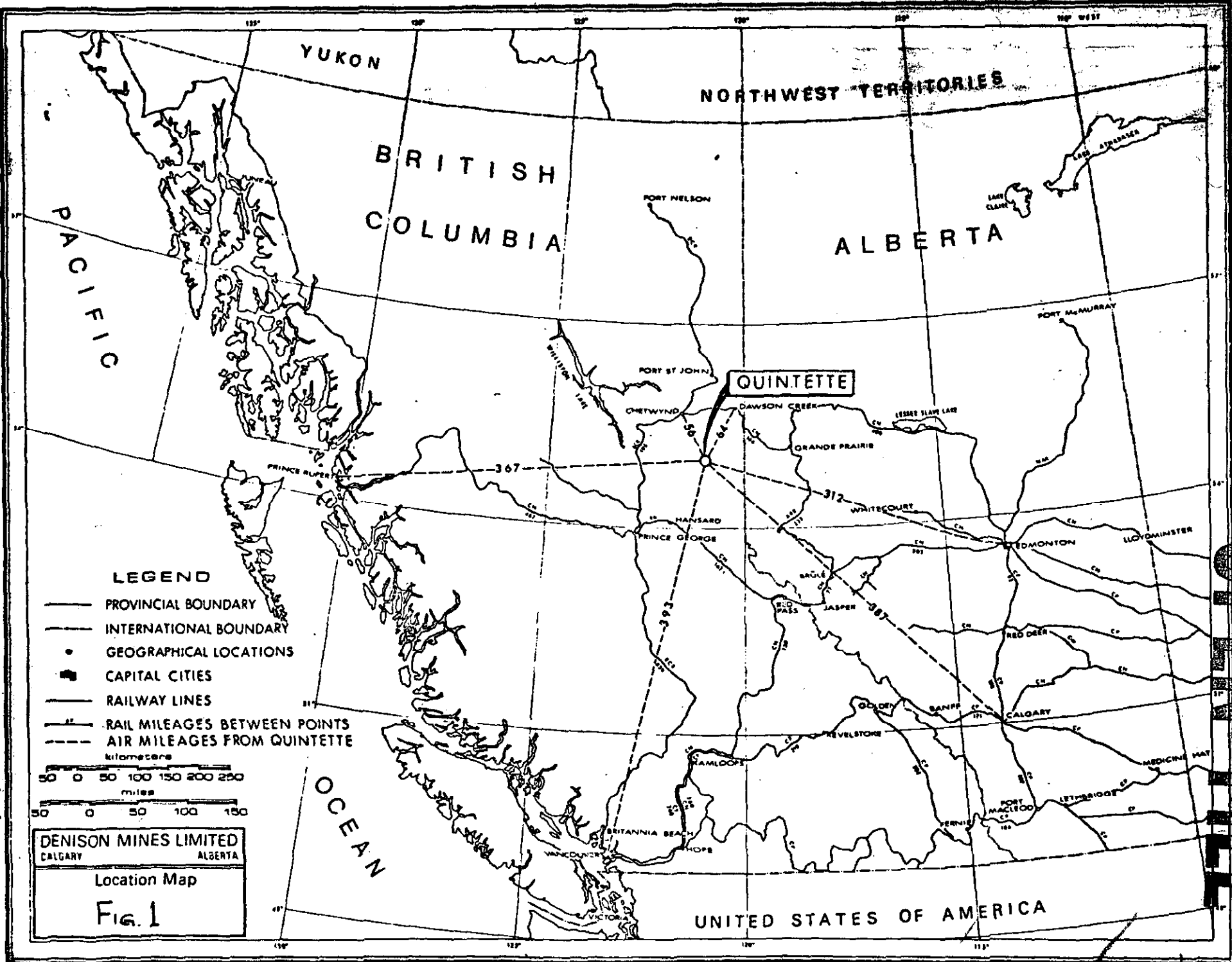
The proposed Quintette mine site is approximately 60 air miles southeast of Chetwynd, and approximately the same distance southwest of Dawson Creek.

Dawson Creek is a distribution centre with a population of about 15,000, while Chetwynd is a smaller community whose population is about 3,000.

Both communities are on the mainline of the British Columbia Railway which passes through Prince George and continues to its terminus in Vancouver, B.C., and both are on the same main highway leading to Prince George and thence to the lower mainland area of British Columbia: that is, the Vancouver area.

Prince George is also an interchange point between the British Columbia Railway (B.C.R.) and the Canadian National Railway (C.N.R.). The C.N.R. then runs in a westerly direction to its Prince Rupert terminus, on the west coast of British Columbia. Both railways therefore afford transportation facilities to the west coast and, as previously mentioned, the route to be used to transport Quintette's coal awaits governmental decision as to the location of the new port and coal terminal, which will be forthcoming before the end of 1976.

7(12)A



LEGEND

- PROVINCIAL BOUNDARY
- INTERNATIONAL BOUNDARY
- GEOGRAPHICAL LOCATIONS
- CAPITAL CITIES
- RAILWAY LINES
- RAIL MILEAGES BETWEEN POINTS
- AIR MILEAGES FROM QUINTETTE

50 0 50 100 150 200 250
miles

50 0 50 100 150
kilometers

DENISON MINES LIMITED
CALGARY ALBERTA

Location Map

Fig. 1

QUINTETTE

CONFIDENTIAL

If Britannia is selected as the new port, the Quintette coal will be transported from the mine to the port terminal solely by British Columbia Railway. Rail distance via Chetwynd and Prince George will be approximately 710 miles.

Alternatively, if it is decided to establish the new port at Ridley Island, Prince Rupert, which is the location favoured by Quintette and Denison, then Quintette coal will be transported by the British Columbia Railway from the mine, via Chetwynd, to Prince George. From Prince George to Prince Rupert the trains will be handled by the Canadian National Railway. The total distance from the mine to Prince Rupert will be approximately 760 miles.

Both these routes are predicated on the construction of 91 miles of new rail trackage from Chetwynd to the mine sites. It is anticipated that this extension will be constructed, and owned, by British Columbia Railway.

- 2.1.2 Due to the somewhat remote area of the Quintette coal properties, access is currently limited to four wheel drive vehicles which use existing trails and logging roads. Alternatively, access is gained through the use of helicopters.

CONFIDENTIAL

2.2 INFRASTRUCTURE REQUIREMENTS

2.2.1 Roads

Present road access to the property is not adequate to support a major construction project. It will be necessary, initially, for a gravel surface, all-weather, access road to be built from either Chetwynd or Dawson Creek to the proposed townsite and thence to the mine site.

In accordance with Quintette's proposed development schedule, which contemplates the start of preproduction development as soon as may be practical in 1977, such road access will be required by not later than mid 1977 to facilitate the movement of construction forces, plant and equipment to the sites, and to provide continuing access throughout the construction period.

Once mine production commences in late 1979, it is planned to continue for a minimum of 20 years. Thus, following construction of the initial access road, it is contemplated that a permanent asphalt surfaced road system will be constructed to provide access from the townsite to either Chetwynd or Dawson Creek, or possibly both.

Chetwynd is located on the existing main paved highway between Prince George and Dawson Creek, so no new road construction will be required in that area. The distance from Chetwynd to Dawson Creek is about 60 miles, and to Prince George about 195 miles.

CONFIDENTIAL

Discussions are continuing with the B.C. Government respecting the provision of road access. These negotiations are dealt with in more detail in Section 5.0 of this Volume -- suffice it to say that the Government is very cooperative. It is probable that the Government will provide road access to the townsite, with Quintette undertaking responsibility for the roads from the town to the two mine wash plants at Wolverine (about 10 miles) and Babcock (about 20 miles) respectively.

2.2.2 Townsite

It is considered that the existing communities of Chetwynd and Dawson Creek are too far from the mine site to contemplate using either or both for the accommodation of the labour force and their families, as it is impractical to expect workers to commute about 80 miles each way between their homes and the mine.

Because of the nature of the mining operation, which will involve several hundred men per shift, three shifts per day and a year-round operation, the harsh winter conditions alone, in our experience, limit the practical commuting distance to a maximum of about 30 miles each way.

For this reason, it is the intention of Quintette to establish a new townsite within 20 miles of the mine for the accommodation of its employees and their families.

The site selected is immediately east of the confluence of the Murray River and Flatbed Creek. It was chosen for its central location relative to Quintette's proposed plant sites at Wolverine and Babcock, as well as favourable physical features which make the site suitable for townsite construction.

CONFIDENTIAL

Being on a bench, the town will be well above any flood levels of the rivers, and the terrain is suitable for economic construction.

Chetwynd is about 60 miles northwest of the proposed townsite, and the proposed road, rail, and power transmission lines from Chetwynd to the mine will also service the town.

The proposed townsite is about equidistant in a south-westerly direction to Dawson Creek. Ultimately it is intended that a road will be built connecting all three towns.

Discussions with the B.C. Government have indicated a strong interest in the establishment of a town at the proposed location, but whereas Quintette has been planning for a town sufficient in size to accommodate its own employees and their families, with the necessary supporting facilities: e.g. schools, and other institutional and service facilities, the B.C. Government is favouring a multi-use town to make provision for Quintette and any other potential industrial development which may occur in the area. This is in accordance with the Government's overall policy for the development of the northeastern region of British Columbia.

More detail of the current status of negotiations with the B.C. Government is given in Section 5.0 of this Volume.

To date, Quintette has based its plans on the establishment of a town to meet its own requirements, although the site affords adequate area for future expansion.

CONFIDENTIAL

Based on Quintette's forecasts, its manpower requirements will be 850 at the start of production in late 1979, rising to 1,300 by the end of 1983, which will then be the continuing requirement for the ensuing mining operation.

Quintette's intention is to start the townsite development concurrently with the mine preproduction development, so that when mine production starts sufficient permanent accommodation for the 850 employees, both single and married, together with the necessary utilities, services, institutional and recreational facilities, will be available. Townsite development will then be continued so that by 1983 the total of 1,300 residential units for single and married employees, and the necessary supporting services and facilities, will be completed.

The development of residential areas will progress in modular groupings as the project expands, with green belt separations to provide an attractive appearance from the early stages.

Residential requirements have been based on a ratio of 70% married status to 30% single status persons.

Married personnel will require a range of one to five bedroom detached houses, and single personnel will be accommodated in one-bedroom apartments or communal type housing. Family units will be complete with all the usual facilities, excluding furnishing and domestic appliances, whereas single status units will be furnished, with some common domestic facilities.

CONFIDENTIAL

In addition to the residential requirements, the townsite will also include:

- a) Schools to high school completion;
- b) Municipal buildings - including provincial and federal;
- c) Recreational facilities - indoor and outdoor;
- d) Institutional buildings;
- e) Commercial buildings;
- f) Industrial buildings.

Services and utilities, based on a total of about 3,500 residents, will include:

- a) Water supply;
- b) Sewage treatment;
- c) Storm sewers;
- d) Power supply;
- e) Telephone service.
- f) It is intended that radio and T.V. service will be provided by private enterprise.

Adjacent to the town, it is proposed to construct a gravel airstrip, which will be suitable for non-scheduled air line service. The nearest airport for scheduled air line service is at Dawson Creek.

CONFIDENTIAL**2.2.3 Power**

It is estimated that the total power requirement will be 45 mva for the Quintette mine, and an additional 5 mva for the townsite.

The power will be supplied by B.C. Hydro from its Gordon M. Shrum hydro-electric generating station, which is located about 30 miles northwest of Chetwynd.

A new transmission line will have to be constructed by B.C. Hydro from Chetwynd, via the townsite to the Quintette mine. It is probable that the existing transmission system from the Gordon M. Shrum station to Chetwynd will have to be upgraded by B.C. Hydro to meet the Quintette power requirement.

Discussions are continuing with B.C. Hydro respecting the matter and are dealt with in more detail in Section 5.0 of this volume.

2.2.4 Rail

The rail transportation of coking coal from the Quintette mine to a new port loading terminal on the west coast of British Columbia has been referred to in Sections 1.2.2 and 2.1.1 of this Volume.

It is the intention that coal will be moved in unit trains from the mine to a new west coast port which, dependent on governmental decision, will be established either at Britannia, near Vancouver, on the British Columbia Railway (B.C.R.), or alternatively at Ridley Island, near Prince Rupert, which is served by the Canadian National Railway (C.N.R.).

CONFIDENTIAL

There is no rail access to the mine site at the present time. Following discussions with the B.C.R., C.N.R., and B.C. Government, which discussions are continuing, the Government has established a transportation committee which has instructed B.C.R. to examine four potential schemes for rail access to the Quintette mine (refer to attached map). Two of these routes are from Chetwynd to the mine site: one direct, and the other initially looping to the west to pick up the Sukunka coalfield before returning to the direct route by means of a two to three mile tunnel under the mountain range.

The other two proposed routes are from the existing mainline at Prince George, running in a northeasterly direction and coming into the southerly end of the Quintette property. However, these two routes present serious construction problems, due to the nature of the terrain, when compared with the proposed direct route from Chetwynd. They also each represent considerably over 100 miles of very costly new construction, and would take probably three to four years to build.

The direct route from Chetwynd to the mine - about 80 miles - is over less difficult terrain, would be cheaper to build, and could be constructed in not more than two and one-half years. The disadvantage of the Chetwynd route is that it is about 100 rail miles further from the mine to Prince George than the alternative routes from Prince George directly to the Quintette mine area.

In addition, the aforementioned B.C. Government Transport Committee has requested the Canadian National Railway to

CONFIDENTIAL

submit, for consideration, its proposal for a new rail route from Prince George, via the Monkman Pass, to the Quintette mine area. This route is to the south of the B.C.R.'s possible routes from Prince George, but presents similar problems of adverse terrain conditions, construction time, and cost parameters.

It is the intention of the B.C. Government to decide on the rail access route to the Quintette mine by October 1976. and to make a firm proposal on how this rail line would be made available to Quintette.

Rail distance from the mine, via Chetwynd, to Britannia is 710 miles (all British Columbia Railway) and to Prince Rupert is 760 miles (B.C.R. to Prince George, thence C.N.R. to Prince Rupert).

Coal will be moved from the mine to the port in unit-trains. Preliminary indications are that each unit-train set will probably consist of 4 x 3,000 H.P. locomotives, and 100 x 100 ton cars. It is similarly anticipated that six unit-train sets will be required to move 5 million tonnes of coking coal per year. The round trip cycle time will be five days.

Discussions are continuing with the B.C.R., the C.N.R. and the B.C. Government, and it has been indicated that each Railway is prepared to upgrade its respective trackage to meet the standards required for unit train movements, provided they have assurance of sufficient tonnage to justify the expenditure.

CONFIDENTIAL

More details of the current status of negotiations with B.C. Governmental authorities is given in Section 5.0 of this Volume.

2.2.5 Port

Reference has been made previously to the fact that a new port and loading terminal will be required on the west coast of British Columbia to handle the Quintette coal tonnages. Existing terminal facilities in the Vancouver area are limited in coal handling capacity and accessibility to the Quintette Project, and the Vancouver port area is expected to become more congested in the future.

For these reasons, both the British Columbia and Canadian governments favour the establishment of a new port with coal handling facilities on the west coast of British Columbia.

If such a bulk loading terminal were to be established at Britannia, a few miles north of Vancouver on Howe Sound, then, as this location is served by British Columbia Railway, Quintette's coal would be transported from the mine to Britannia solely by the B.C.R. Thus, all the freight revenue generated would accrue to the B.C.R. For this reason, the B.C.R., which is owned by the B.C. Government, is proposing Britannia as the new port site and is submitting a study to the B.C. Government in this regard. An extensive rehabilitation program would be required to raise the B.C.R. trackage to a standard suitable for unit-train movements.

CONFIDENTIAL

The Canadian Government favours an alternative site for the proposed port, at Ridley Island, near Prince Rupert, on the northwest coast of British Columbia. The B.C. Government is also giving this proposal favourable consideration as an alternative to Britannia. Quintette would prefer to see the Ridley Island alternative adopted.

Prince Rupert is served by the Canadian National Railway, and Quintette's coal would be transported from the mine to Prince George by the British Columbia Railway and thence to Prince Rupert by the C.N.R.

Both the B.C.R. and the C.N.R. trackage would require a considerable amount of rehabilitation to achieve the standards required for unit-train movements.

C.N.R. rail access to Ridley Island will necessitate a short extension from the existing mainline of approximately 2,000 feet. (Ref. Drawing No. 3270-01-001).

A road connection to the Island will also be constructed, and will provide communication to Prince Rupert.

The current status is that the Canadian Government, which owns Ridley Island, has given an option to Neptune Terminals to enter upon the property for the purpose of preparing a feasibility study respecting the proposed bulk terminal and port facility for handling coal.

Neptune has retained an engineering consulting company - Swan Wooster Engineering Co.Ltd. - and the study is scheduled to be completed about the end of May 1976.

BARRETT RK

KAIEN ISLAND

PROPOSED ROUTE
ACCESS ROAD

SWITCH

C.N.R.

ZANARDI
RAPIDS

DUNDAS
ISLAND

PRINCE RUPERT
HWY 16
PRINCE EDWARD
C.N.R.

KEY PLAN

5 0 10 20 MILES

BISHOP IS.

PROPOSED RELOCATION
OF EFFLUENT LINE

EXISTING
EFFLUENT LINE

PORPOISE HARBOUR

WATSON
ISLAND

C.C.CO. LTD.
PULP MILL

ABANDONED
HIGHWAY

SPLITTER CHUTE
SURGE BIN

OFFICE

BRIDGE

WATER LINE

POWER LINE

150,000 DWT
BULK CARRIER

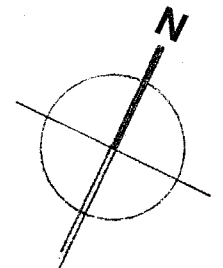
STOCKPILES
TOTAL STORAGE
APPROX 1,000,000 TONS

DUMP PIT

RIDLEY ISLAND

TO HIGHWAY 16

OPEN FILE
CONFIDENTIAL



1000 0 1000 2000 FEET

PORT EDWARD

KILBORN

76(2)A
DENISON COAL LIMITED
LOCATION MAP FOR
SHIPPING TERMINAL

CONFIDENTIAL

Neptune Terminals Ltd. owns and operates an existing bulk loading terminal located at North Vancouver, British Columbia. They have been handling and loading in excess of 2 million long tons of western Canadian coking coal annually for the past several years. Almost all of this coal is shipped to Japan for use by the Japanese steel mills. They also handle other bulk commodities, and are well experienced in the industry.

Provided the aforementioned Study proves the proposed port development at Ridley Island is viable, and provided the necessary governmental approvals are forthcoming permitting the port to be established, then if Neptune can be assured of a long term annual throughput tonnage of coal it is prepared to finance the cost of constructing and equipping the port. It will then own and operate the facilities on a normal commercial basis, with shippers paying at a tonnage rate for the services provided.

Design parameters call for the port facilities to occupy an area of approximately 70 acres, which is sufficient to accommodate 21,000 feet of loop rail trackage, capable of allowing two unit-trains to be on the property simultaneously. It will also allow for an ultimate throughput of 10,000,000 tonnes of coal annually, with a storage capacity of 1,000,000 tonnes.

Initial development will be based on an annual throughput capacity of 6,000,000 tonnes of coal, with storage for 500,000 tonnes.

CONFIDENTIAL

Facilities will include a unit-train rotary car dumper, and a stacker-wheel reclaimer with a peak loading capacity of 4,500 tons per hour. Dust control and car washing equipment will also be provided. Additional equipment will be installed when necessary to increase the annual capacity to its ultimate of 10,000,000 tonnes.

Marine structures will consist of mooring and berthing dolphins, together with the sub-structure for shiploading equipment and the approach trestles from the terminal to the berth location.

Materials handling equipment will include two quadrant beam shiploaders, each with a shiploading capacity of 4,500 tons per hour, operating over a single berth. They will be designed to load a 150,000 ton vessel, without requiring the vessel to be moved.

It is understood that the navigational aspects are such that no problems are envisaged for an all year round operation by ships of the tonnage aforementioned, and probably even larger.

Annual mean rainfall in the Prince Rupert area is 95 inches, but it is believed that this will present no difficulties in handling storage and shipment.

Electric power will be provided by the construction of a 3½ mile transmission line from B.C. Hydro's existing Watson Island sub-station to a sub-station to be constructed on Ridley Island.

Water will be supplied by the construction of a pipeline from the nearby water supply system of the village of Port Edward.

CONFIDENTIAL

2.3 OTHER POTENTIAL - INDUSTRIAL AND RECREATIONAL

2.3.1 Industrial

The Quintette coal property is located in the Northeast Development Region of British Columbia, which region is under active study by both the British Columbia and Canadian governments for general economic development and support.

This being so, the proposed Quintette coal development, because of its magnitude and advanced stage of planning, is receiving the fullest cooperation of the B.C. Government and the relevant Canadian government departments in its development endeavours.

The B.C. Government has already initiated engineering and economic studies of such infrastructure requirements as road and rail access, and the establishment of the townsite.

It is believed that the B.C. Government considers the development of Quintette, because of its attendant infrastructure, will allow other proposed coal developments in the same area to become economically viable, with common use of road, rail, and townsite facilities.

The development of a large natural gas field adjacent to Quintette is imminent, which again will lead to an increased usage of the same infrastructure facilities.

Further industrial potential exists in the continuation and expansion of the forest industry. Sawmills are established in Chetwynd and Dawson Creek, and logging operations are active south of Chetwynd in the general area of Quintette.

2.3.2 Recreational

CONFIDENTIAL

Quintette is located in a wilderness area of the foothills of the Rocky Mountains. Access to this potential recreational area for hunting, fishing, and other outdoor activities is virtually non-existent at present.

The B.C. Government is considering the establishment of a Provincial Park about 15 miles south of the Quintette mine site. The access roads from Chetwynd and/or Dawson Creek necessary to service the townsite would be extended to provide public access to the Provincial Park, which will cover an area of approximately 250 square miles.

The same access roads would obviously open up other areas, outside the Provincial Park, for recreational purposes.

CONFIDENTIAL

3.0 DESCRIPTION OF COAL PROPERTY

3.1 AREA OF COAL LICENCES HELD FROM B.C. GOVERNMENT

Quintette Area Coal Licences

An approximate area of 96,000 acres is covered by the Quintette coal licences. Details of licence numbers and locations are shown in Appendices I, II and III.

CONFIDENTIAL

APPENDIX IResume of Coal Licences Held in the Quintette Area

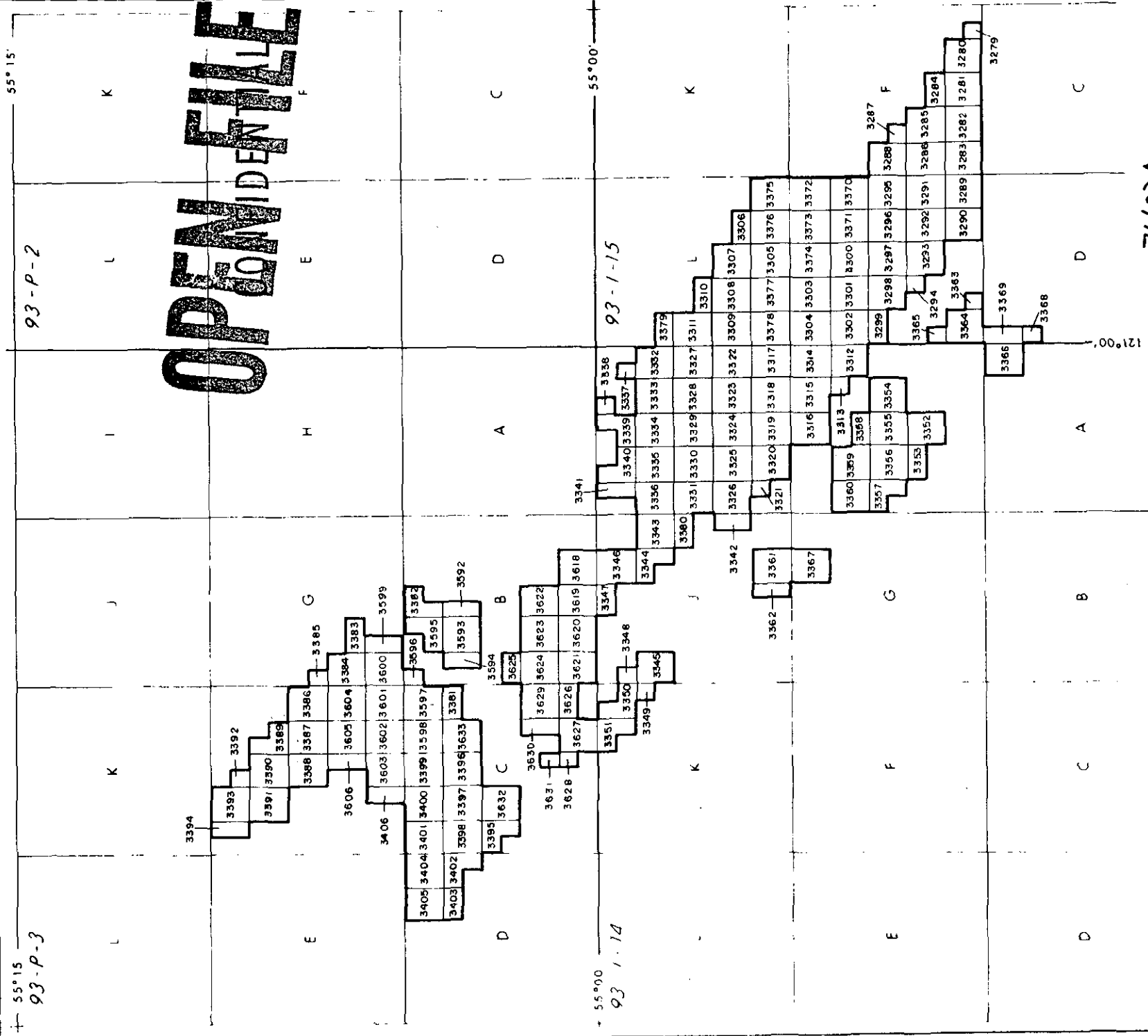
<u>Licence Numbers</u>	<u>Date Issued</u>	<u>Series</u>	<u>Acreage (more or less)</u>
3279 to 3311	October 16, 1974	93-I-15	21,168
3312 to 3333	October 16, 1974	93-I-14	15,070
3334 to 3336	October 16, 1974	93-I-14	2,202
3337	October 16, 1974	93-I-14	184
3338 to 3341	October 16, 1974	93-I-14	1,653
3342	October 16, 1974	93-I-14	368
3343 to 3362	October 16, 1974	93-I-14	11,398
3363 to 3365	October 16, 1974	93-I-15	1,107
3366 to 3367	November 25, 1974	93-I-14	1,473
3368 to 3369	November 25, 1974	93-I-15	554
3370 to 3379	November 25, 1974	93-I-15	6,988
3380	November 25, 1974	93-I-14	368
3381 to 3394	November 25, 1974	93-P-3	7,687
3395 to 3406	February 1, 1975	93-P-3	7,697
3592 to 3606	April 29, 1975	93-P-3	8,791
3618 to 3633	May 27, 1975	93-P-3	9,541

 96,249

55°15'
93-P-3

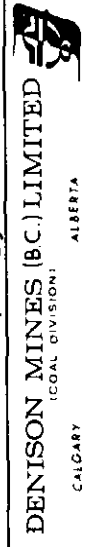
93-P-2

OPEN IDENTIFIED



4°45'

76(2)A



APPENDIX II

QUINTETTE
COAL LICENSES

DRAWN BY: E. JOTH	DATE: Apr. '75	SCALE: 1:250,000
APPROVED BY:	DRAWING NO: QNTT 75 - 0 563 - R01	

121°30'

CONFIDENTIAL**3.2 QUINTETTE TOPOGRAPHY**

The Quintette property lies in the eastern foothills of the Rocky Mountains. The local topography varies in elevation from 3,000 feet to more than 6,000 feet. Folding and faulting of the sedimentary strata, with subsequent glaciation and erosion, has created elongated ridges trending northeast-southwest. Rivers have cut across these ridges forming deep valleys. The lower slopes are tree covered, with the higher slopes being either lichen covered or devoid of vegetation. At the higher altitudes, high wind velocities are common.

CONFIDENTIAL

3.3 GEOLOGICAL SUMMARY

Regional Geology

The "coal-belt" is bounded, for the most part, to both the northeast and southwest by large thrust faults which also splay and transect the belt longitudinally, repeating the coal bearing sections a number of times in the 16 kilometer (10 mile) width. Between faults the structure consists of broad synclines with sharper anticlines.

The Commotion and Gething Formations are the economically important stratigraphic units in the Quintette coalfield, which extends from Chetwynd in a southeasterly direction to the British Columbia/Alberta border. In this area, coal development is best in the Gates Member of the Commotion Formation. In the Gething Formation, consistent but usually thin coal seams are present.

Regional Stratigraphy

The stratigraphic succession ranges from Upper Jurassic to Lower Cretaceous in age, and consists of intertonguing shales and sands of both marine and continental origin, with most of the coal bearing strata being found in a deltaic environment.

The formations encountered at Quintette from the oldest to the youngest are as follows:

Nikanassin Formation - of Upper Jurassic age.

.. consists of cyclic beds of argillaceous fine-grained sandstone, siltstone, carbonaceous shale and coal. The coal is usually in seams less than 15 centimeters (6 inches) thick.

CONFIDENTIAL

Cadomin Formation - of Lower Cretaceous age.

.. consists of well rounded cobbles and boulders of black, white and green chert, white and grey quartzite and quartz with minor flattened and rounded pebbles of the same material, all of which are bound by silicious cement. No coal seams.

Gething Formation - of Lower Cretaceous age.

.. consists of alternating units of fine to coarse grained sandstone, carbonaceous shale, coal, sandy shale and conglomerate. Four coal zones have been encountered during the course of exploration.

Moosebar Formation - of Lower Cretaceous age.

.. the basal part consists of homogeneous dark grey to black shale, with thin beds of sideritic concretions up to 30 centimeters (1 foot) in thickness and thin beds of bentonite and siltstone. The upper part consists of banded or fissile sandy shale, very fine sandstone and sandstone with intercalating thin shales. No coal seams.

Commotion Formation - of Lower Cretaceous age.

.. consists of the Gates Member. The lower portion of the member consists of massive, light-grey, medium grained sandstone with minor carbonaceous and conglomeritic horizons (tentatively referred to as the Quintette sub-member). Cyclic sequences of coal deposition occur above the Quintette Member. Cycles normally begin with laminated medium to fine grained sandstone and grade to carbonaceous shale and coal. Lenses of conglomerate are present in this section. Locally, coal seams in the upper part reach a maximum thickness of 9 metres (30 feet) although they are usually about 2-3 metres (6-10 feet)

CONFIDENTIAL

thick. Those in the lower part attain thicknesses up to 12.2 metres (40 feet). This portion of the Gates Member is called the Middle Gates sub-member. The Middle Gates sequence is overlain by the Babcock sub-member which consists of a massive medium to coarse conglomeritic sandstone or pebble conglomerate sequence. This member does not contain any coal. This Upper Gates sub-member is the top of the Gates Member and is predominantly a shale sequence. It contains some poorly developed coal.

The base of the Hulcross Member is marked by a thin ironstone conglomerate which is usually 15 to 30 cm. (6 to 12 inches) thick. The majority of the rock in this member consists of rubbly or blocky medium to dark grey shale with thin interbeds of siltstone and very fine sandstone. No known coal beds.

The Boulder Creek Member consists of shales, greywacke and conglomerate in the lower portion, alternating medium to fine grained sandstone and shale in the middle portion with massive conglomerate and conglomeritic sandstone in the upper portion. Minor discontinuous coal seams have been observed.

Shaftesbury Formation - Lower to Upper Cretaceous age.
.. consists of dark grey to black marine shale, with minor siltstone. No known coal seams.

This completes the stratigraphic sequence surrounding the coal bearing horizons.

CONFIDENTIALNumber of Coal Seams and General Thickness

At the proposed Windy mine site there are basically 5 seams present, giving a combined total coal thickness of 12.2 metres (40.0 feet). Oxidation may preclude parts of the seams being metallurgical coal.

At the proposed Roman Mountain mine there are five coal seams which give a combined total coal thickness of 13.4 metres (44.0 feet).

At the proposed Sheriff Mine there are four coal seams considered to be of economic importance. These seams give a combined total coal thickness of approximately 17.1 metres (56.1 feet). Oxidation may, again, preclude parts of the seams being metallurgical coal.

The proposed Frame mine has five seams considered to be of economic importance, giving a combined total coal thickness of approximately 11.5 metres (37.7 feet).

At the Babcock No. 1 proposed mine site there are three seams which are considered to be of economic importance. They have a combined total coal thickness (no waste rock included) of approximately 10.83 metres (35.5 feet).

At the proposed Babcock No. 2, 3 and 4 mines there are three seams of economic importance with a combined total thickness of approximately 10.3 metres (33.8 feet).

At the Perry Creek Anticline prospect there are four seams giving a combined total coal thickness of approximately 8.9 metres (29.2 feet).

CONFIDENTIAL

3.4 SUMMARY - COAL RESERVES, QUALITY, AND SPECIFICATIONS OF PROCESSED SALEABLE COKING COAL

3.4.1 Coal Reserves

The "Possible Reserves" on the Quintette property are estimated to be in excess of 2.5 billion tonnes. The "Indicated In Place Reserves" ⁽¹⁾ are estimated to be as follows:

<u>Open Pit</u>	<u>Oxidized plus Unoxidized Mineable Coal</u>
Windy	16,255,000
Roman Mountain	22,812,000
Sheriff	25,230,000
Frame	<u>36,360,000</u>
TOTAL	100,657,000 tonnes <u>100</u>
<u>Underground</u>	
Babcock No. 1	225,665,000
Babcock Creek Area	251,122,000
Babcock Creek South Area	57,449,000
No. 2	48,934,000
No. 3	52,011,000
No. 4	105,482,000
Caribou South (No. 2 South)	81,276,000
Waterfall Creek Area	131,665,000
TOTAL	<u>953,604,000 tonnes</u>
COMBINED TOTAL	<u><u>1,054,261,000 tonnes</u></u>

(1) Indicated In Place Reserves of coal does not include either in-seam or out-of-seam dilution.

CONFIDENTIAL**3.4.2 Quality and Specifications of Processed Saleable Coking Coal**

The tests done to date on coal from the Babcock area indicate a clean coal product having the following properties:

Moisture	6.0%
Ash	7.5%
Volatiles	21.1% - 23.2%
Phosphorous	0.03% - 0.05%
F.S.I.	6.5 - 7.5
Sulphur	0.31% - 0.51%

The above figures are subject to modification on the basis of the results of the 1976 exploration program.

CONFIDENTIAL

4.0 PROPOSED DEVELOPMENT AND PRODUCTION PLANS

4.1 SCHEDULE AND OUTLINE - PREPRODUCTION DEVELOPMENT

Based on obtaining project authorization late in 1976 and starting construction as early as possible in 1977, the start-up date for the first coal preparation plant would be late 1979 at the Wolverine site. It is desirable to have an all-weather road available (from Dawson Creek or Chetwynd) to the plantsite for the start of plantsite clearing in 1977. At the same time, a permanent haul road will be constructed into the pit area. Preproduction stripping in the open pits will be done during 1978-79. At the end of 1979 the Wolverine plant will be in operation.

Starting in 1978 an access road will be constructed into the Babcock area. The Babcock plant construction will start in 1979, with the plant start-up scheduled for mid-1981. The Windy open pit pre-stripping will be done during 1980 and the first half of 1981. Roman Mountain will be prepared for production during 1984-5.

The development program for underground mining at the Babcock area will commence in 1980 as soon as the climatic conditions permit. The development schedule is designed to achieve the target of the hydraulically mined coal from D seam in 1983, and from F seam by the second quarter of 1984. Development of the J seam is delayed until 1987, with production scheduled for 1988.

CONFIDENTIAL**4.2 SCHEDULE AND OUTLINE - PRODUCTION PERIOD**

The Wolverine area open pits, Sheriff and Frame, will be developed as a mining unit. A production rate of 2 million metric tonnes of clean coal per year will be achieved in 1981 and maintained through 1999. While the present clean coal open pit reserves in the Wolverine Area are slightly short of the required tonnage, we are confident that additional open pit reserves will be found in the immediate area. It is probable that additional work on defining the coal reserves in the Sheriff and Frame pits will prove up additional tonnage.

In the Babcock plant area the Windy pit will commence production in 1981 at 750,000 metric tonnes of clean coal and increase production to 2,000,000 metric tonnes per year of clean coal in 1982. In 1985, Roman Mountain pit will produce 250,000 metric tonnes of clean coal and Windy pit production will be reduced by the same amount. In 1986, both Windy and Roman Mountain pits will each produce 1,000,000 metric tonnes per year of clean coal. Roman Mountain will then continue to produce at the rate of 1,000,000 metric tonnes per year through 1999. Windy pit production will be reduced to zero at the end of 1988.

To provide the balance of the tonnage required by the Babcock plant, the Babcock No. 1 underground mine will start production in 1983 at the rate of 500,000 metric tonnes of clean coal. This production will be increased to 1,000,000 metric tonnes per year in 1984 and maintained at that rate through 1986. The underground production will be increased to 2,000,000 metric tonnes per year during 1987-1989 and will replace the Windy open pit production. The underground mining rate of 2,000,000 metric tonnes annually of clean coal will be continued through 1999.

CONFIDENTIAL

4.3 SCHEDULE AND OUTLINE - INFRASTRUCTURE DEVELOPMENT

4.3.1 Railway

The new railway required consists of 60 miles from Chetwynd to the new townsite, 21 miles from the new townsite to the Babcock plantsite, 10 miles from the townsite to the Wolverine plantsite and 4 miles from Prince Rupert to Ridley Island. Clearing for these railroads will be done in 1977, with the construction being done in 1978-79. The railroad will be ready for operation by late 1979.

British Columbia Railway will be constructing the new trackage with the exception of the Ridley Island extension. For other railroad routes being considered by the B.C. Government, refer to Section 2.2.4 of this Volume I.

4.3.2 Power Supply

Power for the Quintette project will be supplied by the British Columbia Hydro and Power Authority (B.C.H.P.A.).

The proposed new transmission line as selected by B.C.H.P.A. will commence at the existing Chetwynd substation and proceed to the proposed townsite and continue on to the plantsites.

Beyond the townsite, separate transmission lines are proposed. The Babcock supply system will continue in a southerly direction, generally following the Flatbed and Babcock Creeks to the plantsite. The Wolverine supply system will extend in a westerly direction along the course of the Wolverine River for a distance of approximately 10 miles.

CONFIDENTIAL

The transmission line covers approximately 60 miles from Chetwynd to the townsite, a further 21 miles from the townsite to the Babcock plant.

To achieve the proposed 1979 plant production target date, the land acquisition, engineering and surveying should commence during July of 1977.

The transmission line route will be coordinated with the railway and access roads wherever possible to achieve maximum benefits for construction and maintenance, and to reduce the costs of rights-of-way.

4.3.3 Access Roads

The initial road connection will be from Dawson Creek to the new townsite. It is by this route that the plant construction materials and major supplies will be shipped. Some upgrading of this route is being done in 1976, and a bridge across Flatbed Creek will be constructed. Access road from the townsite to the plant and minesites at Wolverine will be constructed in 1977. All access roads will be ready for heavy load traffic during the winter of 1977-78 and the summer of 1978. The access road to the Babcock plantsite will be constructed in 1978.

4.4.4 Townsite

The development of the townsite will be governed to accommodate the growth of the project labour force. Construction is scheduled to complete approximately 850 living units, for married and single personnel, in time for the Wolverine plant

CONFIDENTIAL

start-up in 1979, and increase to approximately 1,300 living units some two years later.

The initial development will include all the utilities and services, institutional and recreational facilities required for the completed townsite.

Construction work and camp areas are located so as to utilize the cleared areas for commercial and recreational use after the townsite is completed, wherever practical.

The area chosen has adequate areas for future expansion, in accordance with the B.C. Government's proposed development, and is ideally located for road and rail access, power and other services.

4.4.5 Communications and Public Transportation

Radio, television and telephone services will be supplied to the townsite.

Telephone and mobile radio units will be provided for the mine surface plants and pit areas.

It has been assumed that public transportation systems will be developed by provincial or private transportation companies at no cost to the project.

CONFIDENTIAL

4.4.6 Port Facilities

The port facilities at Prince Rupert will be available for coal shipments at the end of 1979.

For further details on the port development, see Section 2.2.5 of this Volume I.

CONFIDENTIAL

5.0 GOVERNMENTAL REQUIREMENTS AND INVOLVEMENT

5.1 B. C. GOVERNMENT - APPLICATIONS FOR APPROVALS AND PERMITS

Before a coal mine may be developed in British Columbia, it is necessary for the coal developer to apply for coal licences, leases and operating approvals from the Department of Mines and Petroleum Resources, and for water rights and pollution control permits from the Department of Lands, Forests and Water Resources.

In addition, there are requirements and procedures governing such matters as the disposition of Crown Lands for access and settlement; reserve uses other than mining; the establishment of communities; and the provision of housing and services.

The Acts of the Provincial Legislature of British Columbia which contain statutory regulations applicable to coal mine development are:

- ... The Coal Act
- ... The Coal Mines Regulation Act
- ... The Environment and Land Use Act
- ... The Forest Act
- ... The Land Act
- ... The Municipal Act
- ... The Pollution Control Act
- ... The Water Act and Regulations
- ... The Wildlife Act
- ... The Mineral Land Tax Act
- ... The Mining Tax Act
- ... The Income Tax Act

CONFIDENTIAL

The responsibility for the administration of these and other relevant Acts is divided between various provincial government departments, and it is necessary for the coal developer to deal directly with these individual departments when and as necessary.

In addition to the departments, there is an Environmental Land Use Committee, which is a Cabinet Committee of the Government of British Columbia comprised of those Ministers whose departments are responsible for resource use and economic development, as well as matters dealing with major public facilities such as highways, settlement and public health services.

The Committee is responsible, over and above the specific requirements included in other statutes under their administration, for the integration of departmental activity in these fields, and it is empowered under the Environmental and Land Use Act to enact through Order-in-Council special provisions pertaining to environmental land use.

The administrative duties of the Environmental and Land Use Committee are performed by a Secretariat (E.L.U.C. Secretariat).

E.L.U.C. has prepared and published a document entitled "Guidelines for Coal Development". The purpose of the Guidelines is to provide the coal developer and governmental authorities with a program of information requirements and review processes permitting the government to assess the changes and impact of a major resource development on existing natural, social, and economic conditions in the development region. It is also designed to ensure that an integrated accounting, evaluation, planning and programming procedure is undertaken prior to any governmental decisions being taken respecting the development of the mine.

CONFIDENTIAL

In order to coordinate this review process for coal development studies, the B.C. Government has established a Coal Steering Committee comprised of representatives of the E.L.U.C. Secretariat, the Department of Mines and Petroleum Resources, the Department of Economic Development and the Department of Transport and Communications. The Coal Steering Committee is under the chairmanship of the E.L.U.C. Secretariat, with a co-chairman from the Mines Department.

Reporting to the Coal Steering Committee are five sub-committees, consisting of representatives of those departments who have an involvement in the scope of each respective sub-committee. The sub-committees are:

- .. Coal Resource - Chairman - Department of Mines and Petroleum Resources
- .. Environment and Land Use - Chairman - E.L.U.C. Secretariat
- .. Transportation - Chairman - Department of Transport and Communications
- .. Manpower - Chairman - Department of Labour
- .. Townsite and Community Development - Chairman - Department of Municipal Affairs

CONFIDENTIAL

A four stage assessment process is outlined in the Guidelines, which is designed to move the assessment systematically from a general overview of the proposed development to more specific impact assessment and management proposals.

Prospectus

The initiation of the assessment process is the submission of a Prospectus by the coal developer to the Deputy Minister of Mines, who will submit the material to the Coal Steering Committee for review. The purpose of the Prospectus is to acquaint the various government departments with the concept and basic facts of the proposed development, and will be comprised of:

- .. an initial outline of coal reserves, exploration, minesite and offsite development proposals, including:
 - ... the mining properties;
 - ... the coal reserves (location, type, amount recoverable, etc.);
 - ... forecast production by phase;
 - ... estimated labour force by phase;
 - ... exploration and mining programs and areas influenced.

The Prospectus, as outlined, was submitted to the B.C. government on May 7, 1976, for preliminary review.

Stage I - Preliminary Assessment

The Stage I assessment is to assess the major economic, environmental and social impacts of the proposed development on the region in general and will include the following components:

CONFIDENTIAL

- ... outline of proposed development (offsite and onsite);
- ... description of existing natural and social environment;
- ... filling of information gaps;
- ... identification of interactions between the proposed development and the environment, including the general economic impact of the project;
- ... impacts related to:
 - .. exploration;
 - .. mine development;
 - .. mine reclamation;
 - .. coal processing;
 - .. power development;
 - .. transportation;
 - .. community development;
 - .. regional development.

Initially, draft copies of Stage I are submitted for a quick review by the Coal Steering Committee to ensure it conforms to the required format. When this is satisfactorily concluded, the coal developer (Quintette) will submit Stage I in final form. It is anticipated that the governmental review will then take about one month.

Quintette is submitting the aforementioned 'draft' copies of Stage I to the Coal Steering Committee on August 9, 1976.

Stage II - Detailed Assessment

Following review of the Stage I Preliminary Assessment by the Coal Steering Committee and the line departments, and its acceptance, then the coal developer (Quintette) proceeds with the preparation and submission of the Stage II Detailed Assessment.

CONFIDENTIAL

Stage II generally parallels the Stage I report in scope, but requires more in-depth analysis. Its components are:

- ... detailing of the development program outlined in Stage I;
- ... site specific analysis of impacts on the natural environment related to both minesite and offsite aspects of the proposed development program;
- ... analysis of alternative proposals for mitigating identified impacts on the bio-physical environment, using benefit cost analysis;
- ... identification of alternative means of meeting identified community and social requirements;
- ... statement of the preferred approach for each aspect of the development.

Submission and review of the Stage II report is similar to the procedures outlined for Stage I.

It is probable, according to the Guidelines, that this process, from the date of submission, may take a minimum of eight weeks, as it leads to the final operational planning.

Acceptance of the Stage II report by the governmental authorities represents approval in principle for the environmental aspects for the coal mine development.

In the interests of expediency, it is planned that formal application for the necessary permits, licences and approvals will be initiated during the Stage II assessment, although such applications are properly within the scope of Stage III.

Stage III - Operation Plans and Approval Applications

When Stage II has been concluded to the satisfaction of the governmental authorities, then Stage III is prepared and submitted.

CONFIDENTIAL

Its components are:

- a) Preparation of detailed plans of action for:
 - .. managing identified environmental impacts;
 - .. meeting social and community development requirements of selected alternatives.

- b) Applications for necessary permits from various government departments, in accordance with the relevant Acts and Statutes, as follows:
 - .. Mines and Petroleum Resources
 - .. Pollution Control Branch;
 - .. Water Rights;
 - .. Lands Service;
 - .. Municipal Affairs;
 - .. Highways.

- c) Design of monitoring programs for construction and operation.

Detailed reclamation proposals must be submitted to the Department of Mines and Petroleum Resources for review by the relevant Committee in accordance with the Coal Mines Regulation Act.

In addition, before the project may proceed the developer must obtain:

- .. Pollution Control Permits;
- .. Water Licences;
- .. Land Use Permits;
- .. Forestry Approval.

Also:

Approval of the operating plan and a Production Lease as required by various Statutes;

CONFIDENTIAL

Approval of the Production Lease, pursuant to the Coal Act, is given by the Lieutenant Governor in Council upon the recommendation of the Minister of Mines and Petroleum Resources.

On occasion the review of applications for approvals, licences and permits may take several months; therefore, as mentioned previously, Quintette will initiate such applications during Stage II in an effort to reduce the elapsed time.

Stage IV - Project Implementation

Once the necessary approvals, licences, permits and Production Lease have been obtained, the mine development may be initiated by the developer (Quintette).

Stage IV consists of the implementation of continuing monitoring programs by the various government departments and agencies, in accordance with their specific responsibilities, to ensure that the approved objectives and policies are being complied with by the developer during the development period. The monitoring will cover on-site facilities, and off-site facilities: the latter to ensure that the accepted guidelines to mitigate construction impacts are enforced.

After the start of mine production, the normal regulatory inspection functions, relating to adequacy, mine safety and the like, are implemented.

CONFIDENTIAL

5.2 B.C. GOVERNMENT - INVOLVEMENT IN INFRASTRUCTURE AND
N.E. REGIONAL DEVELOPMENT OF BRITISH COLUMBIA

For several years the B.C. Government has been undertaking studies of the northeastern region of British Columbia with a view to diversifying and expanding its potential, both socially and economically. To date the area has been largely agricultural, with some logging and oil and natural gas production.

Large wilderness areas exist which contain undeveloped natural resources, particularly coal, natural gas and forest products.

Quintette's coal properties are included in one of these areas, south of Chetwynd and Dawson Creek. Other potential coal developments are contemplated in the same area, as is the imminent development of a natural gas field.

Discussions are underway between the B.C. and federal governments, together with the two railway companies - British Columbia Railway and Canadian National Railway - for an expansion of the railways in the north part of the region to provide communication and to open up other virgin territory for development.

Quintette's proposed coal mining project is the largest and most advanced of the potential natural resource developments in the region. For this reason, and because of the extent of its supporting infrastructure requirements, it has the highest priority, as a matter of government policy and support, in connection with the government's intention to encourage the development of the region as a whole.

CONFIDENTIAL

Apart from the social and economic benefits which will accrue to the region and the province as a whole if Quintette markets 5 million tonnes of coal annually, the road, rail, port, and townsite developments necessary for Quintette's operations will be available for use by others who are contemplating expansion of, or the development of new, industrial projects in the area.

Over the past few years Denison, in its management role on behalf of Quintette, has maintained continuous contact with the B.C. Government at all levels, including the Ministers and departmental representatives, in connection with Quintette's proposed development plans for on-site mining and off-site facilities.

Numerous meetings have been held, not only with governmental authorities but with others who would be involved with the infrastructure requirements: e.g. Canadian National Railway; B.C. Railway; the potential Ridley Island port developer, Neptune Terminals; and B.C. Hydro in connection with power supply.

The importance of maintaining good public relations with local communities, particularly Dawson Creek, has not been overlooked. The civic authorities and the Chamber of Commerce of Dawson Creek are kept abreast of Quintette's activities and proposed mining development.

Quintette understands that the B.C. Government has instructed its various departments to cooperate with Quintette with a view to providing, by the end of 1976, the necessary approvals, permits, and licences enabling Quintette to proceed with its mine development.

CONFIDENTIAL

The government has also instructed its relevant departments to undertake engineering and feasibility studies, during 1976, covering road and rail access to Quintette's mine site, as well as the townsite requirements. In reviewing the infrastructure requirements, the government is giving consideration to undertaking the construction and costs of rail access, and to amortizing these costs over the life of the project, with recovery from Quintette and others on the basis of tons of coal shipped, or some similar arrangement.

It is also Quintette's understanding that the B.C. Government is giving consideration to assuming the costs of access road construction, at least to the proposed townsite.

Two alternative port locations are being considered: one at Britannia, near Vancouver, the other at Ridley Island, near Prince Rupert. It is believed that the B.C. Government, like the Canadian Government, is favouring the Ridley Island alternative.

Procedures have been established for the input of information by Quintette to the governmental authorities in accordance with Legislative Acts and Statutes, leading to the issuance of the required governmental approvals, permits and licences to enable the Quintette project to be developed and mined.

CONFIDENTIAL

- 5.3 CANADIAN GOVERNMENT - INVOLVEMENT WITH B.C. GOVERNMENT FOR:
- .. Development N.E. Region of B.C.
 - .. Port Development
 - .. Rail
 - .. Labour Training
 - .. Townsite
-

Although the B.C. Government has the prime responsibility for the overall development of the N.E. Region of British Columbia, it is working in cooperation with the Canadian Government, as in certain aspects there are joint interests, and joint funding is contemplated. The Canadian Department of Regional Economic Expansion will be the prime agency involved.

Port

- The Canadian Government is involved in development because of its responsibility for navigational matters. In the case of Ridley Island, the Canadian Government (through the National Harbours Board) owns the property and will have the prime jurisdiction for all aspects of the port development. Undoubtedly it will cooperate with the B.C. Government on policy matters.

Rail

- Discussions are in progress between the B.C. Government and the Federal Government which may result in a joint participation in the railway support necessary for the Quintette Project.

Labour Training

- It is probable that, in cooperation with the B.C. Government, the Canadian Government through its Department of Manpower will be directly involved in recruiting and financial assistance with governmental training programs for Quintette's project.

CONFIDENTIALTownsite

- The B.C. Government's policy decisions respecting the establishment of the town have not yet been established. However, independently of this, there are Canadian Government agencies, such as Central Mortgage and Housing, from whom financing is available for housing development.

As a matter of principle, it is understood that the Canadian Department of Regional Economic Expansion (D.R.E.E.) is maintaining liaison with the B.C. Government departments in connection with the Quintette development in order that it may keep abreast of any areas of mutual inter-governmental interests or involvement.

CONFIDENTIAL

6.0 DENISON COAL LIMITED MANAGEMENT PROGRAM

6.1 WORK TO DATE

6.1.1 Exploration

Exploration work started in 1969 and has continued to date on an annual basis. The 1976 exploration program will be starting shortly, as soon as ground conditions permit. It is anticipated that exploration work will continue until the early 1980's.

At the end of 1975, based on exploration to that time, it was estimated that the possible reserves of coal, in place, at Quintette are 2.5 billion metric tonnes. Of the foregoing total, the "indicated in place reserves" are approximately 1.054 billion metric tonnes.

Sections 3.3 and 3.4 of this Volume I contain the geological summary and the summary of coal reserves and quality respectively.

Exploration work performed to date, and proposed, at Quintette is as follows:

- i) Trenching - From 1969 to 1975 inclusive, 7.75 miles (40,920 feet).
 - It is proposed to carry out an additional 3.5 miles (18,480 feet) during 1976.
- ii) Rotary Drilling - In the years 1971 and 1975 rotary drilling totalled 13,444 feet, and coal samples were obtained for quality determination and structural information.
 - It is proposed to do an additional 6,000 to 8,000 feet of rotary drilling during 1976.

CONFIDENTIAL

- iii) Diamond Drilling
 - During the years 1969 to 1975 inclusive, 43,036 feet of diamond drilling was done to obtain geological structure and quality information on the coal measures.
 - It is proposed to do an additional 6,000 to 8,000 feet of diamond drilling during 1976.
- iv) Adits
 - Fifteen adits were driven, totalling 1,388 feet, in the years 1970, 1971 and 1972. Bulk coal samples were obtained for quality determination and washability tests.
 - It is proposed to drive two more adits in 1976.

As phases of exploration work are completed, the necessary reclamation and erosion control operations are performed; *i.e.* backfilling trenches, building erosion bars and ditches, and seeding of access roads and disposal of cut trees, all in accordance with governmental regulations.

To enable the proposed 1976 exploration program to be undertaken, it will be necessary to construct an additional 6 to 10 miles of access roads.

CONFIDENTIAL**6.1.2 Consultants****i) Kilborn Limited**

Early in 1975, Denison Mines (B.C.) Limited - now Denison Coal Limited - who had been nominated by Quintette Coal Limited to manage the exploration program and the feasibility study, commissioned Kilborn Limited - engineering consultants - to carry out the Preliminary Feasibility Study.

In this capacity, Kilborn also coordinated the work of other consultants retained in connection with this phase of the project.

The Preliminary Feasibility Study was completed at the end of November 1975 and was reviewed by Quintette Coal Limited shortly thereafter.

The Final Feasibility Study, which is planned for completion by the end of 1976, will also be carried out by Kilborn Limited, who will continue to coordinate the work of other consultants in this connection.

Kilborn Limited is a Canadian company, with its head office located in Toronto, Ontario. Kilborn Engineering (B.C.) Ltd., located in Vancouver, is a wholly subsidiary of Kilborn Limited.

CONFIDENTIAL

ii) B.C. Research

With its head office in Vancouver, British Columbia, B.C. Research is a firm of environmental consultants. The firm was retained in the spring of 1975 to prepare a preliminary environmental study. Field studies started in June 1975 and have proceeded on a continuous basis since that time. Such field studies are continuing during 1976 because it is necessary to compile environmental base line information for the general mine and townsite area over a 12-month period.

The preliminary environmental study was completed in November 1975 and formed part of the previously mentioned Preliminary Feasibility Study.

Such environmental studies, together with the impact caused to the environment by the mine development and the developer's plans to mitigate the deleterious effects, are all matters in which governmental authorities are vitally interested. A mining development is not allowed to proceed until the governmental authorities are entirely satisfied as to the manner in which environmental problems will be mitigated by the developer - in this case Quintette.

The final environmental study will be completed by the end of 1976.

From the time when the mine development starts, and thereafter on a continuing basis, an environmental monitoring program will be a necessity.

CONFIDENTIALiii) Dames & Moore

This firm of engineering consultants, with its head office in Toronto, Ontario, was commissioned in 1975 to prepare a report on preliminary open pit mine design for the Quintette property.

The report was completed and included as part of the Preliminary Feasibility Study mentioned previously.

Henceforth, Denison Coal Limited will be directly responsible for all matters pertaining to surface coal mining (open pit mining) at Quintette, and will utilize its own staff, supplemented by such consultants as it may elect to use, to prepare this portion of the Final Feasibility Study.

In this connection, Denison has commissioned Techman Ltd. of Calgary, Alberta - a member of the Loram group of companies, headquartered in Calgary, to prepare initial engineering designs and methods for the proposed surface mining operations.

CONFIDENTIAL

iv) Swan Wooster Engineering Co. Ltd.

A consulting engineering firm, headquartered in Vancouver, British Columbia, Swan Wooster, was retained in June 1975 to prepare a report covering the estimated capital cost requirements for the establishment of the proposed bulk loading terminal and port facilities at Ridley Island, near Prince Rupert, British Columbia.

This report was completed in September 1975 and included an assessment of the terminal layout and access thereto for road and rail, together with tentative engineering designs for the ship loading and coal handling and storage facilities.

v) DeLeuw Cather Canada Ltd.

Through its Toronto, Ontario office, DeLeuw Cather was retained in March 1976 to prepare a rail transportation study, including estimates of capital costs of new rail construction and rehabilitation of existing trackage, rolling stock, and locomotives, together with maintenance and operating costs for moving coal from the mine to Ridley Island, Prince Rupert, B.C.

CONFIDENTIALvi) Price Waterhouse Associates

A firm of managing consultants Price Waterhouse Associates, with offices in Vancouver, British Columbia, was commissioned in 1975 to prepare a socio-economic impact report of the direct and indirect effects of the proposed Quintette mine upon the economy of the region in which it is situated, and upon the Province of British Columbia as a whole. Similarly, the economic effects of the establishment of port facilities, the upgrading of existing rail and road transportation systems, and the establishment of a new townsite in the vicinity of the mine will be assessed.

The report is required for submission to the B.C. Government as part of the prerequisites to obtaining the necessary mine development permits, licences and the like.

It will also be of assistance to Quintette, in conjunction with the engineering, financial and environmental aspects of the Final Feasibility Study, when the board of directors is determining, at the end of 1976, whether or not to proceed with the project.

vii) Others

Although not retained as consultants, considerable information of a preliminary engineering and cost nature has been forthcoming from other authorities and companies who will be directly involved with the infrastructure developments; e.g:

CONFIDENTIAL

British Columbia Railway - new rail access and rehabilitation of existing trackage

British Columbia Hydro - supply of power and power transmission lines.

6.1.3 Preliminary Feasibility Study

As described in Section 1.1.4 of this Volume I, Denison was originally appointed by Quintette Coal Limited to manage the program of exploration and feasibility studies. In this capacity, Denison commissioned Kilborn Limited, consulting engineers with head offices in Toronto, Ontario, to prepare a Preliminary Feasibility Study for a fully integrated mine development of the Quintette coal properties, to produce 4,500,000 metric tonnes per year of metallurgical grade coking coal.

This study was completed in November 1975, and was subsequently reviewed by Quintette Coal Limited.

As a result of the review of the aforementioned study, it has been decided to increase the annual production tonnage to 5,000,000 metric tonnes of metallurgical grade coal and current planning has been adjusted accordingly and will be reflected in the Final Feasibility Study, as well as in any intervening negotiations with governmental authorities and customers for the coal.

The purpose of the Study was to develop the preliminary engineering, design and cost estimate data in sufficient depth to determine the scope of work for the Final Feasibility Study.

The scope of the Preliminary Feasibility Study included:

CONFIDENTIAL

i) Geology

The geological, coal reserve and coal quality information was developed by Denison from the Field exploration and geological programs carried out by Denison's geologists during 1975 and previous years, with the active involvement and support of geologists from Mitsui Mining.

ii) Mining Study

Kilborn, in cooperation with Denison, utilized the aforementioned geological, coal reserve and coal quality information to decide on suitable locations for surface and underground mining and scheduling of development and production from these areas.

Underground mining will be achieved by both hydraulic and conventional mining methods. A great deal of reliance has been placed on the expertise and experience of Mitsui Mining with respect to the hydraulic mining methods and procedures, with Kilborn concentrating on the areas more suitable for conventional underground mining. Kilborn coordinated the overall underground mining program, including servicing, materials handling, and surface facility requirements.

The consulting firm of Dames & Moore prepared an initial assessment of surface mining methods for two of the four contemplated surface mines, but Denison has subsequently assumed the responsibility for all matters relating to such mining, and is working closely with Kilborn in this regard.

CONFIDENTIAL

Also included in the scope of the mining study were the supporting facilities:

- (a) Preliminary engineering designs for the two proposed coal washing and preparation plants, one in the Babcock area with a capacity of 3,000,000 metric tonnes annually of clean metallurgical grade coking coal, and the other in the Wolverine area, with an annual capacity of 2,000,000 metric tonnes of similar clean coking coal.

Each of these plants will be served by railroad spurs, connecting with the new railroad extension to be constructed between Chetwynd and the minesite. The plantsites will be approximately 16 air miles apart.

- (b) Other supporting facilities covered by the mining study were:

- road and rail access to the mine and plant-sites.
- offices, warehouses, workshops, and laboratory facilities.
- utilities and services, including water supply systems, both potable and processing.
- water storage dams and tailings ponds dams.
- coal storage, handling and railway car loading facilities at the mine.

iii) Townsite

The Preliminary Feasibility Study also included an assessment of the townsite facilities necessary to house the Quintette mining employees and their families. Residential requirements have been based on a ratio of 70% married status and 30% single status.

CONFIDENTIAL

Institutional facilities include:

- schools
- municipal buildings - provincial and federal
- recreational facilities - indoor and outdoor
- commercial buildings
- industrial buildings

Services and utilities for the townsite have been based on a total of about 3,500 residents. These services include:

- water supply
- sewage treatment
- storm sewers
- power supply

It is also proposed to construct a gravel airstrip in the vicinity of the town. The airstrip will be suitable for non-scheduled airline service. The nearest airport for scheduled airline service is at Dawson Creek.

As previously mentioned in Section 2.2.2 of this Volume I, the proposed townsite is to be located immediately east of the confluence of the Murray River and Flatbed Creek.

Chetwynd is about 60 miles northwest, and Dawson Creek about the same distance northeast of the proposed townsite.

iv) Infrastructure

Assessments of the other infrastructure requirements;
e.g.:

- rail route to Ridley Island, Prince Rupert
- port facilities at Ridley Island
- road access to the mine and townsite

CONFIDENTIAL

- power supply to the mine and townsite
were also made and included in the Preliminary Feasibility Study.

v) Other Studies

A preliminary environmental impact study of the development formed part of the Preliminary Feasibility Study. The environmental studies are continuing.

A socio-economic study has been undertaken and will be completed shortly.

vi) Capital and Operating Costs

The Preliminary Environmental Study also included estimates of:

- capital costs - both preproduction and post production
- operating costs
- cash flows and related financial data.

These costs included the total project including, in addition to mining, the townsite and other required infrastructure.

CONFIDENTIAL

6.1.4 Negotiations with B.C. Government

Section 5 of this Volume I covers our negotiations to date with the B.C. Government and its various departments. It also sets forth the requirements and procedures to be followed by Quintette in 1976 in order to obtain the approvals, licences, and permits necessary prior to commencement of Quintette's proposed development.

It is the understanding of Quintette that the attitude of the B.C. Government is very favourable towards the early development of the Quintette coal project, and the government has instructed the various governmental departments and agencies to provide their service and cooperation so that the government may provide the necessary approvals, etc. by the end of 1976, permitting the Quintette development to proceed.

CONFIDENTIAL**6.2 1976 PROGRAM**

At the beginning of April 1976, Denison presented its geological report to the Japanese steel mills in Tokyo. This report summarized the results of the exploration and geological work performed between 1969 and 1975 inclusive at the Quintette properties and included:

- regional geology and coal zone development
- regional stratigraphy
- regional geological structure
regional correlation
- regional reserves
- regional coal quality
- regional coking characteristics

It also provided the geology and coal reserve information for each of the proposed mining areas; i.e., four open pits: Windy, Roman Mountain, Sheriff and Frame; and the No. 1 underground mine at Babcock.

The extent of the 1976 exploration program has already been outlined in Section 6.1.1 of this Volume I. This work will be carried out by Denison in conjunction with Mitsui Mining.

Other field work in 1976 will consist of the continuation of the environmental studies and hydrology studies and the preparation of an environmental impact report, including the measures proposed by Quintette to mitigate the effects of environmental problems which may result from the proposed coal mine development.

CONFIDENTIAL

The Final Feasibility Study for the overall project is planned to be completed by the end of 1976.

Consultants to be used in the 1976 program will be:

Kilborn Limited	-	preparation of the Final Feasibility Study
B.C. Research	-	environmental studies
Golder Associates	-	hydrological studies
Price Waterhouse	-	socio-economic study
Techman Ltd.	-	open pit studies

Denison will provide the overall coordination and control in accordance with its management function, as described in Section 1.1.4 and 1.3.1 of this Volume I.

6.2.1 Negotiations with B.C. Government and Agencies

As has already been described in various sections of this Volume I, it is the intention that all the necessary information, required by the B.C. Government through its Statutes, Acts and Regulations, to support Quintette's applications for the approvals, licences and permits requisite for the Quintette project to proceed will be prepared and submitted during 1976, in conformance with the procedures outlined in Section 5.1 of this Volume I.

It is Quintette's understanding that the B.C. Government intends to use its best efforts to issue the necessary authorizations by the end of 1976 to permit the Quintette development to proceed.

Negotiations will also be continued throughout 1976 with governmental authorities to finalize arrangements for the off-site infrastructure facilities; i.e., townsite, rail and road access, port facilities and power supply.

CONFIDENTIAL

6.2.2 Commercial Negotiations

As outlined in Section 1.2.4 of this Volume I, commercial negotiations for the sale of Quintette coking coal are being entered into with the Japanese steel mills. Initially, this will be for two-thirds of the production, with the remaining one-third being open for discussion either with the Japanese steel mills or with others.

The intention is to execute a Basic Sales Agreement between Quintette and the Japanese steel mills by the end of 1976.

6.2.3 Negotiations with Railroads: British Columbia Railway and Canadian National Railway

Negotiations will be continued with the British Columbia Railway and the Canadian National Railway during 1976 to resolve the following outstanding items:

- the routing of the new railroad access to the townsite. The various routing alternatives are described in Section 2.2.4 of this Volume I, and the B.C. Government intends to make its decision by October 1976,
- the applicable freight rates, which can not be determined until after the governmental decision has been made as to whether the new port will be built at Britannia or Prince Rupert. If the new port is to be established at Britannia, then the B.C.R. will be the only railway involved with the movement of Quintette coal. If Prince Rupert is selected as the port, then both the B.C.R. and C.N.R. will be involved,
- method of amortizing the cost of new railroad construction,
- method of provision of locomotive and rolling stock.

CONFIDENTIAL**6.2.4 Approval of Quintette Board of Directors**

It is reiterated that the primary objective of achieving completion of the 1976 program, as set forth in this Section 6.2, is to provide Quintette with sufficient information to enable its board of directors to determine, by December 1976, whether or not to proceed with the development of the project.

CONFIDENTIAL**7.0 LABOUR REQUIREMENTS AND SCHEDULE OF BUILD UP****7.1 CONSTRUCTION FORCES**

The estimated construction work force required for the Quintette development is:

Mining	200
Surface Plants	300
Townsite	<u>250</u>
TOTAL	750

Additional personnel will be required by others to construct the railway, power lines and the access roads to the new townsite.

CONFIDENTIAL

7.2 OPERATING WORK FORCE

The number of people required to operate and maintain the mine is anticipated to be approximately as follows:

<u>Year</u>	<u>Supervi- sory and Clerical</u>	<u>Hourly</u>				<u>Total</u>
		<u>Open Pit Mining</u>	<u>Plant Opera- tions</u>	<u>Under- ground Operations</u>	<u>Main- tenance Trades</u>	
1978	120	85	-	-	45	250
1979	200	209	60	-	181	650
1980	225	300	70	100	265	960
1981	250	324	102	114	300	1,090
1982	253	324	102	171	300	1,150
1983	253	324	102	299	322	1,300

1983 is the full operating force

These numbers are subject to a number of variables such as equipment size for the open pits and mining method in the underground operation.

CONFIDENTIAL**7.3 RECRUITING AND TRAINING**

Recruiting a construction force of 750 people is not foreseen as a problem, as the work will be done by contractors. Generally, each contractor has a basic work force and a pool of men he can call on for major projects.

Recruiting of an operating force is not seen as a problem for supervisory, clerical, open pit mining and plant operations, as these people can be drawn from both the mining industry and construction industry in Canada. People for Underground Mining Operations and for the Maintenance Trades are not as readily available. A good working relationship has been established with the B.C. Government and plans are being made for recruiting and training the necessary personnel.

PR-QUINETTE 76(1)A-2

INFORMATION SUMMARY

AUG-1976

VOL. II

QUINETTE COAL LTD.

AUGUST 1976

**C O P E N T I A L
F I L E**

**GEOLOGICAL BRANCH
ASSESSMENT REPORT**

00 608

CONFIDENTIAL
OPEN FILE
CONFIDENTIAL

QUINETTE COAL LIMITED

INFORMATION SUMMARY

AUGUST 1976

VOLUME II

CONFIDENTIAL

QUINETTE COAL LIMITED

INFORMATION SUMMARY

AUGUST, 1976

INDEX

	<u>Page No.</u>
1.0 <u>GEOLOGICAL SUMMARY</u>	
1.1 Regional Geology	1-1
1.2 Coal Reserves	1-14
1.3 Coal Quality	1-21
2.0 <u>PRE-PRODUCTION DEVELOPMENT</u>	
2.1 Introduction	2-1
2.2 Mining - Open Pits	2-2
2.3 Mining - Underground	2-5
2.4 Surface Facilities - Wolverine	2-10
2.5 Surface Facilities - Babcock	2-31
2.6 Construction Camps	2-58
2.7 Infrastructure	2-66
3.0 <u>PRODUCTION PERIOD</u>	
3.1 Introduction	3-1
3.2 Surface Mining	3-2
3.3 Underground Mining	3-9
3.4 Surface Facilities - Wolverine	3-24
3.5 Surface Facilities - Babcock	3-25
3.6 Operating Work Force	3-27
4.0 <u>CONSULTANTS</u>	
5.0 <u>ENVIRONMENTAL STUDIES</u>	
5.1 Introduction	5-1
5.2 Impact Study	5-2
5.3 Waste and Reclamation - Open Pits	5-3
5.4 Tailings and Reclamation - Surface Plants	5-8
6.0 <u>REFERENCE DRAWINGS</u>	

CONFIDENTIAL

1.0 GEOLOGICAL SUMMARY

1.1 REGIONAL GEOLOGY

The regional geology in the area of the Quintette property is shown on Map QNTT-71-100-R11 accompanying this report. This regional geology has been compiled from the detailed and reconnaissance mapping that has been done on the property and, while it is not complete in some areas, it does accurately reflect the style and distribution of the coal bearing formations.

The Quintette property is located within the Rocky Mountain Foothills region and covers most of the land containing coal bearing formations in an area approximately 25 miles long and 10 miles wide in the Peace River district of northern British Columbia.

The Quintette Coal Field is bounded, for the most part, to both the northeast and southwest by large thrust faults which also splay and transect the belt longitudinally, repeating the coal bearing sections a number of times in the 10 mile width.

The Commotion and Gething Formations are the economically important stratigraphic units in the field which extends from Chetwynd, B.C. southeast to the Alberta-British Columbia border. Within this area, coal development is best in the Gates Member of the Commotion Formation, particularly starting around Bullmoose Creek near the northern boundary of the Quintette property and extending southward through the property. Although good coal seams may be present near the northern boundary of the property, aggregate thicknesses of coal 15 metres thick are not attained until the Wolverine

CONFIDENTIAL

River valley on the Quintette property is reached. In the Murray area of the property, along the ridge dividing the Wolverine and Murray River watersheds, the total coal thickness reaches 20 metres or more. It is in this area that the Sheriff and Frame pits developments are proposed.

Further south, on the other side of the Murray River, coal seams in the Babcock and Roman Mountain areas are very consistently developed and an aggregate coal thickness of 15 metres in the Gates Member is also quite common. In the Five Cabin area, west of Babcock and still south of the Murray River, the Gates seams are not as well developed and attain a combined thickness of 7 or 8 metres.

Development of coal seams in the Gething Formation is also consistent throughout most of the Quintette Coal Field. On the Quintette property itself, three or four coal zones have been distinguished, although they are not always all present or particularly well developed in some localities.

The uppermost Gething coal zone contains the Bird, Skeeter and Chamberlain seams or their equivalents. In some places the Bird seam itself becomes a distinct zone and this zone must be subdivided into a Bird zone and a Skeeter-Chamberlain zone. The Skeeter-Chamberlain zone seldom exceeds 4 metres in combined coal thickness and the Bird seam or zone may contain up to 6 or 7 metres of coal although this has only been observed in the Roman Mountain and Quintette trend parts of the Babcock area.

CONFIDENTIAL

The middle coal zone of the Gething Formation appears to be the least persistent. It is best known in the Wolverine area where the zone is composed of one 2.5 metre seam, one 1 metre seam, and another seam or split 0.6 metres in thickness. In the Murray (Sheriff/Frame) area these seams are also present but they are thinner. Only one 1-metre seam is present in the middle coal zone in the Five Cabin area and the zone has not yet been tested in the other parts of the property.

The basal coal zone of the Gething Formation appears to be more erratically developed than the other zones. However, it may be economically significant locally where the total coal thickness attains 6 metres. This zone is apparently present only in the northern part of the property. It is most consistently developed in the west Wolverine area where it is about 3 metres thick. The basal coal zone is located just above or in close proximity to the Cadomin conglomerates.

Since it is so close to this zone of high energy sedimentation, it is reasonable to assume that it may not be laterally consistent and that, in those areas where coal is absent, it has been replaced by stratigraphically equivalent conglomerates and sandstones.

REGIONAL STRATIGRAPHY

The stratigraphic succession exposed on the Quintette property ranges from Upper Jurassic to Lower Cretaceous in age and consists of inter-tonguing shales and sands of both marine and continental origin, with most of the coal-bearing strata being from a deltaic environment. The table of formations for the area is outlined on the following page, with formation thickness ranges and general coal zones as outlined by exploration

GENERAL STRATIGRAPHIC SECTION SHOWING GEOLOGICAL FORMATIONS
PRESENT ON THE BABCOCK PROPERTY

CONFIDENTIAL

Series	Group	Formation (Thickness)	Seam	Columnar Section	Description		
LOWER CRETACEOUS	FORT ST. JOHN GROUP	Shaftesbury F. (270 ft +)			Alternation of interbedded dirty gray shale and mudstone with a few thin sandy shale.		
		COMMOTION Formation	Boulder Creek M. (400 ~ 450 ft.)		Coarse fine grained, well sorted sandstone, massive conglomerate, and non-marine gray shale with thin layers of carbonaceous materials.		
			Halcross M. (300 ft.)		Dark-gray marine shale and sandy shale with a few sideritic concretions and kaolinitic mudstones.		
		GATES Member (860 ~ 900 ft.)	A	Upper Gates Interval.		Cyclic alternation of interbedded gray shale and coarse-fine grain sandstone, conglomerate and coal. About three coal seams are workable and other six coal seams are unworkable.	
			B	Babcock Member			
			C	D. E. F. Zone			
			D	Middle Gates Interval			
			E	Quintette Member			
				Moosebar F. (400 ft.)			Dark gray marine shale with sideritic concretions; glauconitic sandstone and pebbles at base
		UPPER JURASSIC	BULL HEAD GROUP	Gething F.	X		Upper Coal Zone includes Bird, Skeeter-Chamberlain Subzones. Alternating sandstone and shale. Middle Coal Zone - Sandstone, shale below glauconitic sandstone. Basal Coal Zone. Conglomerates, Sandstones. Shale in coal zone. Conglomerate, massive-chert and quartzite pebbles and cobbles.
Cadomin F.	Y			Alternating siltstone, shales, some sandstone and coaly shale.			
Nikanassin F.	Z						

CONFIDENTIAL

to date. As has been mentioned, coal seams of economic thickness and quality are found in the Gates Member of the Commotion Formation and the Gething Formation.

A brief description of the formation encountered at Quintette, from the oldest to youngest, is as follows:

1. Nikanassin Formation

The Nikanassin Formation of the Minnes Group is generally accepted as being Upper Jurassic in age. The formation consists of cyclic beds of argillaceous fine-grained sand, siltstone, carbonaceous shale, and coal. The coal is poorly developed (usually less than 15 cm (6") in thickness) and discontinuous. The formation generally occurs under low angle slopes which are tree and bush covered below 1525m (5000') and form grey-brown pebbly talus above 1525m (5000'). Gradation from the Nikanassin Formation to the Cadomin Formation is abrupt, with gradation from fine sand to coarse sand to the sharp contact of cobble conglomerate usually taking place within 6 metres (20 feet). Only the upper portion of this formation is present at Quintette; however, it is reported to range from 150m (500 ft) to 45m (1,500 ft) in thickness.

2. Cadomin Formation

The Cadomin Formation and Gething Formation comprise the Bullhead Group of the Lower Cretaceous Series. The Cadomin consists of well rounded cobbles and boulders of black, white and green chert, white and grey quartzite

CONFIDENTIAL

and quartz with minor flattened and rounded pebbles of the same material, all of which are bound by silicious cement. It is generally believed that this formation was deposited over an extensive area and thus the upper contact is defined at the first stratigraphic break in the massive conglomerate. Due to its resistant nature, the formation is usually well exposed. It weathers to a rusty gravel and forms one of the better stratigraphic markers on the property. Thicknesses range from 15m (50 feet) to 45m (150 feet).

3. Gething Formation

The Gething Formation consists of alternating units of fine to coarse grained sandstone, carbonaceous shale, coal, sandy shale and conglomerate. The sandstones are thickly bedded to massive, with conglomeritic beds increasing towards the base of the formation. Four coal zones have been encountered during the course of exploration. The Gething is poorly exposed on the property, with the basal conglomerates forming the only distinctive marker. The formation varies in thickness from 120m (400 feet) to 200m (680 feet). The upper contact of the Gething is defined by a thin bed of pebble conglomerate followed by a bed of glauconitic sandstone which signifies the start of marine sediments of the overlying Moosebar Formation. This glauconitic sandstone is probably equivalent to the Bluesky Formation on the Plains area.

CONFIDENTIAL

4. Moosebar Formation

The Moosebar and Commotion Formations comprise the Ft. St. John Group of Lower Cretaceous age. The basal sequence of the Moosebar Formation consists of homogenous dark grey to black shale, with thin beds of sideritic concretions up to 1 foot in thickness and thin beds of bentonite and siltstone. The upper part of the formation consists of banded or fissile sandy shale, very fine sandstone and sandstone with intercalating shales. This latter sequence forms the transition from marine sediments to massive continental sands at the base of the overlying Gates Member of the Commotion Formation. The variable nature of the transition sequence accounts for the overall variation in the formation which ranges from 120m (400 feet) to 215m (700 feet) in thickness. Exposure of Moosebar sediments is normally restricted to areas of high relief where creek channels or gulleys often cut along the strike of the beds.

5. Commotion Formation

Gates Member

The Gates Member (or Formation), which ranges in thickness from 260m (860 feet) to 290m (950 feet), lies conformably over the Moosebar Formation and contains the bulk of the coal reserves explored to date on the Quintette property. The lower portion of the formation consists of massive, light-grey, medium grained sandstone, with minor carbonaceous and conglomeritic horizons, and is tentatively referred to as the Quintette Member. Four, and perhaps five, cyclic sequences of coal

CONFIDENTIAL

deposition occur above the Quintette Member within about 90m (300 feet) of section. Cycles normally begin with laminated medium to fine grained sandstone and grade to carbonaceous shale and coal. Lenses of conglomerate may also be found in this section which weathers to a light to medium orange rubble where exposed above the treeline. In general, coal seams developed in the upper 3 or 4 zones reach a maximum thickness of about 3m (10 feet), whereas coal seams developed in the lower zone are usually those which show the greatest thickness (up to 3.5 to 12 metres or 12 to 40 feet) and continuity. Excellent correlation of coal seams has been possible over distances up to 8 miles and with continued exploration it is felt such correlation for the entire property will be possible, whereas at present some regional correlations must be considered tentative.

A massive medium to coarse conglomeritic sandstone or pebble conglomerate sequence with an average thickness of about 18 metres (60 feet) overlies the first coal horizon (D seam) in the Middle Gates. The unit, which is known as the Babcock Member, is very resistant as the conglomerates contain a high degree of chert and silicious cement and thus the Member forms a useful marker in locating the Middle Gates coal bearing horizon. A predominantly shale sequence referred to as the Upper Gates Member overlies the Babcock Member. It contains intercalating sandy shale or very fine sandstone and poorly developed coal. Three coal zones (A, B and C) have been located in this sequence; however, they have not yet been found to contain sufficient thickness, quality and

CONFIDENTIAL

continuity to be given economic consideration. A very thin bed of chert pebbles with feruginous cement marks the contact of the overlying marine sediments of the Hulcross Formation.

Hulcross Member

The Hulcross Member consists of between 75m (250 feet) and 105m (350 feet) of rubbly or blocky, medium to dark grey shale with thin interbeds of siltstone and very fine sandstone. Sandstone and siltstone interbeds are more prevalent near the top of the formation where a few kaolinite beds have also been observed. The formation is more homogenous near the base and contains sideritic concretions.

Boulder Creek Member

The Hulcross marine shale grades conformably into shale, graywacke and conglomerate of the Lower Boulder Creek Member. The middle part of the member consists of alternating medium to fine-grained sandstone and shale, while the upper part consists of massive conglomerate and conglomeritic sandstone. The Upper Boulder Creek lithology closely resembles that of the Babcock Member in the Gates. An average thickness of 165 metres (550 feet) has been measured in this member.

6. Shaftesbury Formation

The lower portion of the Shaftesbury Formation, consisting of dark-grey to black marine shale with minor siltstone, overlies the Boulder Creek Member and completes the

CONFIDENTIAL

stratigraphy exposed at Quintette. This formation closely resembles Hulcross shale. Exposures of the Shaftesbury Formation are restricted to the axes of major synclines at high elevations and to the north-eastern border of the licence area.

REGIONAL GEOLOGICAL STRUCTURE

The regional structure within the Quintette property is best illustrated on the map QNTT-71-100-R11 accompanying this report. This map shows that the primary structural controls are the large thrust faults which define the coal field. Within the Quintette property, in areas which contain the coal-bearing formations, the main geological structures are broad synclines and sharper anticlines which are separated by medium to high angle thrust faults and zones of more highly deformed Nikanassin Formation. The faults dip to the south-west and have vertical displacement in the order of 100 metres. This probably indicates that they are splays from the major faults system which defines the northeastern boundary of the coal field and may underlie it.

Geological structures and topography, to a large extent, define the coal reserve areas within the Quintette property. This is most obvious in some of the proposed open pits where the coal reserves are entirely contained within synclines which form topographic highs. The Roman Mountain, Sheriff and Frame Pits are good examples of this. The underground reserves are located in large, structurally continuous blocks on the limbs of anticlines and synclines. It is important to note that faulting is not frequent within these structures, although it does become more frequent as the degree of structural

CONFIDENTIAL

deformation increases. For example, the Roman Mountain reserves, which are located in a tight chevron fold, more often contain small faults than those in the much broader (flat) Babcock Mountain structure where the few faults that have been observed have displacements in the order of only 5 or 10 metres. In any case, the faulting that is present is not expected to have a significant effect on the mineability of the various reserves.

REGIONAL CORRELATION

Within the Quintette property three stratigraphic units are particularly valuable for regional correlation. These are the distinctive Cadomin conglomerate and the Moosebar and Hulcross shales. Although there is some similarity between the Hulcross and Moosebar shales they can usually be distinguished by their relationships to surrounding strata and the absence of glauconitic sands at the base of the Hulcross. Once they have been identified the two main coal bearing units, the Gates Member and the Gething Formation, are easily distinguished.

The regional correlation of the important formations and coal zones on the Quintette property is presented in drawing QNTT 76-0647-R01 of this report. This drawing, which is composed of composite type sections from each of the major reserve areas, demonstrates the regularity of the development of the strata in this area. It is also evident from this illustration that all of the important coal development within the Gates Member occurs between the persistent and readily defined Babcock and Quintette sandstones.

CONFIDENTIAL

The Babcock sandstone unit overlies seam D and this seam has been used as the datum for correlation. Seam J is located just above the Quintette sandstones or, occasionally, above siltstones and shales that separate it from local developments of seam K (for example, in the Babcock and Roman Mountain areas).

Between these two widespread coal zones there is considerable variation in the E and F seam developments which may effectively constitute a separate coal zone. In the Sheriff area these seams appear to coalesce to form a significant coal zone containing approximately 7 metres of coal.

Seam G is developed below seams E and F, but only in the area from Babcock Mountain north to the Wolverine area. It attains a thickness of about 1 to 2 metres and is only locally significant.

It is now apparent that seam I is essentially a split from seam J as the two seams merge in a number of places, forming very significant widths of mineable coal (Roman Mountain, Quintette trend, Sheriff Pit, and Perry Creek anticline). Seam K is also apparently a split from seam J as the two seams nearly merge in the Little Windy portion of the Windy pit at Babcock.

In the Gething Formation, the major coal zones have not been as well documented as they are in the Gates Member. However, it is clear that the Bird zone or seam is regionally continuous. The relationship of the Skeeter and Chamberlain seams to this zone is uncertain and they may form a separate zone or be part of the Bird zone. In the Wolverine and Murray

CONFIDENTIAL

(Sheriff and Frame) areas of the property these seams are well separated by about 30 metres of strata but they apparently merge in the southern part of the property (Babcock, Quintette trend, Roman Mountain). At Five Cabin, just a short distance from Roman Mountain, only a remnant of the Bird zone is present but a seam which is very similar in characteristics to the Chamberlain seam is well developed (3 metres thick).

The middle coal zone of the Gething Formation has only been documented in a few places and so far it is only known to attain economic thickness in the Wolverine area where one split is about 2.5 metres thick. More exploration is required before the full significance of this zone can be determined, particularly in the Meadow prospect in the Murray area where apparently significant sub-crops of coal have been found at this stratigraphic level.

The Lower or basal coal zone of the Gething Formation has only been observed persistently in the Wolverine west and Meadow prospect areas. This seam appears to have a thickness of from 3 to 6 metres in these areas and could represent an important source of low volatile coal. In the southern part of the property this zone appears to be replaced by sandstones and conglomerates.

CONFIDENTIAL**1.2 COAL RESERVES**

The Quintette property is comprised of a number of areas within which varying degrees of exploration and development work have been done. As a consequence, large reserves of medium volatile coking coal and of some low volatile coal have been identified in a variety of potential mining conditions. These reserves now amount to over 2.5 billion metric tonnes of theoretical coal in place.

Map numbers QNTT-76-0656-R01 and QNTT-76-0657-R01 outline the areas for which reserves have been recently recalculated on the basis of the 1975 mapping and drilling program and earlier drilling and trenching programs. These maps and this reserve calculation combine all the known reserves regardless of the degree to which they have been explored. As a consequence, the reserves associated with the various mining proposals are included in this total resource figure and are not in addition to it.

The total theoretical coal in place reserve for the Quintette property is summarized in the tables on the following pages. It should, of course, be understood that these reserve estimates are only approximate except in those areas where detailed reserve estimates have been made (i.e. for Babcock, Sheriff, Frame, part of Wolverine, etc; see the following sheet). The basic method of calculation has been to assign a thickness of coal to each area based on a few known measurements in the area or adjacent to it and to apply this coal thickness to the entire area, corrected from a conservatively selected average dip in that area. Areas which are structurally complex have been omitted from the estimates at the present time, even though it is reasonably certain coal seams exist there and may have open pit mining potential.

CONFIDENTIAL

REGIONAL RESERVES
QUINETTE COAL LICENCES

TOTAL THEORETICAL COAL IN PLACE*

<u>AREA</u>	<u>GETHING FORMATION (Kgt)</u>	<u>GATES MEMBER (Kcm(g))</u>	<u>THEORETICAL COAL IN PLACE METRIC TONS x 10⁶</u>
Babcock	117	1464	1581
Five Cabin	100	39	139
Murray	166	61	227
Wolverine	239	325	564
TOTAL	<u>622</u>	<u>1889</u>	<u>2511 *</u>

- * Theoretical Coal in place represents the basic geological resource of the Quintette licence areas and includes those areas for which detailed reserve calculations have been prepared. Clean coal product availability is not implied as such estimates are provided only in the detailed calculations for specific mine plans.

Specific gravity used = 1.4

QUINETTE COAL LICENCES

BABCOCK AREA

TOTAL THEORETICAL COAL IN PLACE

<u>AREA</u>	<u>FORMATION</u>	<u>ESTIMATED AGGREGATE COAL THICKNESS</u>	<u>THEORETICAL COAL IN PLACE METRIC TONS x 10⁶</u>
Mitsui 1974 Reserve Area	KCm(g) KGt Bird seam	See detailed calculation 1974 Report	699 52
Denison 1972 Reserve Area	KCm(g)	See detailed calculation 1972 Report	247
South Roman Mountain Trend	KGt Bird seam	4.6m	9
Quintette Mountain South	KGt Bird seam KCm(g)	4.6m 14.0m.	56 518
		Babcock area sub-total	<u>1581</u>

CONFIDENTIAL

QUINETTE COAL LICENCES

MURRAY AREA

TOTAL THEORETICAL COAL IN PLACE

<u>AREA</u>	<u>FORMATION</u>	<u>ESTIMATED AGGREGATE COAL THICKNESS</u>	<u>THEORETICAL COAL IN PLACE METRIC TONS x 10⁶</u>
Murray West	KGt Bird, and Skeeter/Chamberlain and basal coal	5.5m	40
Meadow	KGt Bird, and Skeeter/Chamberlain seams and basal coal	12.6m	126
Sheriff	KCm(g)	12.5m	36
Frame	KCm(g)	20.0m	25
		Murray area sub-total	<u>227</u>

CONFIDENTIAL

QUINTETTE COAL LINCENCES

WOLVERINE AREA

TOTAL THEORETICAL COAL IN PLACE

<u>AREA</u>	<u>FORMATION</u>	<u>ESTIMATED AGGREGATE COAL THICKNESS</u>	<u>THEORETICAL COAL IN PLACE METRIC TONS x 10⁶</u>
Wolverine West	KCm(g)	10m	101
	KGt basal + middle coals	5m	56
Fortress Mountain	KCm(g)	6.7m	224
	KGt Skeeter and Chamberlain seams	4.7m	183
		Wolverine area sub-total	<u>564</u>

CONFIDENTIAL

QUINTETTE COAL LICENCES

FIVE CABIN AREA

TOTAL THEORETICAL COAL IN PLACE

<u>AREA</u>	<u>FORMATION</u>	<u>ESTIMATED AGGREGATE COAL THICKNESS</u>	<u>THEORETICAL COAL IN PLACE METRIC TONS x 10⁶</u>
Five Cabin North	KCm(g)	7.5m	21
	KGt Skeeter/Chamberlain Seam	3.3m	57
Five Cabin South	KCm(g)	7.0m	18
	KGt Skeeter/Chamberlain Seam	3.3m	27
Turning Mountain	KGt Skeeter/Chamberlain Seam	3.3m	16
Five Cabin area sub-total			<u>139</u>

CONFIDENTIAL

CONFIDENTIALQUINETTE PROPERTYSUMMARY OF INDICATED IN PLACE RESERVES

<u>Open Pit</u>	<u>Mineable Coal</u>	(1)
Windy	16,255,000	9.1
Roman Mountain	22,812,000	9.8
Sheriff	25,230,000	<
Frame	36,360,000	13
	61.8	
	<hr/>	
TOTAL	<u>100,657,000</u>	metric tons

Underground

Babcock #1	225,665,000
Babcock Creek Area	251,122,000
Babcock Creek South Area	57,449,000
No. 2	48,934,000
No. 3	52,011,000
No. 4	105,482,000
Caribou South (No. 2 South)	81,276,000
Waterfall Creek Area	131,665,000
	<hr/>
TOTAL	<u>953,604,000</u> metric tons

COMBINED TOTAL 1,054,261,000 metric tons

- (1) The Mineable Coal tonnage does not include any "in seam" or "out of seam" dilution.

Pages 1-21 to 1-23 of this report contain coal quality data, and remain confidential under the terms of the *Coal Act Regulation*, Section 2(1). They have been removed from the public version.

http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/10_251_2004