QUINTETTE COAL LIMITED

1975 EXPLORATION & DEVELOPMENT REPORT

CONFIDENTIAL

OPEN FILE

Coal Licences: [illegible]2[illegible] - [illegible]00[illegible], [illegible]592 - [illegible]0[illegible]
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N.T.S. Reference: 93-I-14 & 15, 93-P-3

PR-QUINTETTE 75(1)A.

Operator: Denison Mines (BC) Limited

G. P. Gormley
January, 1976

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6. 1975 Exploration & Development		
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	Quintette Regional Geology 1:50,000	Back Pocket
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SECTION	ITEM	LOCATION
6. 1975 Exploration & Development		
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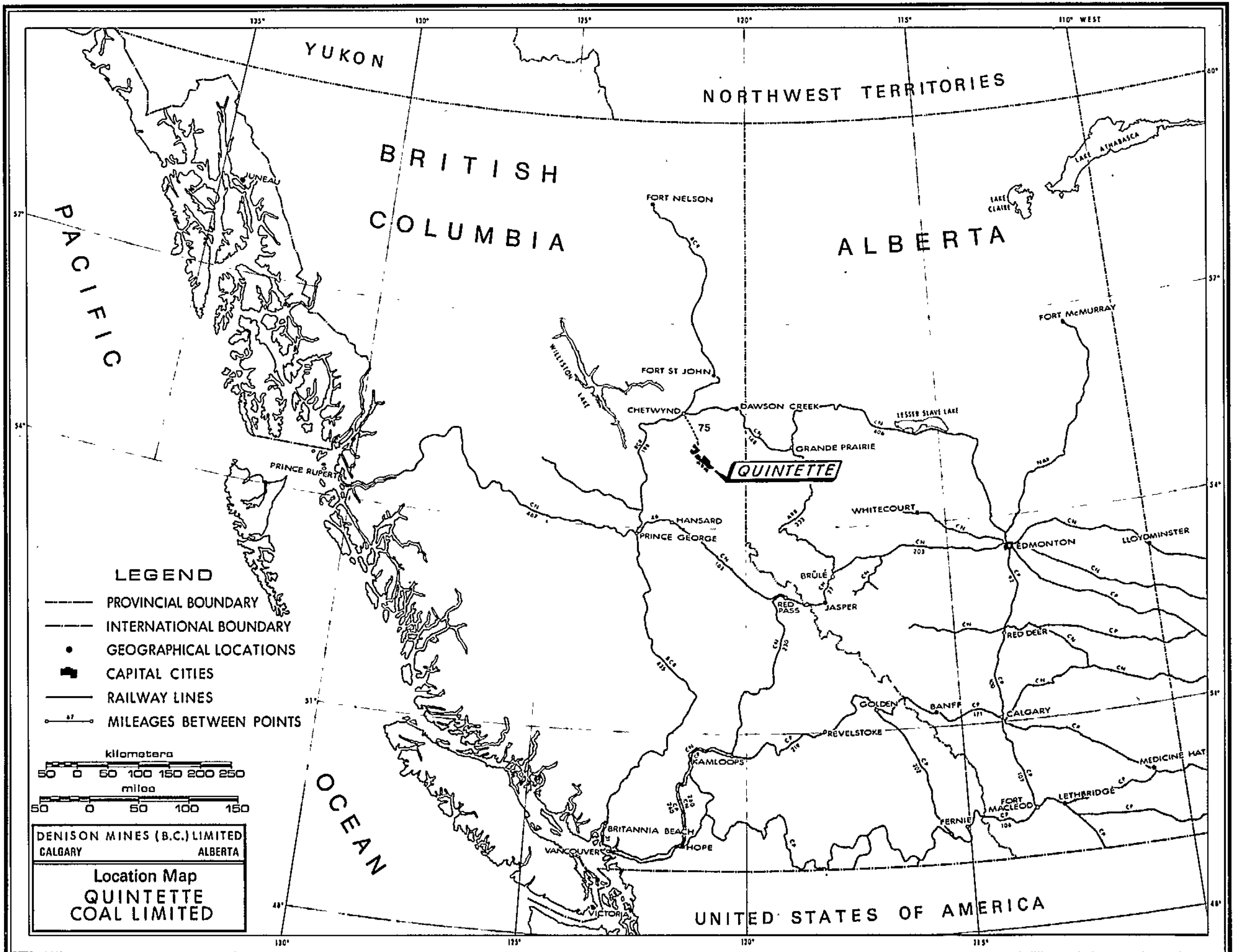
1. PREFACE

Previous reports have dealt with the general geology of the Quintette Property and with the reserve developments of specific areas. This report documents the interpretation of results from the 1975 program, however, the incorporation of all of this data into detailed reserve calculations is not complete at the present time. The general geology and reserves for the property have been summarized in a separate section of this report, it should be noted that reserves stated for the Windy, Roman Mountain and Sheriff and Frame areas are preliminary and subject to revision.

2. SUMMARY

The 1975 exploration and development field program on the Quintette Coal Licences commenced May 15th, 1975. A total of approximately 104 line miles of geological traverses were undertaken to update regional maps on as much of the entire property as was possible and to provide detailed geology in the Windy, Roman Mountain, Sheriff and Frame open pit prospects. A total of 4,846 feet of diamond drilling and 7,306 feet of rotary percussion drilling were completed in the open pit areas and supplemented by 3.5 miles of trenching. Geophysical logs were run in the drill holes and 247 coal seam samples were taken from drill core and composited for washability analysis. Reclamation was undertaken in all areas investigated prior to the cessation of work on October 9th, 1975.


YUKON
NORTHWEST TERRITORIES
BRITISH COLUMBIA
ALBERTA
PACIFIC
OCEAN
UNITED STATES OF AMERICA
JUNEAU
FORT NELSON
FORT ST JOHN
CHETWYND
DAWSON CREEK
75
QUINTETTE
GRANDE PRAIRIE
LESSER SLAVE LAKE
LAKE ATHABASCA
LAKE CLAIRE
FORT McMURRAY
WILLISTON LAKE
PRINCE RUPERT
HANSARD
PRINCE GEORGE
WHITECOURT
EDMONTON
LLOYDMINSTER
BRÛLÉ
RED PASS
JASPER
RED DEER
GOLDEN
BANFF
CALGARY
REVELSTOKE
KAMLOOPS
MEDICINE HAT
FORT MACLEOD
LETHBRIDGE
FERNIE
BRITANNIA BEACH
HOPE
VANCOUVER
VICTORIA
LEGEND
PROVINCIAL BOUNDARY
INTERNATIONAL BOUNDARY
GEOGRAPHICAL LOCATIONS
CAPITAL CITIES
RAILWAY LINES
MILEAGES BETWEEN POINTS
kilometers
50 0 50 100 150 200 250
miles
50 0 50 100 150
DENISON MINES (B.C.) LIMITED
CALGARY ALBERTA
Location Map
QUINTETTE
COAL LIMITED

3. INTRODUCTION

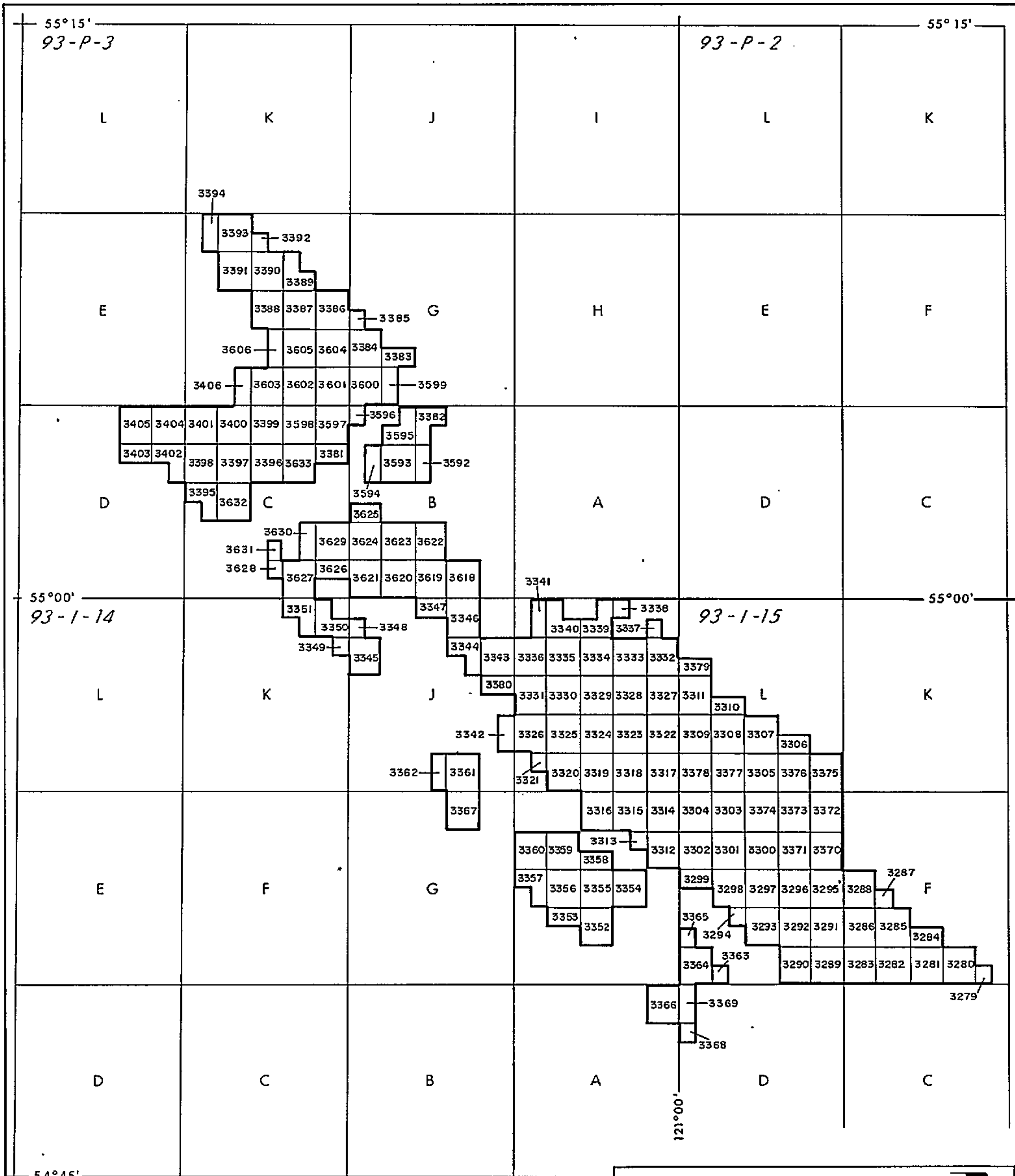
Snow removal and maintenance of the main access road to the Babcock camp site were commenced May 15th, 1975 and a 40 man (12 trailer) camp was functional by the first week in June. Using this camp as a base, regional geological mapping of a large portion of the Quintette licences and detailed geological mapping trenching and drilling of the Windy and Roman Mountain Pit areas was undertaken prior to the camp closure on September 15th. Some of the staff were then transferred to a camp in the Murray area where detailed mapping, trenching and rotary drilling were undertaken until the cessation of exploration on October 9th, 1975.

4. LOCATION, ACCESS AND LOCAL RESOURCES

The location, access, local resources and preliminary concepts of infrastructure have been presented on 1:250,000 map sheets 93I & P in the back flap of this text.

5. LICENCE DESCRIPTION

LEGAL DESCRIPTION OF QUINTETTE COAL LICENCES



DENISON MINES (B.C.) LIMITED
(COAL DIVISION)
CALGARY ALBERTA

QUINTETTE COAL LICENSES

DRAWN BY: E. Toth	DATE: Apr. '75	SCALE: 1:250,000
APPROVED BY:	DRAWING NO: QNTT 75 - 0563 - R01	

LEGAL DESCRIPTION OF QUINTETTE COAL LICENCES

Licence Number	Date Issued	Series	Block	Units	Acreage (more or less)
3370	Nov. 25/74	93-I-15	E	61,62,71,72	736
3371	Nov. 25/74	93-I-15	E	63,64,73,74	736
3372	Nov. 25/74	93-I-15	E	81,82,91,92	736
3373	Nov. 25/74	93-I-15	E	83,84,93,94	736
3374	Nov. 25/74	93-I-15	E	85,86,95,96	736
3375	Nov. 25/74	93-I-15	L	1,2,11,12	735
3376	Nov. 25/74	93-I-15	L	3,4,13,14	735
3377	Nov. 25/74	93-K-15	L	7,8,17,18	735
3378	Nov. 25/74	93-I-15	L	9,10,19,20	735
3379	Nov. 25/74	93-I-15	L	69,70	368
3279	Oct. 16/74	93-I-15	F	2	185
3280	Oct. 16/74	93-I-15	F	3,4,13,14	737
3281	Oct. 16/74	93-I-15	F	5,6,15,16	737
3282	Oct. 16/74	93-I-15	F	7,8,17,18	737
3283	Oct. 16/74	93-I-15	F	9,10,19,20	737
3284	Oct. 16/74	93-I-15	F	25,26	369
3285	Oct. 16/74	93-I-15	F	27,28,37,38	737
3286	Oct. 16/74	93-I-15	F	29,30,39,40	737
3287	Oct. 16/74	93-I-15	F	48	184
3288	Oct. 16/74	93-I-15	F	49,50,59,60	736
3289	Oct. 16/74	93-I-15	E	1,2,11,12	737
3290	Oct. 16/74	93-I-15	E	3,4,13,14	737
3291	Oct. 16/74	93-I-15	E	21,22,31,32	737
3292	Oct. 16/74	93-I-15	E	23,24,33,34	737
3293	Oct. 16/74	93-I-15	E	25,26,35,36	737
3294	Oct. 16/74	93-I-15	E	37	184
3295	Oct. 16/74	93-I-15	E	41,42,51,52	736
3296	Oct. 16/74	93-I-15	E	43,44,53,54	736
3297	Oct. 16/74	93-I-15	E	45,46,55,56	736
3298	Oct. 16/74	93-I-15	E	47,48,57,58	736
3299	Oct. 16/74	93-I-15	E	59,60	368
3300	Oct. 16/74	93-I-15	E	65,66,75,76	736
3301	Oct. 16/74	93-I-15	E	67,68,77,78	736
3302	Oct. 16/74	93-I-15	E	69,70,79,80	736

LEGAL DESCRIPTION OF QUINTETTE COAL LICENCES

Licence Number	Date Issued	Series	Block	Units	Acreage (more or less)
3303	Oct. 16/74	93-I-15	E	87,88,97,98	736
3304	Oct. 16/74	93-I-15	E	89,90,99,100	736
3305	Oct. 16/74	93-I-15	L	5,6,15,16	735
3306	Oct. 16/74	93-I-15	L	23,24	368
3307	Oct. 16/74	93-I-15	L	25,26,35,36	735
3308	Oct. 16/74	93-I-15	L	27,28,37,38	735
3309	Oct. 16/74	93-I-15	L	29,30,39,40	735
3310	Oct. 16/74	93-I-15	L	47,48	368
3311	Oct. 16/74	93-I-15	L	49,50,59,60	735
3312	Oct. 16/74	93-I-14	H	61,62,71,72	736
3313	Oct. 16/74	93-I-14	H	73	184
3314	Oct. 16/74	93-I-14	H	81,82,91,92	736
3315	Oct. 16/74	93-I-14	H	83,84,93,94	736
3316	Oct. 16/74	93-I-14	H	85,86,95,96	736
3317	Oct. 16/74	93-I-14	I	1,2,11,12	735
3318	Oct. 16/74	93-I-14	I	3,4,13,14	735
3319	Oct. 16/74	93-I-14	I	5,6,15,16	735
3320	Oct. 16/74	93-I-14	I	7,8,17,18	735
3321	Oct. 16/74	93-I-14	I	19	184
3322	Oct. 16/74	93-I-14	I	21,22,31,32	735
3323	Oct. 16/74	93-I-14	I	23,24,33,34	735
3324	Oct. 16/74	93-I-14	I	25,26,35,36	735
3325	Oct. 16/74	93-I-14	I	27,28,37,38	735
3326	Oct. 16/74	93-I-14	I	29,30,39,40	735
3327	Oct. 16/74	93-I-14	I	41,42,51,52	735
3328	Oct. 16/74	93-I-14	I	43,44,53,54	735
3329	Oct. 16/74	93-I-14	I	45,46,55,56	735
3330	Oct. 16/74	93-I-14	I	47,48,57,58	735
3331	Oct. 16/74	93-I-14	I	49,50,59,60	735
3332	Oct. 16/74	93-I-14	I	61,62,71,72	734
3333	Oct. 16/74	93-I-14	I	63,64,73,74	734
3337	Oct. 16/74	93-I-14	I	82	184
3342	Oct. 16/74	93-I-14	J	21,31	368

LEGAL DESCRIPTION OF QUINTETTE COAL LICENCES

Licence Number	Date Issued	Series	Block	Units	Acreage (more or less)
3395	Feb. 1/75	93-P-3	C	49,59,60	550
3396	Feb. 1/75	93-P-3	C	65,66,75,76	733
3397	Feb. 1/75	93-P-3	C	67,68,77,78	733
3398	Feb. 1/75	93-P-3	C	69,70,79,80	733
3399	Feb. 1/75	93-P-3	C	85,86,95,96	733
3400	Feb. 1/75	93-P-3	C	87,88,97,98	733
3401	Feb. 1/75	93-P-3	C	89,90,99,100	733
3402	Feb. 1/75	93-P-3	D	61,71,72	550
3403	Feb. 1/75	93-P-3	D	73,74	367
3404	Feb. 1/75	93-P-3	D	81,82,91,92	733
3405	Feb. 1/75	93-P-3	D	83,84,93,94	733
3406	Feb. 1/75	93-P-3	F	7,17	366
3366	Nov. 25/74	93-I-14	A	81,82,91,92	737
3367	Nov. 25/74	93-I-14	G	83,84,93,94	736
3368	Nov. 25/74	93-I-15	D	80	185
3369	Nov. 25/74	93-I-15	D	90,100	369
3380	Nov. 25/74	93-I-14	J	51,52	368
3381	Nov. 25/74	93-P-3	C	71,72	367
3382	Nov. 25/74	93-P-3	B	86,95,96	550
3383	Nov. 25/74	93-P-3	G	27,28	366
3384	Nov. 25/74	93-P-3	G	29,30,39,40	732
3385	Nov. 25/74	93-P-3	G	50	183
3386	Nov. 25/74	93-P-3	F	41,42,51,52	732
3387	Nov. 25/74	93-P-3	F	43,44,53,54	732
3388	Nov. 25/74	93-P-3	F	45,46,55,56	732
3389	Nov. 25/74	93-P-3	F	63,64,74	549
3390	Nov. 25/74	93-P-3	F	65,66,75,76	732
3391	Nov. 25/74	93-P-3	F	67,68,77,78	732
3392	Nov. 25/74	93-P-3	F	86	183
3393	Nov. 25/74	93-P-3	F	87,88,97,98	731
3394	Nov. 25/74	93-P-3	F	89,99	366

LEGAL DESCRIPTION OF QUINTETTE COAL LICENCES

Licence Number	Date Issued	Series	Block	Units	Acreage (more or less)
3334	Oct. 16/74	93-I-14	I	65,66,75,76	734
3335	Oct. 16/74	93-I-14	I	67,68,77,78	734
3336	Oct. 16/74	93-I-14	I	69,70,79,80	734
3338	Oct. 16/74	93-I-14	I	94	184
3339	Oct. 16/74	93-I-14	I	85,86,95	551
3340	Oct. 16/74	93-I-14	I	87,88,98	551
3341	Oct. 16/74	93-I-14	I	89,99	367
3343	Oct. 16/74	93-I-14	J	61,62,71,72	734
3344	Oct. 16/74	93-I-14	J	63,73,74	551
3345	Oct. 16/74	93-I-14	J	69,70,79,80	734
3346	Oct. 16/74	93-I-14	J	83,84,93,94	734
3347	Oct. 16/74	93-I-14	J	95,96	367
3348	Oct. 16/74	93-I-14	J	90	184
3349	Oct. 16/74	93-I-14	K	71	184
3350	Oct. 16/74	93-I-14	K	81,82,92	551
3351	Oct. 16/74	93-I-14	K	83,93,94	551
3352	Oct. 16/74	93-I-14	H	25,26,35,36	737
3353	Oct. 16/74	93-I-14	H	37,38	368
3354	Oct. 16/74	93-I-14	H	43,44,53,54	736
3355	Oct. 16/74	93-I-14	H	45,46,55,56	736
3356	Oct. 16/74	93-I-14	H	47,48,57,58	736
3357	Oct. 16/74	93-I-14	H	49,59,60	552
3358	Oct. 16/74	93-I-14	H	65,66	368
3359	Oct. 16/74	93-I-14	H	67,68,77,78	736
3360	Oct. 16/74	93-I-14	H	69,70,79,80	736
3361	Oct. 16/74	93-I-14	J	3,4,13,14	735
3362	Oct. 16/74	93-I-14	J	5,15	368
3363	Oct. 16/74	93-I-15	E	8	185
3364	Oct. 16/74	93-I-15	E	9,10,19,20	737
3365	Oct. 16/74	93-I-15	E	30	185
3592	Apr. 29/75	93-P-3	B	66,76	367
3593	Apr. 29/75	93-P-3	B	67,68,77,78	733
3594	Apr. 29/75	93-P-3	B	69,79	367

LEGAL DESCRIPTION OF QUINTETTE COAL LICENCES

Licence Number	Date Issued	Series	Block	Units	Acreage (more or less)
3595	Apr. 29/75	93-P-3	B	87,88,97	550
3596	Apr. 29/75	93-P-3	B	100	184
3597	Apr. 29/75	93-P-3	C	81,82,91,92	733
3598	Apr. 29/75	93-P-3	C	83,84,93,94	733
3599	Apr. 29/75	93-P-3	G	8,18	366
3600	Apr. 29/75	93-P-3	G	9,10,19,20	732
3601	Apr. 29/75	93-P-3	F	1,2,11,12	732
3602	Apr. 29/75	93-P-3	F	3,4,13,14	732
3603	Apr. 29/75	93-P-3	F	5,6,15,16	732
3604	Apr. 29/75	93-P-3	F	21,22,31,32	732
3605	Apr. 29/75	93-P-3	F	23,24,33,34	732
3606	Apr. 29/75	93-P-3	F	25,35	366
3618	May 27/75	93-P-3	B	3,4,13,14	734
3619	May 27/75	93-P-3	B	5,6,15,16	734
3620	May 27/75	93-P-3	B	7,8,17,18	734
3621	May 27/75	93-P-3	B	9,10,19,20	734
3622	May 27/75	93-P-3	B	25,26,35,36	734
3623	May 27/75	93-P-3	B	27,28,37,38	734
3624	May 27/75	93-P-3	B	29,30,39,40	734
3625	May 27/75	93-P-3	B	49,50	367
3626	May 27/75	93-P-3	C	11,12	367
3627	May 27/75	93-P-3	C	3,4,13,14	734
3628	May 27/75	93-P-3	C	15	184
3629	May 27/75	93-P-3	C	21,22,31,32	734
3630	May 27/75	93-P-3	C	23,33	367
3631	May 27/75	93-P-3	C	25	184
3632	May 27/75	93-P-3	C	47,48,57,58	733
3633	May 27/75	93-P-3	C	63,64,73,74	733

1975 EXPLORATION AND DEVELOPMENT

6.1 GEOLOGICAL MAPPING

6.1.1 REGIONAL GEOLOGY

Results of the regional mapping are summarized on the 1:50,000 map and cross-sections included at the end of this text. The work was undertaken on 1-inch to 200-foot topographic map sheets in the field and later transferred to the 1-inch to 400-foot base sheets which form Appendix 'A'. Four 2-man geological teams (see acknowledgements) were supported by a Hughes 500 Helicopter to accomplish this work. The actual mapping system used was that of a "modified plane table" system, in which the location of all outcrops on a traverse are surveyed and all pertinent geological information placed directly on the topographic map in the field. This year's regional work was concentrated on all the licences north of the Murray River and in the Five Cabin area south of the Murray River and is illustrated on the 1:50,000 traverse map at the end of this text.

6.1.2 DETAILED GEOLOGY

Detailed mapping was undertaken in three open pit prospect areas, namely, the Windy, Roman Mountain and Sheriff/Frame Pits. These areas are outlined on the 1:50,000 compilation map and the geological maps and cross-sections for each area have been included at the end of the text. The regional mapping system was used (1-inch:200 feet) with a greater traverse density and additional control points to increase the accuracy of the geological survey in the pit areas.

6.2 AERIAL PHOTOGRAPHY, SURVEYING AND TOPOGRAPHIC MAPPING

At the request of Denison Mines (BC) Limited, Burnett Resource Surveys Ltd. undertook a program of aerial photography aimed at assisting exploration on the Quintette, Saxon and Belcourt coal properties.

This program was designed to achieve the following results:

1) A semi-controlled mosaic which included the three coal properties could be prepared;

2) Utilization of this photography to carry out photogrammetric mapping at various scales and contour intervals;

3) The aerial photography survey could be used to assist intensive environmental surveys;

4) Photo geological studies could be carried out;

5) Transportation routes such as rail or pipeline could be detailed and refined;

6) Assistance could be given to solving various problems concerning plant site, pit design and infrastructure.

Keeping all the above in mind we designed the following program:

1) High level photography to cover approximately 250 sq. miles of area at the approximate scale of 1:32,000.

2) High level photography to cover approximately 800 sq. miles at 1:25,000.

3) Medium level photography to cover approximately 455 sq. miles at 1:15,000 approximate scale.

4) Low level photography to cover approximately 50 sq. miles at the approximate scale of 1:10,000.

   Note: All above photography was black/white photography on panchromatic film.

5) Colour photography at the approximate scale of 1:12,000 covering approximately 100 sq. miles.

Colour photography utilized an aero-colour film 2445 and 2448.

The various photo scales were selected in such a manner as to be suitable for various purposes, especially compilation of metric photogrammetric maps.

The photography was carried out in the months of August and September of 1975, at a time when much of the ground work was completed. Thus, diamond drill holes, road location and target could be documented.

Several sets of prints were dispatched, immediately after photography, to Denison Mines (BC) Limited, so that these could be utilized in the field by the geologist as well as the survey crews for the remainder of the season.

Control Survey:

During the summer, ground crews undertook survey control work on the coal properties. In early spring, targets of different sizes for various photo scales were laid on the ground. This work required a helicopter to provide transport to points of difficult access. In all, approximately 200 targets were set to control the topographic mapping. The ground parties surveyed the location of targets, drill holes and base lines, adits, etc.

The surveyors employed the most modern electronic survey equipment, in addition to conventional equipment.

All surveys are now based on U.T.M. coordinates (geodetic datum).

All coordinates are tabulated in the metric system.

Photogrammetric Mapping:

In the first quarter of 1975, Burnett Resource Surveys Ltd. undertook photogrammetric mapping of the coal properties, based on existing data. The scale chosen was 1:5,000, with 5 metre contour interval. Belcourt map sheets were designed in such a manner that each sheet consisted of four coal licenses. All maps were produced to the highest standards with regard to photogrammetry and carthography as could be gained from the existing data (Belcourt: existing NTS maps; Saxon and Quintette: existing 1" = 400', 20' contour topograph).

The maps were then utilized by the field geologist during the summer program. These maps covered the Belcourt and Saxon properties and the localized Little Windy, Big Windy and Roman Mountain areas. Additional mapping was carried out at the scale of 1" = 400' with 20' contour interval to cover the fringe areas of Wolverine, Babcock and Five Cabin areas (utilizing existing Denison control).

During 1975, Burnett Resource Surveys produced 6 - 1:25,000 preliminary maps with 20 metre interpolated contours, described above, to cover Babcock, Five Cabin and Wolverine areas. The map sheets are based on coal license areas, and the sheet layout is designed to suit future projects of detailed metric mapping. Cartography of these maps is designed in such a way that it can accommodate the geological data and still assure clarity.

A similar program of 1:25,000 scale preliminary map preparation was carried out to cover Saxon property (1 map sheet) and Belcourt property (3 map sheets); the only difference being that the contour interval is 25 metres. The difference in contour interval is due to the fact that some survey data and existing photogrammetric mapping was available to cover part of the 6 map sheets for the Wolverine, Babcock and Five Cabin areas, but no ground control survey or mapping was available for the Belcourt or Saxon properties.

To facilitate environmental studies, colour as well as the black/white photography was provided.

As indicated, all photography and survey control carried out in 1975 was designed to fully "metrify" the Denison properties. Further survey control will be required to replace the preliminary maps with regional and detailed metric maps.

121°00'
55°15'
121°30'
55°15'
54°15'
120°00'
54°30'
121°45'
2nd book
75(I)A
AFTER PG. 13
1:25,000 B & W PHOTOS
1:31,000 B & W PHOTOS
1:12,000 COLOUR PHOTOS
1:10,000 B & W PHOTOS
1:15,000 B & W PHOTOS
DENISON MINES (B.C.) LIMITED
(COAL DIVISION)
CALGARY
ALBERTA
AERIAL PHOTO PROGRAM
INDEX MAP
DRAWN BY: E. Toth
DATE: Dec. '75
SCALE: 1 : 250,000
APPROVED BY:
DRAWING NO: QNTT 75 - 0621 - R01

Data Base

a) Geological mapping.

b) 8 diamond drill holes.

Method of Calculation

a) The data for this reserve has been extracted from the Denison Mines Limited report on the Wolverine area dated January, 1973.

b) The original calculations were based on planimetric measurements of adjoining areas of influence around each drill hole. The volume of coal was calculated by dividing these areas into sub-areas based on isopachs of seam thickness. Specific gravities used were based on the raw ash content of each total seam intersection.

WOLVERINE UNDERGROUND
PERRY CREEK ANTICLINE - EAST LIMB
SUMMARY OF RESERVES
(S.I. (Metric) Units)

Seam	Area of Coal Reserve $m^2 x 10^6$	Weighted Average Seam Thickness (metres)	Cubic Metres of Coal x 10^6	Weighted Average Specific Gravity	Coal in Place* M.T.x10^6	Mining Recovery (Estimated)** %	Net Raw Coal to be Mined M.T.x10^6	Preparation Plant Yield (Theoretical Less 5%)*** %	Net Clean Coal Reserve M.T.x 10^6
Gates No.1	9.01	2.29	20.60	1.404	28.92	65	18.80	77.77	14.62
Gates No.2	4.67	2.59	12.10	1.483	17.94	60	10.76	59.46	6.40
Gething II	8.41	2.09	17.58	1.466	25.77	60	15.46	58.69	9.07
Gething III	8.41	1.90	15.98	1.376	21.99	60	13.19	88.39	11.66
TOTALS					94.62		58.21	71.83	41.75

Estimated raw coal production capacity****(1.1 million tonnes per year) for first 20 years = 22 million tonnes.

Estimated clean coal production capacity (0.75 million tonnes per year) for first 20 years = 15 million tonnes.

Production capacity could be increased to 1.5 million tonnes of clean coal if reserves on the west flank are substantiated.

* Reserve data re-formatted from report by Denison Mines Limited, January 1973.

** No mine plans have been developed for this area. Mining recoveries are conceptual only, based on conventional (room and pillar) extraction.

*** Dilution has not been estimated, except by decreasing theoretical yields by 5%.

**** Production from this area, in the first stage, is expected to come primarily from the Gates seams as the clean coal from these seams is expected to have better coking characteristics (F.S.I. 6 to 8.5) and they are closer to the surface.

Open Pit Reserves - Babcock Area

Windy Pit

Geological Notes

The Windy Pit area is the surface extension of the Babcock No. 1 Mine underground reserve. The area within the pit is essentially a broad, nearly flat syncline. Within the area there is one significant roll in the floor of Seam D which probably projects, down section, into a small fault in Seams J and K. Another small fault has been found in the Big Windy area and a fault complex has been discovered associated with the previous known fault in the Little Windy area.

Most of these faults do not have a significant effect on reserves. The Little Windy fault zone, however, may have an effect on coal oxidation through ground water circulation on the fault plane. Based on this concept, a liberal deduction for additional coal oxidation has been made on the plans for each seam in this area.

In 1975 a number of holes were drilled to test the zones of oxidation for each seam in this area. As a result, it has been established that the depth of oxidation on relatively well-sloped land is 50 feet or less, but that on the "flat" areas of Big and Little Windy the oxidation may be as deep as 200 feet. On the basis of the drilling results, oxidation maps were prepared for each seam and these were used to estimate the remaining fresh coal in the pit area.

Reserves have been calculated for a number of pit designs with different locations of the pit high-wall. These calculations have shown an optimum strip ratio of 7.8 metres to 1 metric ton, based on the data now available. The reserves for this pit are summarized in the table in this section.

Data Base

a) Detailed geological mapping.
b) 30 drill holes (rotary and diamond).
d) 10 successful adits (see also Babcock No. 1 Mine).

Method of Calculation

a) Seams greater than 1 metre and rock bands less than 1 metre thick which were overlain and underlain by coal were included in the reserve.

b) A mining loss of 30cm of coal was assumed for each seam.

c) Oxidized coal was considered to be waste material.

d) Each seam was isopached and planimetered to obtain both the volume of coal and the volume of rock. Weighted average thicknesses were calculated using the total volume and total area of the seam, as calculated by this method.

e) The total volume of rock and coal was calculated by planimetering each 100 ft contour between the pit walls and the base of Seam K.

f) Coal and rock were tabulated separately and tonnages for each were calculated using specific gravities of 1.4 and 1.9 respectively.

g) Clean coal recoveries were estimated by assuming that 90% of the coal only portion of the mining section (calculated after deducting 30cm for mining loss) would be obtained as clean coal.

h) With the exception of Seam E, only those seam sections with a calculated clean coal recovery of 65% or better were included in reserves.

i) As dips are usually less than 10 degrees, no correction of seam thickness was made.

WINDY PIT

SUMMARY OF RESERVES

(S.I. (Metric) Units)

Seam	Area of Unoxidized Coal*	Weighted Average Coal Thickness**	Weighted Average Thickness Mined Dilution	Cubic Metres Coal	Cubic Metres Mined Dilution	M.T. Mined Coal (Sp.Gr. 1.40)	M.T. Mined Dilution (Sp.Gr. 1.90)	Total M.T. Raw Coal Mined***
	Sq.m	metres	metres	x 10^6	x 10^6	x 10^6	x 10^6	x 10^6
D	0.215	2.34	0.34	0.503	0.073	0.704	0.139	0.843
E	0.355	1.77	0.85****	0.628	0.302	0.880	0.573	1.453
F	0.396	1.79	0.34	0.709	0.135	0.992	0.256	1.248
G	0.426	1.19	0.09	0.507	0.038	0.710	0.073	0.783
J,K	0.830	5.07	0.88	4.208	0.730	5.891	1.388	7.279
TOTALS		12.16		6.555	1.278	9.177	2.429	11.606

Total Rock Volume (including all coal and mined dilution = 98,510,000 cubic metres.

$$\text{Strip Ratio} = \frac{\text{Total Rock Volume - (vol. coal mined + vol. mined dilution)}}{\text{(Tons of coal mined + tons dilution mined)}} = 7.8 \text{ cu.m/M.T.}$$

* Area of Unoxidized Coal = sum of measured plan areas uncorrected for dip as dips are generally less than 10 degrees.

** Weighted Average Coal Thickness = measured thicknesses less 30cm for mining loss as the coal only portion of the seam thickness, weighted by planimetry of coal isopachs.

*** Raw Coal Mined = mined coal + mined dilution.

**** Estimate of clean coal recovery is less than 65%, but Seam E is retained in reserves due to its exceptional quality (clean).

Open Pit Recovery - Babcock Area

Roman Mountain Pit

Geological Notes

The Roman Mountain pit is located within a fairly simple chevron fold. This fold is somewhat complicated by small drag folds and minor faulting but it is not expected that these structures will impede mining. The drag folds may even increase coal thicknesses locally.

The main difficulty in mining this structure may be found in removing the three uppermost seams, D, E, and F, as total seam thicknesses are only about 1.5 and 2.5 metres. The entire abandonment of these upper seams would increase the strip ratio to about 7.4 cubic metres per metric ton and would reduce the clean coal reserve to about 13.4 million metric tons.

Data Base

a) Detailed geological mapping.
b) 4 trenches.
c) 11 rotary drill holes.
d) 2 diamond drill holes.

Method of Calculation

a) The following criteria were used to determine whether or not a seam would be included in reserves.
   i) Minimum average thickness of 1.5 metres including rock bands no greater than 1 metre.
   ii) Estimated clean coal recovery of 65% or better, based on 90% of the coal in the section being recovered.

b) Coal to a depth of 50 feet was assumed to be oxidized and was considered to be waste material.

c) Mining loss was assumed to be 30cm of coal from each seam.

d) The numerical average of the coal seam thicknesses and the dilution thicknesses were used for each seam, using only those data points from trenching and drilling which were considered completely reliable (some drilling and trenching was near faults or disturbed bedding). There was not sufficient data to justify preparing isopach maps for each seam.

e) Structure contour maps were prepared for each seam and the seam volumes were calculated by measuring areas of similar dip on these plans and correcting to true area by multiplying by the secants of the dips and by the coal and rock thicknesses.

f) The total volume of rock was calculated by planimetering the area of each 100 foot topographic contour between the land surface and, where appropriate, the structure contour of the base of Seam J.

g) Coal and rock were tabulated separately and tonnages for each were calculated by using specific gravities of 1.4 and 1.9 respectively.

ROMAN MOUNTAIN PIT
SUMMARY OF RESERVES
(S.I. (Metric) Units)

Seam	Area of Unoxidized Coal *	Average Coal Thick-ness **	Average Thickness Mined Dilution	Cubic Metres Coal	Cubic Metres Mined Dilution	M.T. Coal Mined (Sp.Gr. 1.40)	M.T. Mined Dilution Sp.Gr. (1.90)	Total M.T. Raw Coal Mined ***
	Sq.metres	metres	metres	x 10^6	x 10^6	x 10^6	x 10^6	x 10^6
D	386,011	2.13	0.31	.822	.119	1.151	.227	1.378
E	476,778	1.29	0.32	.615	.153	0.861	.290	1.151
F	832,132	1.53	0.16	1.273	.133	1.782	.253	2.035
I	1,256,048	3.15	0.45	3.957	.565	5.539	1.074	6.613
J	1,257,163	5.29	0.29	6.650	.365	9.311	.693	10.004
TOTALS				13.317	1.335	18.644	2.537	21.181

Total Rock Volume (including all coal and mined dilution) = 133,578,000 cubic metres.

$$\text{Strip Ratio} = \frac{\text{Total Rock Volume} - (\text{vol. coal} + \text{vol. mined dilution})}{(\text{tonnes of coal mined} + \text{tonnes mined dilution})} = 5.62 \text{ cu.m/metric ton.}$$

* Area of Seam = sum of measured plan areas corrected for dips (i.e. multiplied by secants).

** Average Coal Thickness = average seam thickness (approximate) less 30cm mining loss.

*** Raw Coal Mined = coal mined + mined dilution.

Open Pit Reserves - Wolverine Area

Sheriff Pit

Geological Notes

The Sheriff Pit is located on Mast Ridge, the topographic high which divides the headwaters of Mast Creek and the Wolverine River from those of the Murray River. The geological structure of the main reserve area consists of a rather complex syncline which overlies a large thrust fault. To the southwest a smaller syncline adjoins this structure and the reserves of both are combined in the reserve table for this area. No reserves have been located below the main fault and that area is a prime candidate for future exploration.

The Sheriff Pit contains two major coal seams, Seam E which is about 7 metres thick, and Seam J which is 8 to 9 metres thick. These two seams constitute the bulk of the reserves. While Seam E does not meet the general requirement for reserve status, as its estimated clean coal recovery is only about 58%, it is retained in the reserves as its inclusion does not reduce the overall estimated recovery below 65%. (Calculated recovery is 66.5%)

No oxidation drilling has yet been done on the Sheriff pit but Seam D was oxidized below 100 ft in the first hole that was drilled. For this reason, all of Seam D is considered oxidized in the present calculations and all other seams are assumed to be oxidized to a depth of 100 ft. only?

Data Base

a) Detailed geological mapping.

b) Approximately 8 trenches.

c) One rotary drill hole, with core.

Method of Calculation

The method of calculation of reserves for the Sheriff pit was essentially the same as that for the Roman Mountain pit, with the following exceptions:

a) Rock bands included in the mined section of Seams E and J may locally exceed 1 metre in thicknesses.

b) As noted, Seam E is not removed by the 65% estimated clean coal criterion.

c) Oxidation was taken to be 100 ft.

d) No data points were rejected. Most were from trenching.

SHERIFF PIT

SUMMARY OF RESERVES

(S.I. (Metric) Units)

Seam	Area of Unoxidized Coal *	Average Coal Thick-ness **	Average Thickness Mined Dilution	Cubic Metres Coal	Cubic Metres Mined Dilution	M.T. Coal Mined (Sp.Gr. 1.40)	M.T. Mined Dilution Sp.Gr. (1.90)	Total M.T. Raw Coal Mined ***
	Sq.metres	metres	metres	$x\ 10^6$	$x\ 10^6$	$x\ 10^6$	$x\ 10^6$	$x\ 10^6$
D_S	- SEAM D CONSIDERED ENTIRELY OXIDIZED -							
E_S Deputy Syncline	46,222	7.01	2.14****	0.324	0.099	0.454	0.188	0.642
Mesa Syncline	584,841	7.07	2.90****	4.135	1.696	5.789	3.222	9.011
G_S Deputy Syncline	96,902	1.51	0.23	0.146	0.022	0.205	0.042	0.247
Mesa Syncline	614,846	1.13	0.18	0.695	0.111	0.973	0.210	1.183
J_S Deputy Syncline	197,662	8.60	2.08	1.698	0.411	2.377	0.781	3.158
Mesa Syncline	603,411	8.96	1.49	5.406	0.899	7.569	1.708	9.277
TOTALS				12.404	3.238	17.367	6.151	23.518

Total Rock Volume (including all coal and mined dilution) = 88,006,750 cubic metres.

$$\text{Strip Ratio} = \frac{\text{Total Rock Volume} - (\text{vol. coal} + \text{vol. mined dilution})}{(\text{tonnes of coal mined} + \text{tonnes mined dilution})} = 3.1 \text{ cu.m/metric ton.}$$

* Area of Seam = sum of measured plan areas corrected for dips (i.e. multiplied by secants).

** Average Coal Thickness = actual thickness less 30cm mining loss.

*** Raw Coal Mined = mined coal + mined dilution.

**** In Seam E_S estimates of clean coal recovery are less than 65%, but the seam is still included in reserves.

Open Pit Reserves - Wolverine Area

Frame Pit

Geological Notes

The proposed Frame Pit is located almost adjacent to and southwest of the Sheriff Pit along Mast Ridge. This pit area is also located in a syncline (the Mast Syncline) but the structure is significantly larger and is not directly associated with significant faulting, although there are minor faults within it. Within the Mast Syncline there is a significant reduction in coal thickness in both Seams E and J compared with their stratigraphic equivalents in the Sheriff Pit.

In the Frame Pit area, five seams are developed, all of which are between about 2 and 3 metres thick. In-seam dilution seldom exceeds 0.5 metres and this results in an estimated clean coal recovery of about 77% and, despite the higher stripping ratio, would suggest that this pit should be mined in conjunction with the Sheriff pit to provide overall recoveries of about 70%.

Data Base

a) Detailed geological mapping.

b) Approximately 5 trenches.

c) One rotary drill hole with core.

Method of Calculation

The reserves for the Frame pit area were calculated essentially as indicated for the Roman Mountain pit, with the following exception:

a) The oxidation level was assumed to be 100 ft.

FRAME PIT

SUMMARY OF RESERVES

(S.I. (Metric) Units)

Seam	Area of Unoxidized Coal *	Average Coal Thick-ness **	Average Thickness Mined Dilution	Cubic Metres Coal	Cubic Metres Mined Dilution	M.T. Coal Mined (Sp.Gr. 1.40)	M.T. Mined Dilution Sp.Gr. (1.90)	Total M.T. Raw Coal Mined ***
	Sq.metres	metres	metres	$x\ 10^6$	$x\ 10^6$	$x\ 10^6$	$x\ 10^6$	$x\ 10^6$
D_F	1,130,059	2.04	0.23	2.305	0.260	3.227	0.494	3.721
E_F	1,312,924	2.48	0.41	3.256	0.538	4.558	1.023	5.581
F_F	1,566,869	2.33	0.45	3.651	0.705	5.111	1.340	6.451
G_F	1,771,912	2.70	0.12	4.784	0.213	6.698	0.404	7.102
J_F	2,461,877	1.95	0.19	4.801	0.468	6.721	0.889	7.610
TOTALS				18.797	2.184	26.315	4.150	30.465

Total Rock Volume (including all coal and mined dilution) = 316,634,400 cubic metres.

$$\text{Strip Ratio} = \frac{\text{Total Rock Volume} - (\text{vol. coal} + \text{vol. mined dilution})}{(\text{tonnes of coal mined} + \text{tonnes mined dilution})} = 9.7 \text{ cu.m/metric ton.}$$

* Area of Seam = sum of measured plan areas corrected for dips (i.e. multiplied by secants).

** Average Coal Thickness = actual thickness less 30cm mining loss.

*** Raw Coal Mined = coal mined + mined dilution.

7. CONCLUSIONS

Continued regional and detailed geological mapping at Quintette is essential to further develop the many coal bearing structures that exist in the coal field. Various amounts of development including geotechnical studies, drilling, trenching and bulk sampling are also required to delineate the various reserve areas discovered to date. It is anticipated that the Sheriff/Frame, Roman Mountain and Windy Pits will be given continued attention during the course of the next year's development.

8. STATEMENT OF QUALIFICATIONS & ACKNOWLEDGEMENTS

I, Gordon Gormley graduated from the University of B.C. with a Bachelor of Science degree in the field of geology in 1970. For the past five years I have been involved in the exploration and development of coal properties in B.C. and Alberta including the discovery and development of the Quintette coal field and have been a registered professional geologist in the Province of Alberta for the past three years.

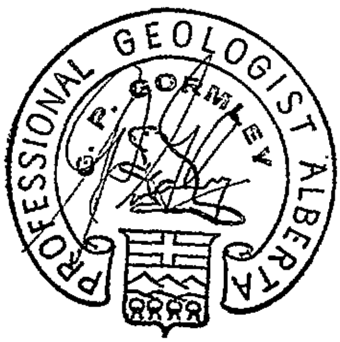
The field work described in the report was under my immediate supervision with particular acknowledgements extended to Mr. I. Kakizaki and to Mr. G. Jordan in directing the detailed and regional geological work on the property and to Mr. Alan Johnson for time spent in consultation on the planning and direction of the program. A complete list of staff on the field program is as follows:

DENISON MINES (BC) LIMITED

G. P. Gormley, Project Geologist
G. R. Jordan, Project Geologist
A. Bak, Geologist & First Aid
G. Hoffman, Geologist
C. Mankowski, Geologist
D. Thacker, Geologist
G. Perry, Geological Assistant
J. Myers, Geological Assistant
P. Meima, Geological Assistant
L. Sharpe, Geological Assistant & First Aid
A. Hooper, Field Accountant
L. Scorgie, Camp Foreman

MITSUI MINING CO., LTD.

I. Kakizaki, Chief Project Geologist
K. Kinoshita, Geologist
Y. Kawaguchi, Geologist



G. P. Gormley, P. Geol.

6.3 ROTARY DRILLING

Rotary drilling was undertaken by Garritty and Baker Drilling Company of Edmonton, Alberta between July 13th and September 28th, 1975. A Mayhew 1000 Drill Rig was equipped with hydraulic "feed" control to accommodate rotary percussion on "hammer" drilling with a Mission Megadrill and was mounted on a Nodwell RN 110 tracked vehicle. Rotary drive was supplied directly from the Nodwell and air drive was supplied by a Westinghouse Leroy 250 p.s.i. (650 c.f.m.) "piston-type" compressor. Both the compressor and a water storage tank were mounted on RN 110 Nodwells.

The drilling procedure used is outlined as follows:

1) Drill overburden with 9-7/8 inch tricone bit and set 6-1/2 inch casing to bedrock.

2) Commence "hammer" drilling using 5-1/8 inch to 5-1/2 inch bits to depth stipulated by geologist or until coal was intersected.

3) Commence coring entire coal seam with 4-3/4 inch tungsten carbide closed centre bit with 10-foot Valley Foot Machine(V.T.M.) core barrel.

4) Drillers mark top and bottom footages with the aid of geolograph and place with core (3-inch diameter) in covered core boxes for logging by geologist at core inspection area at base camp.

5) Drilling procedure continues with alternating hammer and coring runs until all seams have been intersected.

6) Drill hole is geophysically logged.

The results of the drilling are summarized in the table entitled "SUMMARY LIST OF 1975 DRILLING RESULTS". Drill hole locations can be found on the 1:50,000 compilation map as well as on the geology maps of the various pits. The drill holes were used in addition to surface geological information to control the cross-sections prepared in the pit areas. The cored coal seam intersections were logged in detail and recoveries were obtained by comparing the lithologic log with the detailed density geophysical log (see 6.5 - Geophysical Logging). At least one and normally two project geologists were present to supervise the core sampling intervals (see 6.6 - Coal Analysis).

SUMMARY LIST OF 1975 QUINTETTE DRILLING RESULTS

Drill Hole Number	Total Depth Drilled	Coal Seams Description	Coal Seams Interval	Sample Number	% Recovery
QBD 7501	200	I Seam	102.13 - 104.9	801	100.0
		J Roof	114.39 - 115.75	802	95.2
		J Upper	115.75 - 119.85	803	95.2
		J Split	119.85 - 121.61	804	95.2
		J Lower	121.61 - 127.75	805	95.2
		K Upper	181.38 - 182.61	806	60.9
		K Middle	188.51 - 190.18	807	86.4
		K Dirt	190.18 - 191.33	808	86.4
		K Lower	191.33 - 196.23	809	86.4
QBD 7502	138	J Roof	107.53 - 109.59	810	80.24
		J Upper	109.59 - 111.51	811	80.24
		J Split	111.51 - 113.62	812	80.24
		J Lower	113.62 - 119.66	813	80.24
QBD 7503	198	I Upper	81.07 - 82.07	814	100.0
		I Lower	84.00 - 84.64	815	100.0
		J Roof	91.46 - 93.54	816	88.29
		J Upper	93.54 - 96.17	817	88.29
		J Split	96.17 - 97.12	818	88.29
		J Lower	97.12 - 104.75	819	88.29
		J Floor	104.75 - 105.25	820	88.29
		K Upper	142.65 - 145.32	821	100.0
		K Middle	146.61 - 150.29	822	100.0
		K Split	150.29 - 151.27	823	100.0
		K Lower	151.27 - 154.00	824	100.0
QBD 7504	229	I Upper	114.00 - 115.94	831	
		K Lower	122.74 - 125.91	832	
		J Upper	129.33 - 134.82	833	94.4
		J Parting	134.82 - 135.84	834	94.4
		J Lower	135.84 - 142.71	835	94.4
		K Upper	183.93 - 186.33	836	80.5
		K Lower	188.04 - 190.83	837	80.5
QBD 7505	204	I Seam	119.32 - 121.12	825	96.2
		J Upper	125.73 - 130.39	826	96.2
		J Parting	130.36 - 131.18	827	96.2
		J Lower	131.18 - 138.04	828	96.2
		K Upper	179.06 - 181.51	829	81.9
		K Lower	182.37 - 187.95	830	81.9
QBD 7506	193	I Seam	110.47 - 111.83	838	
		J Upper	115.78 - 121.67	839	78.9
		J Parting	121.67 - 122.20	840	78.9
		J Lower	122.20 - 128.57	841	78.9
		K Upper	163.84 - 166.81	842	91.8
		K Lower	168.65 - 174.02	843	91.8

SUMMARY LIST OF 1975 QUINTETTE DRILLING RESULTS

Drill Hole Number	Total Depth Drilled	Coal Seams Description	Coal Seams Interval	Sample Number	% Recovery
QBD 7507	159	I Seam	82.05 - 83.45	844	
		J Upper	91.00 - 96.75	845	90.8
		J Parting	96.75 - 98.50	846	90.8
		J Lower	98.50 - 105.60	847	90.8
		K Upper	135.70 - 138.10	848	99.5
		K Lower	139.35 - 145.66	849	99.5
QBD 7508	159	I Seam	79.30 - 80.87	850	
		J Upper	85.80 - 91.58	1601	94.7
		J Parting	91.58 - 93.40	1602	94.7
		J Lower	93.40 - 100.15	1603	94.7
		K Upper	128.80 - 131.10	1604	91.6
		K Lower	132.78 - 139.45	1605	91.6
QBD 7509	279	I Seam	192.45 - 194.55	1606	
		J Upper	197.93 - 203.15	1607	99.5
		J Parting	203.15 - 204.70	1608	99.5
		J Lower	204.7 - 211.15	1609	99.5
		K Upper	249.50 - 251.20	1610	91.5
		K Lower	252.95 - 258.60	1611	91.5
QBD 7510	599	D Upper	168.90 - 174.92	1612	93.0
		D Lower	174.92 - 177.50	1613	93.0
		E Upper	230.15 - 231.70	1614	96.7
		E Up. Parting	231.70 - 231.05	1615	96.7
		E Mid. Coal	234.05 - 235.85	1616	96.7
		E Mid. Parting	235.85 - 236.80	1617	96.7
		E Low. Coal	236.80 - 239.20	1618	96.7
		F Roof Coal	272.85 - 274.00	1619	99.0
		F Coal	274.00 - 279.50	1620	99.0
		F Parting	279.50 - 281.40	1621	99.0
		F Lower Coal	281.40 - 282.40	1622	99.0
		G Upper	300.45 - 301.65	1623	89.0
		G Lower	301.65 - 307.00	1624	89.0
		I Seam	515.62 - 520.79	1625	85.3
		J Upper	520.79 - 524.55	1626	85.3
		J Parting	524.55 - 526.17	1627	85.3
		J Lower	526.17 - 535.07	1628	85.3
		K Upper	567.85 - 570.2	1629	92.0
		K Lower	572.5 - 577.2	1630	92.0

SUMMARY LIST OF 1975 QUINTETTE DRILLING RESULTS

Drill Hole Number	Total Depth Drilled	Coal Seams Description	Coal Seams Interval	Sample Number	% Recovery
QBD 7511	624	D Seam	26.4 - 33.45	1631	78.7
		E Upper Coal	71.80 - 73.85	1632	76.6
		E Upper Parting	73.85 - 74.75	1633	76.6
		E Mid. Coal	74.75 - 78.05	1634	76.6
		E Low. Parting	78.05 - 78.6	1635	76.6
		E Lower Coal	78.6 - 83.47	1636	76.6
		F Upper	113.7 - 115.8	1637	69.4
		F Lower	115.8 - 121.2	1638	69.4
		G Seam	191.84 - 196.7	1639	95.1
		I Seam	498.35 - 500.36	1640	90.8
		I/J Parting	500.36 - 502.79	1641	90.8
		J Upper	502.79 - 508.95	1642	90.8
		J Parting	508.95 - 509.75	1643	90.8
		J Lower	509.75 - 518.10	1644	90.8
		K Upper	523.00 - 524.55	1645	85.2
		K Lower	528.4 - 533.8	1646	85.2
QBD 7512	474	F Upper	84.00 - 85.25	1647	79.0
		F Lower	85.25 - 94.00	1648	79.0
		I Seam	336.00 - 337.53	1649	80.0
		J Upper	347.00 - 353.60	1650	90.6
		J Parting	353.60 - 354.77	1851	90.6
		G Seam	139.30 - 143.91	1852	98.1
		J Lower	354.77 - 361.87	1853	90.6
		K Upper	367.80 - 369.39	1854	86.6
		K Lower	371.89 - 377.46	1855	86.6
QBD 7513	725	D_1	290.6 - 296.0	2951	38.9
		D_2	301.45 - 311.77	2952	66.1
		E Seam	419.75 - 426.7	2953	78.2
		F Seam	500.85 - 511.1	2954	40.5
		I Seam	641.2 - 653.3	2955	59.2
		J Seam	664.65 - 692.50	2956	48.3
QBD 7514	665	D_1	89.45 - 93.50	2965	75.0
		D_2	118.25 - 134.00	2966	99.0
		E Upper	248.05 - 261.90	2967	82.0
		E Lower	263.60 - 266.70	2968	82.0
		F Seam	365.10 - 376.00	2969	76.0
		I Seam	585.45 - 603.70	2970	55.0
		J Seam	648.00 - 669.6	2971	72.0
QBR 7531	20	-----------------	ABANDONED -----------------		--------

SUMMARY LIST OF 1975 QUINTETTE DRILLING RESULTS

Drill Hole Number	Total Depth Drilled	Coal Seams Description	Coal Seams Interval	Sample Number	% Recovery
QBR 7532	176	I Seam	109.2 - 110.6	1856	85.00
		K Upper	154.5 - 156.0	1857	62.2
		J Seam	119.4 - 139.2	1868	85.00
		K Lower	158.2 - 161.00	1869	62.2
QBR 7533	173	K Seam	149.3 - 162.8	1858	94.57
		J Upper	97.85 - 100.7	1865	91.65
		J Parting	100.7 - 103.0	1866	91.65
		J Main (Lower)	103.0 - 112.73	1867	91.65
QBR 7534	327	F Seam	15.72 - 24.5	1859	93.88
		G Seam	44.6 - 49.6	1860	76.34
		J Lower	224.3 - 234.6	1861	55.49
		J Lower (Below fault)	255.7 - 263.5	1862	83.93
		K Seam Upper	305.0 - 306.8	1863	50.62
		K Lower	308.7 - 310.2	1864	50.62
QBR 7535	126	E Seam	30.0 - 38.6	1870	87.25
		F Seam	73.0 - 78.5	1871	74.56
		G Seam	105.0 - 109.0	1872	40.51
QBR 7536	138	E Seam	50.00 - 60.60	928	90.49
		F Seam	85.55 - 93.10	929	83.77
		G Seam	114.30 - 117.30	930	42.86
QBR 7537	144	E Upper	53.30 - 54.60	923	97.31
		E Middle	54.60 - 60.60	924	97.31
		E Lower	60.60 - 63.40	925	97.31
		F Seam	88.00 - 95.30	926	97.00
		G Seam	120.00 - 127.00	927	89.58
QBR 7538	106	D Seam	69.60 - 80.00	922	87.74
QBR 7539	69	D Seam	34.00 - 43.20	931	89.20
QBR 7540	122	D Seam	30.79 - 40.45	1877	98.57
		E Upper	99.63 - 102.80	1878	97.00
		E Middle	102.80 - 107.00	1879	97.00
		E Lower	107.00 - 110.40	1880	97.00
QBR 7541	149	D Seam	29.00 - 38.78	1900	94.60
		E Upper	98.80 - 100.00	910	90.11
		E Middle	100.00 - 105.00	911	90.11
		E Lower	105.00 - 107.27	912	90.11
		F Main	130.00 - 128.70	913	94.25
		F Floor Split	140.20 - 141.20	914	94.25

SUMMARY LIST OF 1975 QUINTETTE DRILLING RESULTS

Drill Hole Number	Total Depth Drilled	Coal Seams		Sample Number	% Recovery
		Description	Interval		
QBR 7542	246	I Seam	173.07 - 174.20	918	98.14
		J Seam	177.00 - 191.88	919	98.14
		K Upper	223.09 - 225.40	920	94.62
		K Lower	227.00 - 232.50	921	94.62
QBR 7560	140	D Seam	69.0 - 79.7	1896	83.0
		E Upper	108.5 - 109.8	1897	83.6
		E Middle	109.8 - 115.7	1898	83.6
		E Lower	115.7 - 118.85	1899	83.6
QBR 7561	280	D Seam	108.25 - 117.03	1893	95.4
		E Upper	159.50 - 166.30	1894	93.3
		E Lower	166.30 - 169.60	1895	93.3
QBR 7562	135	E Upper	19.70 - 21.50	1885	87.9
		E Middle	21.50 - 27.80	1886	87.9
		E Lower	27.80 - 29.90	1887	87.9
		F Seam	64.70 - 68.00	1888	47.8
		G Seam (fault)	92.00 - 96.70	1889	36.6
		E Upper	102.00 - 104.00	1890	36.6
		E Middle	106.00 - 110.10	1891	36.6
		E Lower	110.10 - 115.60	1892	36.6
QBR 7563	163	E Seam	23.80 - 22.65	915	82.7
		F Seam	51.30 - 56.98	916	85.4
		G Seam	129.40 - 128.60	917	76.3
QBR 7564	182	D Seam	16.70 - 26.70	1881	95.7
		E Seam	60.80 - 69.18	1882	97.3
		F Seam	120.20 - 126.00	1883	87.0
		G Seam	165.30 - 169.00	1884	94.9
QBR 7565	140	E Seam	26.00 - 34.70	938	83.7
		F Seam	73.5 - 78.00	939	50.9
		G Seam	121.00 - 125.00	940	97.5
QBR 7566	295	F Seam	26.5 - 32.7	941	77.6
		G Seam	92.8 - 96.7	942	91.6
		I/J Seam	256.55 - 263.70	943	57.35
QBR 7567	119	J Upper	71.6 - 77.8	944	92.6
		J Middle	77.8 - 79.3	945	92.6
		J Lower	79.3 - 86.8	946	92.6
		K Upper	96.00 - 97.4	947	76.0
		K Lower	101.2 - 104.8	948	76.0
		I Upper	50.00 - 51.8	949	81.0
QBR 7568	341	J Seam	304.5 - 319.4	950	69.8

SUMMARY LIST OF 1975 QUINTETTE DRILLING RESULTS

Drill Hole Number	Total Depth Drilled	Coal Seams Description	Coal Seams Interval	Sample Number	% Recovery
QBR 7570	342	E Upper	66.70 - 69.00	932	78.3
		E Lower	76.10 - 79.50	933	78.3
		F Upper	125.00 - 125.8	934	19.4
		F Lower	142.00 - 143.8	935	56.4
		I Seam	231.00 - 234.60	936	40.8
		J Seam	255.30 - 281.20	937	75.7
QBR 7580	320	D Seam	53.00 - 61.00	2957	93.96
		E Upper	75.00 - 83.50	2958	67.36
		E Lower	89.75 - 96.75	2959	N/A
QBR 7581	380	E Upper	134.00 - 142.75	2960	N/A
		E Lower	153.00 - 156.55	2961	N/A
		E	170.00 - 174.1	2962	N/A
		F Seam	325.00 - 345.00	2963	N/A
		F_2	348.00 - 354.80	2964	N/A
QBR 7582	74	I Seam	16.00 - 20.5	2984	64.81
		J Seam	27.00 - 58.5	2985	77.19
QBR 7586	121	F Seam	37.00 - 44.50	2990	74.19
QBR 7587	120	I Seam	36.00 - 52.70	2972	60.00
		J Seam	75.00 - 102.40	2973	42.01
QBR 7588	98	J Seam	50.50 - 86.30	2974	56.44
QBR 7589	91	I_1	14.00 - 18.00	2975	38.57
		I_2	37.00 - 39.80	2976	75.68
		I_3	49.00 - 53.70	2977	68.12
QBR 7590	136	J Seam	14.00 - 32.50	2978	60.71
		K Upper	93.10 - 95.20	2979	51.16
		K Lower	104.50 - 108.00	2980	25.53
QBR 7591	98	F Seam	70.00 - 78.2	2981	61.16
QBR 7593	181	E Upper	136.00 - 143.00	2982	73.13
		E Lower	150.00 - 156.7	2983	24.64

SUMMARY LIST OF 1975 QUINTETTE DRILLING RESULTS

Drill Hole Number	Total Depth Drilled	Coal Seams: Description	Coal Seams: Interval	Sample Number	% Recovery
QBR 7594	549	E Upper	115.0 - 121.8	2987	68.69
		E Lower	124.3 - 126.50	2988	65.71
		F Seam	227.00 - 233.45	2989	63.86
		J_1	409.00 - 431.50	2991	55.83
		J_2	440.5 - 466.6	2992	48.37
		J_3	480.00 - 509.00	2993	39.28
		J_4	515.00 - 549.00	2994	39.28
QMR 7595	458	D	130.2 - 137.45	1201	41.7
		E Upper	172.2 - 179.5	1202	68.4
		E Middle	182.8 - 192.3	1203	68.4
		E Lower	194.1 - 199.6	1204	68.4
		G	251.1 - 258.49	1205	61.5
		J Upper	334.5 - 345.60	1206	62.5
		J Middle	348.45 - 350.30	1207	62.5
		J Lower	353.35 - 356.55	1208	62.5
QMR 7596	607	E	352.30 - 366.70	1212	86.0
		F Upper	423.65 - 426.98	1213	75.9
		F Lower	435.85 - 440.50	1214	78.3
		G	526.55 - 541.05	1215	84.1
QMR 7597	140	J Upper	82.20 - 87.65	1209	35.1
		J Middle	92.80 - 95.00	1210	93.2
		J Lower	102.20 - 109.30	1211	96.7

6.4 DIAMOND DRILLING

Diamond drilling was undertaken by Tonto Drilling Ltd., of Vancouver, British Columbia between June 19th and September 3rd, 1975. A total of 3,456 feet of H.Q. drilling and 1,390 feet of N.Q. drilling were completed in the Windy and Roman Mountain areas, respectively. The 12 H.Q. drill holes in the Windy area were all vertical and completed with a track-mounted Longyear 38 Wireline Rig complete with 10-foot triple tube core barrel. The rig was moved by a D6 Caterpillar or by a Foremost Tracked Vehicle. Due to more rugged terrain at Roman Mountain, the above rig was replaced with a lightweight skid-mounted Longyear 38 Wireline Rig equipped for angled N.Q. drilling. Water was pumped from the nearest streams in both areas, and it should be noted that the lack of water at Roman Mountain created delays in completing the drilling.

All holes were cased to bedrock and completely cored and geophysically logged. The hole locations have been shown on the 1:50,000 compilation map and on the detailed geology maps of the respective pit areas where they have also been incorporated in the cross-sections. Geophysical logs are presented in 'B' and detailed logs (both visual and geophysical) of all coal seams intersected can be found on the seam correlation charts for the pit areas. The coal was sampled under the same procedure as rotary core and the samples taken have been summarized in the table entitled "SUMMARY LIST OF 1975 DRILLING RESULTS" and indicated on the correlation charts. Treatment of samples is dealt with in the section entitled "COAL ANALYSIS".

6.5 GEOPHYSICAL LOGGING

Roke Oil Enterprises Ltd. of Calgary, Alberta were contracted for all drill hole geophysical logging. Gamma ray, neutron and sidewall density logs were run at a 1-inch to 20-foot general scale and supplemented by detailed density (1-inch to 20-feet) logs over economic coal seam intervals. Water levels were recorded and logging was not carried out through the drill rods unless poor hole conditions required it. Geophysical logs are presented in Appendix 'B' and the detailed log sections have also been incorporated on the seam correlation charts.

6.6 COAL ANALYSIS

Coal samples taken from the 1975 drill core were analyzed by Cyclone Engineering Sales Ltd., of Edmonton, Alberta. The sampling procedure was as follows:

1) Core was visually logged in detail and compared with detail density logs.

2) Coal seams were separated into logical sample interval based on distinguishable quality zones within the seam (i.e. - rock partings, boney coal, expected roof or floor dilution, etc.) under the direction of the project geologist.

3) As coal core was placed on polyethylene sheets within the core boxes, it was possible to ensure that a maximum amount of a particular sample interval could then be placed in fibrene bags. Sample tags were then filled out, one was placed inside of the sample bag, one on the outside of the sample bag and one retained in the field office. The tags recorded sample number, drill hole number, coal seam identifier and interval.

4) Samples were sent directly from the field to the lab as the drilling progressed.

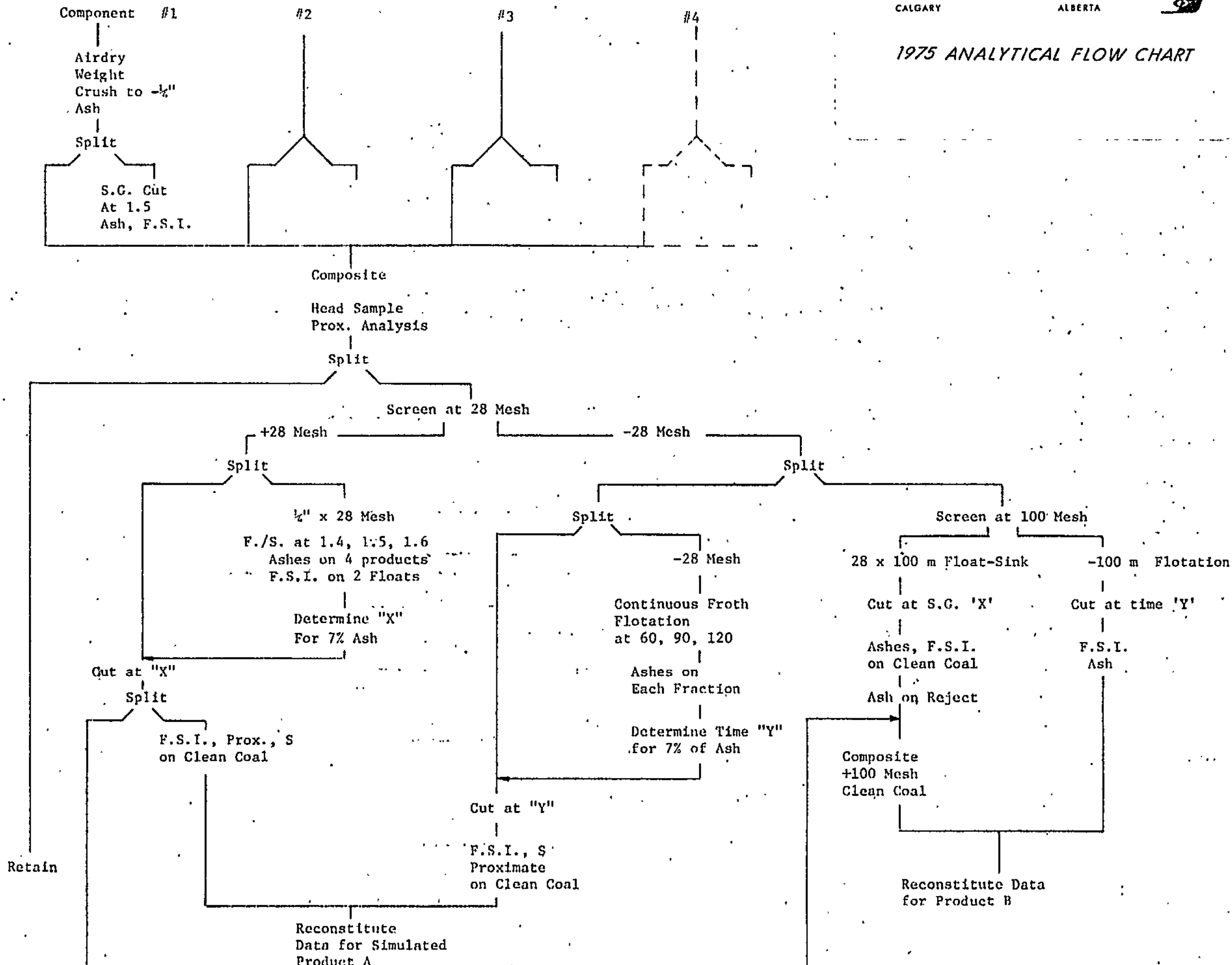
Cyclone were given compositing instructions and proceeded with washability analysis according to the flow chart on the following page for coal seams with F.S.I. of 4 or greater. The analytical results form Appendices 'C' and 'D'.

6.7 TRENCHING

Ragan Construction Ltd., and Tompkins Contracting Ltd., of Ft. St. John, B. C., were contracted to undertake coal seam trenching in the Roman Mountain, Sheriff and Frame pit areas. This work was designed to confirm the location of poorly exposed coal seams and to obtain detailed measured descriptions of seams prior to drilling. (See detailed geology maps and correlation charts of the pit areas for surveyed trench locations and descriptions of seams intersected.) Trenches were cut across strike with D-6, D-7 or D-8 caterpillars depending on ground condition. In general the trench width was kept to the width of one dozer blade and length was restricted to the thickness of the seam. As the pit areas investigated have little overburden, it was only necessary to excavate to an average depth of 5 feet to get past "rotten" surface coal and into a representative seam section. The results of this work have made a significant contribution to our understanding of the continuity of seam development in the potential pit areas.

DENISON MINES (B.C.) LIMITED
(COAL DIVISION)
CALGARY ALBERTA

1975 ANALYTICAL FLOW CHART



Cyclone Engineering Sales Ltd.

6.8 ROAD CONSTRUCTION AND MAINTENANCE

Road construction and maintenance was contracted to the companies used in the trenching programme. The main access road from the Monkman Pass to the main Babcock campsite was cleared of snow early in May and the existing road system to the Windy pit areas was then opened. No new roads were required in this area as adit and previous drill site access trails were incorporated as access for the 1975 drilling programme. At Roman Mountain a main access trail was built from approximately Mile 6 (the headwaters of Five Cabin Creek) to the 6000 foot level of Roman Mountain and cat trails were then utilized to provide access to the 1975 drill holes and trenches beyond this point.

In the Sheriff and Frame Pit areas the access road to the Kerr McGee well location (93P3b60A) was opened and a small camp set up near the well site. A cat trail was built from the campsite to the Sheriff and Frame pit areas. Fuel and crew changes for the equipment in the Sheriff/Frame and Roman Mountain areas was provided by helicopter.

6.9 FIELD CAMPS

Room and board was supplied by Denison from a 40 main trailer camp at the headwaters of Babcock Creek. Catering for this camp was contracted to Westcamp Construction Catering Ltd., of Edmonton. A second metal core storage shed was constructed during the summer to accommodate diamond drill core from the project. Tompkins Contracting Limited supplied room and board for crews working in the Sheriff and Frame areas.

6.10 RECLAMATION

Reclamation undertaken during 1975 can be summarized as follows:

Roman Mountain Area

All trenches including those from previous years have been filled and erosion bars and ditches were built on the main access route. No seeding was undertaken on the access road as further use of the road is expected next year.

Murray River Road

Approximately 5½ miles of total disposal (including erosion control and seeding) and 4 miles of erosional control and seeding were completed.

Sheriff-Frame Areas

All trenches and trails in the Sheriff and Frame areas were reclaimed and seeded prior to cessation of the 1975 field programme.

6.11 SUMMARY OF GEOLOGY AND RESERVES

The geological information, reserve calculations, and estimates of productive capacity presented in this section are based to some extent on preliminary evaluations of information recently received from the field and on sometimes incomplete re-evaluations of previously reported information.

REGIONAL GEOLOGY

The regional geology in the area of the Quintette property is shown on the regional geology map 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 on the Quintette property.

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 "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 10-mile width.

The Commotion and Gething Formations are the economically important stratigraphic units in the Quintette coal field which extends from Chetwynd southeast to the Alberta-British Columbia border. In this area, coal development is best in the Gates member approximately from Bullmoose Creek southeast, although aggregate thicknesses of coal approaching 15 metres are not attained until the Wolverine River Valley is reached. In the Gething Formation, usually thin but consistent coal seams are developed from about the Chetwynd area southeast to at least the Monkman Pass road.

On the Quintette property, development of coal in both these formations is unusually good. In the Gates Member of the Commotion Formation the aggregate coal thickness (in four or five seams) is usually in the order of 15-20 metres. The Gething Formation usually has thin (2 to 4 metre), but consistent, seam development in the Skeeter-Chamberlain zone and variable seam thicknesses in the Bird and Middle coal zones. Near Quintette Mountain the Bird zone is about 9-10 metres thick.

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 to date. 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 formations 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 6" in thickness) and discontinuous. The formation generally occurs under low angle slopes which are tree and bush covered below 5000' and form grey-brown pebbly talus above 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 20 feet. Only the upper portion of this formation is present at Quintette; however, it is reported to range from 500 to 1,500 feet in thickness.

GEOLOGICAL CORRELATION & BRIEF DESCRIPTION OF THE FORMATIONS IN QUINTETTE PROPERTY

Series	Stage	Group	Formation (thickness)	Member / Interval	Coal zone	Columnar section	Description
Upper Creta.	Cenomanian	FORT ST. JOHN GROUP	Shaftesbury (500' - 1500')				Alternation of interbedded dirty gray shale and mudstone with a few thin sandy shales.
LOWER CRETACEOUS	ALBIAN	FORT ST. JOHN GROUP	COMMOTION FORMATION	Boulder Creek Member (400'-500')			Coarse fine grained, well sorted sandstone, massive conglomerate, and non-marine gray shale with thin layers of carbonaceous materials.
LOWER CRETACEOUS	ALBIAN	FORT ST. JOHN GROUP	COMMOTION FORMATION	Hulcross Member (250'-350')			Dark-gray marine shale and sandy shale with a few sideritic concretions and kaolinitic mudstones.
LOWER CRETACEOUS	ALBIAN	FORT ST. JOHN GROUP	COMMOTION FORMATION, Gates Member (860'-950')	Upper Gates Interval	A B C		Cyclic alternation of interbedded gray shale and coarse-fine grain sandstone, conglomerate and coal.
				Babcock Member			
				D.E.F. Zone and Middle Gates Interval	D E F I J		
				Quintette Member			
LOWER CRETACEOUS	ALBIAN	FORT ST. JOHN GROUP	Moosebar (425'-700')				Dark gray marine shale with sideritic concretions; glauconitic sandstone and pebbles at base.
LOWER CRETACEOUS	?-APTIAN-?	BULLHEAD GROUP	Gething (400'-680')		Bird; Skeeter; Chamberlain; Middle		Fine to coarse-grained, brown, calcareous, carbonaceous sand, coal, coaly shale, carbonaceous shale and conglomerate.
LOWER CRETACEOUS	BARREMIAN	BULLHEAD GROUP	Cadomin (100'-150')				Massive conglomerate containing chert and quartzite, pebbles, cobbles.
LOWER CRETACEOUS	BARREMIAN	MINNES GROUP	Nikanassin (1500'+)				Fine-grained sandstone, sandy shale and shale with a few thin-banded coal shales.

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 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 50 to 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 400 to 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 of the Plains area.

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 thin shales. This later 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 400 to 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 860 to 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 deposition occur above the Quintette Member within about 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 weather 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 10 feet, whereas coal seams developed in the lower zone are usually those which show the greatest thickness (up to 12 to 40 feet) and continuity. Correlation of coal seams has been possible over distances up to 8 miles and with continued exploration it is felt correlation for the entire property will be possible.

A massive medium to coarse conglomeritic sandstone or pebble conglomerate sequence with an average thickness of about 60 feet overlies the first coal horizon (D seam) in the Middle Gates. This sequence, 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 & C) have been located in this sequence; however, they have not yet been found to contain sufficient thickness, quality and 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.

<u>Hulcross Member</u>

The Hulcross Member consists of between 250 and 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 550 feet has been measured in this member.

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 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 northeastern border of the licence area.

REGIONAL GEOLOGICAL STRUCTURE

The regional structure within the Quintette property is best illustrated on the regional geology map 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 highly deformed Nikanassin Formation. The faults dip to the southwest and have vertical displacement in the order of 100 metres. This probably indicates that they are splays from the major fault 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 flanks 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 deformation increases. For example, the Roman Mountain reserves, which are located in a tight chevron fold, are more often faulted 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.

QUALITY

No attempt has been made, for this report, to re-calculate the quality of the clean coal product which is expected for the various reserves on the Quintette property. In the case of the Underground reserves this data has been presented in some detail in previous reports by Denison Mines Limited and Mitsui Mining Company. The quality of the Open Pit reserves in the Windy Pit is also fully documented from that earlier work as the pit is located on the outcrop extension of the Babcock No. 1 Mine. Only preliminary data is available for the Roman Mountain area, the Frame pit and the Sheriff pit. This data indicates that coal quality in these areas will be very similar to the Babcock area, although the volatile content may be about 1% higher and, in some cases, the Free Swelling index may also be higher.

As has been previously reported, the average clean coal product from the Babcock area is expected to have the following properties:

Moisture	6.0%
Ash	7.5%
Volatiles	21.2-23.2%
Phosphorous	0.03-0.05%
F.S.I.	6.5-7.5
Sulphur	0.31-0.51%

RESERVES

Since the original property was acquired in 1969 a number of areas within it have been drilled and tested and, as a consequence, large reserves of medium volatile coking coal have been identified in a variety of potential mining conditions. These conditions range from 2 to 6 metre thick, relatively flat-lying underground reserves to open pit reserves containing coal seams with average thicknesses ranging from about 1 to 9 metres.

Only indicated reserves in areas which have been tested with a significant amount of drilling, trenching, and/or adit drivage are summarized in this report. No attempt has been made to re-calculate the overall possible reserves of coal in place (previously estimated at 2.8 billion tons) within the entire property as the data from this year's exploration is still being analyzed.

The table on the following page summarizes the indicated reserves and estimated productive capacities of most of the areas in the Quintette property which have been tested by drilling, trenching, and/or adit drivage. In this table the reserves for the Nos. 2, 3 and 4 Mines have been combined as they are contiguous and revised plans, with main entries near Babcock Creek, have not yet been prepared for No. 2 Mine. It can be assumed that such new plans would show reserves similar to those now indicated and, on this basis, it can be estimated that the productive capacity of the No. 2 and No. 3 Mines together would be a total of about 3.5 million metric tons over 5 to 6 years. Care should also be used in evaluating the reserves summarized in this table on the basis of their indicated strip ratios alone, as these ratios are very sensitive to the amount of rock dilution in the coal and they do not always reflect mining conditions, particularly at the Roman Mountain pit and on the east side of the Frame pit where geological conditions may affect mining costs as dips exceed 30 degrees and in some cases total seam thicknesses may approach 1.5 metres.

QUINTETTE PROPERTY

SUMMARY OF INDICATED RESERVES AND PRODUCTIVE CAPACITY

UNDERGROUND MINING RESERVES

Proposed Mine Site	Indicated Reserves In Place Within Mining Area M.T.x10^6	Estimated Raw Coal Productive Capacity* - First 20 Years M.T.x10^6	Preparation Plant Yield %	Estimated Clean Coal Productive Capacity -First 20 Years M.T.x10^6
Babcock No.1	122.0 ✓	54.0	69	37.3
Babcock No.2,3 & 4****	41.4 ✓	22.9	73	16.7
Wolverine				
- Perry Creek Anticline	94.47	22.0**	70	15.4
- Five Cabin Syncline	104.3	44.0	-not estimated-	

OPEN PIT MINING RESERVES

Proposed Mine Site	Strip Ratio Cubic Metres Per Metric Ton	Indicated Reserves In Place M.T.x10^6	Estimated Preparation Plant Recovery *** %	Estimated Clean Coal Productive Capacity At Stated Strip Ratio M.T.x 10^6
Babcock Area				
- Windy Pit	7.8	11.6	71	8.2
- Roman Mountain Pit	5.6	21.2	79	16.7
				24.9
Wolverine Area				
- Sheriff Pit	3.1	23.5	67	15.7
- Frame Pit	9.7	30.5	78	23.8
- Sheriff & Frame Pits combined	6.8			39.5

* Productive capacities estimated from preliminary data in previous reports by Denison Mines Limited and Mitsui Mining Company, extended to 20 years.

** Underground production from the Wolverine area is expected to come primarily from the Gates Member during the first stage of production.

*** Preparation plant recovery (yields) for open pit reserves are estimated by assuming that 90% of the coal only portion of the total raw coal mined will be recovered.

**** The productive capacity of No.2 and No.3 Mines together is estimated at 3.7 million tonnes per year over a period of 5 to 6 years.

Underground Reserves - Babcock No. 1 Mine

Geological Notes

The Babcock No. 1 Mine area contains up to five seams, three of which may be considered to be mineable. The reserves occur in a relatively flat synclinal structure with dips in the order of 8 to 15 degrees. Significant faulting has only been observed in the northern corner of the reserve area and present mine plans take this into account. Other small faults along the northwest face of Babcock Mountain have been observed and the significance of these or similar faults to plans for mining has not been estimated in detail, but it is not expected to be great as the displacement on the faults is only 5 to 10 metres.

It should be noted that the reserve table accompanying this section refers to coal in place within the reserve block and the estimated clean coal yield does not imply a mining recovery factor, but relates only to the planned mining within this block in the first twenty years of the mine's operation. In fact, the total clean coal reserve in the first proposed mine set-up probably exceeds 50 million tons.

Data Base

a) Geological mapping with detailed work along the southwest and northwest sides and along Babcock Creek.

b) 13 to 15 diamond and rotary drill holes.

c) 10 successful adits (see also Windy Pit).

Method of Calculation

a) A specific gravity of 1.60 has been used for raw coal in place as detailed coal/rock ratios were not always recorded in the early drilling from this area and the seam sections include in-seam dilution.

b) Seam thicknesses of coal and included rock are the weighted averages from all the holes in the proposed mine area that were reported in the Denison Mines Limited Second Interim Report (1972).

c) The area accessed by the present mine plans refers to that area within the seam that is enclosed by the mine plans presented in the main body of this report (Kilborn Limited). An adjustment has been made for that part of the reserve that lies within the proposed Windy Pit.

d) Roof dilution is the weighted average of expected roof dilution as indicated in Denison's 1972 interim report. It is somewhat more than, but similar to that suggested by Mitsui Mining Company in their 1974 report.

e) Total raw coal in place includes coal plus in-seam and out-of-seam dilution.

f) As noted in the reserve table, productivities (raw and clean) were based on the data provided by Mitsui in their 1974 report.

BABCOCK NO. 1 UNDERGROUND MINE

SUMMARY OF RESERVES

(S.I. (Metric) Units)

Seam	Total In-Place Reserve of Coal & Mined Dilution* M.T.x10^6	Approx.Area Accessed by Present or Anticipated Mine Plans cu.m x 10^6	Weighted Average Thickness Of Coal Seam metres	Weighted Average Thickness Of Roof Dilution metres	Raw Coal In-Place In Mine Area (Sp.Gr.= 1.60) M.T.x10^6	Mined Roof Dilution In Place (Sp.Gr.= 1.90) M.T.x10^6	Total Raw Coal In Place in Mine Area M.T.x10^6
D	54.7	6.48	2.50	0.34	25.9	4.2	30.1
F	67.1	6.37	2.90	0.46	29.6	5.5	35.1
J	98.6	6.14	5.43	0.30	53.3	3.5	56.8
TOTALS	220.4				108.8	13.2	122.0

Anticipated raw coal production** in first 20 years = 54.0 million tonnes.

Estimated clean coal production capacity in first 20 years = 37.3 million tonnes.

* Raw coal reserves taken from Denison Mines Limited Second Interim Report, Babcock Area, May 1973.

** Raw coal production is based on preliminary data from Mitsui Mining Company, extended for 20 years. Estimated clean coal yield for this reserve area was about 73%. (Second Interim Report).

Underground Reserves - Babcock No. 2, 3, and No. 4 Mines

Geological Notes

The No. 2, 3 and No. 4 Mines are all contiguous and are located in the southwest flank of the Waterfall Creek Syncline within an area north and south of Babcock Creek. The reserve areas are steep with dips ranging from about 45 to 70 degrees. Only three coal seams are sufficiently thick (greater than 2.5 metres) to be considered economically interesting at this time. The reserves in these three seams, F, I, and J, are combined for all three mine sites in the Reserve Summary table accompanying this report as the final relationship between No. 2 Mine and No. 4 Mine has not been determined. It is expected that the final plans for No. 2 Mine and No. 3 Mine together will provide for approximately 3.5 million tons of clean coal productive capability. If mining is to extend over a twenty-year period in this area it will be necessary to continue mining into the No. 4 Mine area, at least to the 3800 foot Main Entry level.

The detailed mapping and trenching that has been done on the surface outcrops of the coal measures in this area has not indicated any faulting which would interfere with plans for mining in this block. The average thicknesses of the three mineable coal seams range from just under 3 metres to about 5.4 metres, and in the No. 3 and No. 4 Mine area to the southeast, I and J seams merge into one coal zone about 8 to 9 metres thick.

Data Base

a) Detailed Geological mapping.

b) 12 trenches, 10 of which cover the complete section.

c) 2 diamond drill holes.

Method of Calculation

a) The reserves for this area have been re-formatted directly from data prepared by Mitsui Mining Company in their Geological Report of September, 1974.

b) Productive capacities have been estimated from data provided by Mitsui Mining Company in their feasibility report dated December, 1974.

BABCOCK NO. 2, 3, AND NO. 4 MINES - UNDERGROUND

SUMMARY OF RESERVES

(S.I. (Metric) Units)

Seam*	Average Coal Thickness*** Metres	Theoretical Reserves In Place** M.T.x 10^6	Mineable Clean Coal Reserves*** M.T.x 10^6
F West (No.2,4 Mines)	2.79	4.005	1.729
F East (No.3,4 Mines)	2.61	4.187	1.843
I West (No.2,4 Mines)	3.85	6.538	2.809
I East (No.3,4 Mines)	3.00	6.674	3.054
J West (No.2,4 Mines)	4.99	8.023	3.693
J East (No.3,4 Mines)	5.36	11.936	5.134
TOTALS		41.363	18.262

Estimated raw coal production capacity**** first 20 years = 22.9 million tonnes.

Estimated clean coal production capacity**** first 20 years = 16.7 million tonnes.

* The reserves for No.2 Mine are combined with No.4 Mine northwest of Babcock Creek and No.3 Mine reserves are combined with those from No.4 Mine southeast of the Creek.

** Theoretical reserves and other data in this table have been re-formatted from data prepared by Mitsui Mining Company in their 1974 Geological Report.

*** Average coal thickness is based on the coal only (no rock or included dilution) part of the seam section. Consequently, mineable clean coal reserves are for the coal only part of the section and do not reflect the raw coal tonnage which would be required to provide this amount of clean coal. About 90% of the "mineable clean coal" is expected as product from the preparation plant.

**** Production capacities estimated from preliminary data supplied by Mitsui Mining Company and extended for 20 years.

Underground Reserves

Wolverine Area - Perry Creek Anticline - East Limb

Geological Notes

The Wolverine underground reserves have been located in the east limb of the Perry Creek Anticline where it has a relatively stable slope with dips averaging about 15 degrees. The coal seams are located in both the Gates Member and the Gething Formation. In the Gates Member the basal coal seam, tentatively identified as the Gates No. 1 seam, is best developed over the entire reserve area. The Gates No. 2 seam, which is potentially mineable in only half the area, is located just above the Gates No. 1 seam and in the south corner of the reserve area they are separated by only a few metres of rock. Drilling on the west limb of the anticline indicates that the seams merge there into one coal zone about 7 metres thick.

The Gething II and III seams are probably equivalent to the Skeeter-Chamberlain zone which has been identified north of the Quintette property. These seams are each about 2 metres thick and appear to be quite extensive, although not all of the holes were drilled to this depth.

At the present time no faults have been identified which would interfere with mining in the area where reserves have been designated. The reserve area is, however, terminated by a syncline which may be faulted in places along its axis.

Productivities have been estimated only for the Gates Member and then only conceptually in this area. Mining in the Gething Formation would require inclined or vertical shafts and the F.S.I. of the seams there indicates that they may not be strongly coking. For these reasons, it is not anticipated that the Gething seams would be mined during the initial phase of production. Increased productivity (an additional million tons of raw coal per year) could be obtained from the Perry Creek Anticline if reserves are proven to extend as anticipated in the west blank of the structure. This would provide an annual clean coal potential of 1.5 million tons per year.

DENISON MINES (BC) LIMITED

COAL DIVISION
1300 - 409 GRANVILLE STREET, VANCOUVER, BRITISH COLUMBIA, V6C 1T9

EXECUTIVE OFFICE:
4 KING STREET WEST
TORONTO, ONTARIO M5H 1C2
TEL. 416-363-4991
TELEX 02-2205

DIVISION OFFICE:
1500 - 444 5TH AVENUE S.W.
CALGARY, ALBERTA T2P 2T8
TEL. 403-269-4327

JAN 12 '76 PM

CALGARY,

January 12, 1976

DEPT. OF MINES AND PETROLEUM RESOURCES

Dr. J. T. Fyles,
Associate Deputy Minister of Mineral Resources,
Department of Mines & Petroleum Resources,
Government of British Columbia,
Victoria, British Columbia.

347

Dear Dr. Fyles:

I have presented the 1975 exploration work on the Quintette Property in text titled "Quintette Coal Limited - 1975 Exploration Report", with four Appendices ('A', 'B', 'C' and 'D'). Some of the washability data has not yet been received but will be sent to you to complete the appropriate Appendix as soon as it is available. A number of charts from the trenching program have been presented in "rough drawn" form due to time constraints in our Drafting Department.

As previously indicated by Mr. Johnson, detailed reserve calculations are currently under way on the Windy, Roman Mountain and Sheriff/Frame Pit areas and these reports will also be sent to you on their completion.

Yours truly,

DENISON MINES (BC) LIMITED

G. P. Gormley, P. Geol.

GPG/nla

FILING CLERK	FILE NO.			C. & P.	MIN. REV.	INSP.	GEOL.	ACCTS.	G.C.	ACPR	DCSC	C.P.R.	C.G.C.	ADM (P)	ADM (M)	D.M.	REFERRED TO
																	DATE
																	INITIAL

607

DENISON MINES (BC) LIMITED
COAL DIVISION
1300 - 409 GRANVILLE STREET, VANCOUVER, BRITISH COLUMBIA, V6C 1T9

EXECUTIVE OFFICE:
4 KING STREET WEST
TORONTO, ONTARIO M5H 1C2
TEL. 416-363-4991
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DIVISION OFFICE:
1500 - 444 5TH AVENUE S.W.
CALGARY, ALBERTA T2P 2T8
TEL. 403-269-4327

DEPT. OF MINES
AND PETROLEUM RESOURCES
Rec'd JAN 26 1976

JAN 22 '76 PM

DEPT. OF MINES
AND PETROLEUM RESOURCES

CALGARY,

January 20, 1976

986

Mr. A. R. Corner,
Administrator for Coal,
Department of Mines & Petroleum Resources,
Government of British Columbia,
Parliament Buildings,
Victoria, British Columbia.

Dear Mr. Corner:

Enclosed please find analytical data for inclusion in Appendices 'C' and 'D' - 1975 Quintette Coal Analysis which accompany the report on 1975 Exploration.

We expect the remaining analytical data to be forwarded to you within the next three weeks.

Yours truly,

DENISON MINES (BC) LIMITED

G. P. Gormley, P. Geol.

GPG/nla

Enclosures

FILING CLERK | FILE NO. | EQ. & P. | M. REV. | INSP. | GEOL. | ACCTS. | G.C. | ACPR | DCGC | C.P.R. | C.G.C. | ADM (P) | ADM (M) | D.M. | REFERRED TO

23/1

Enclosures forwarded to Mr. Jones 23/1

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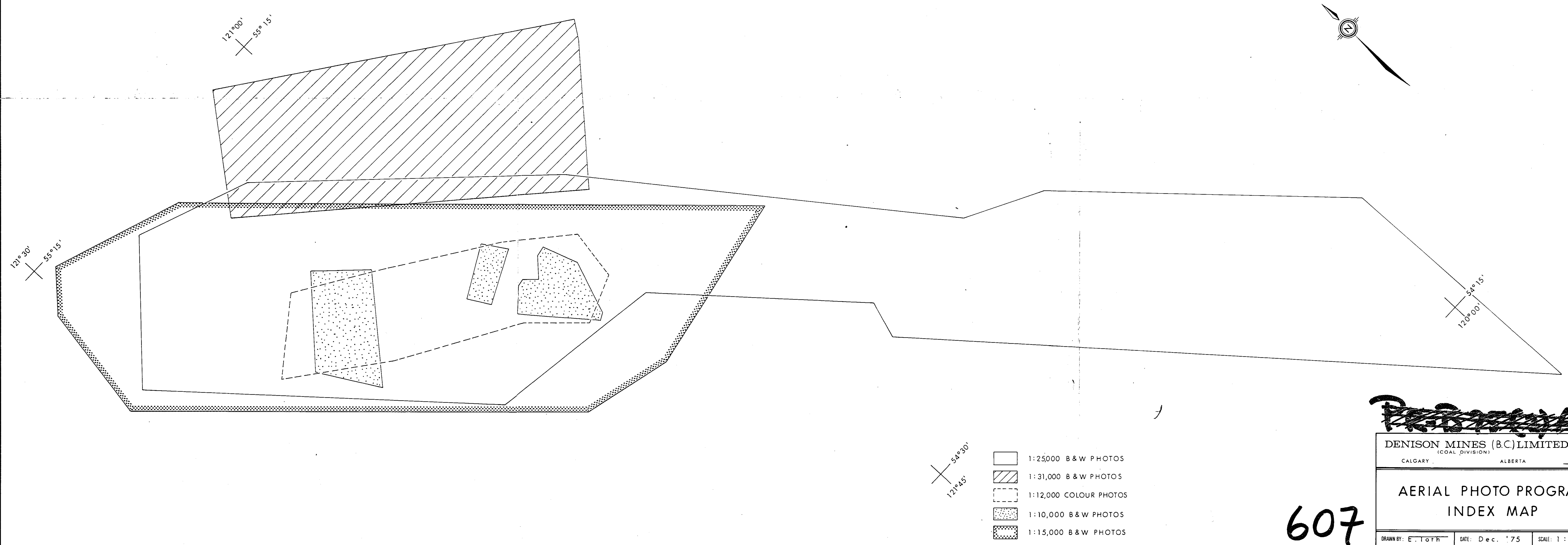

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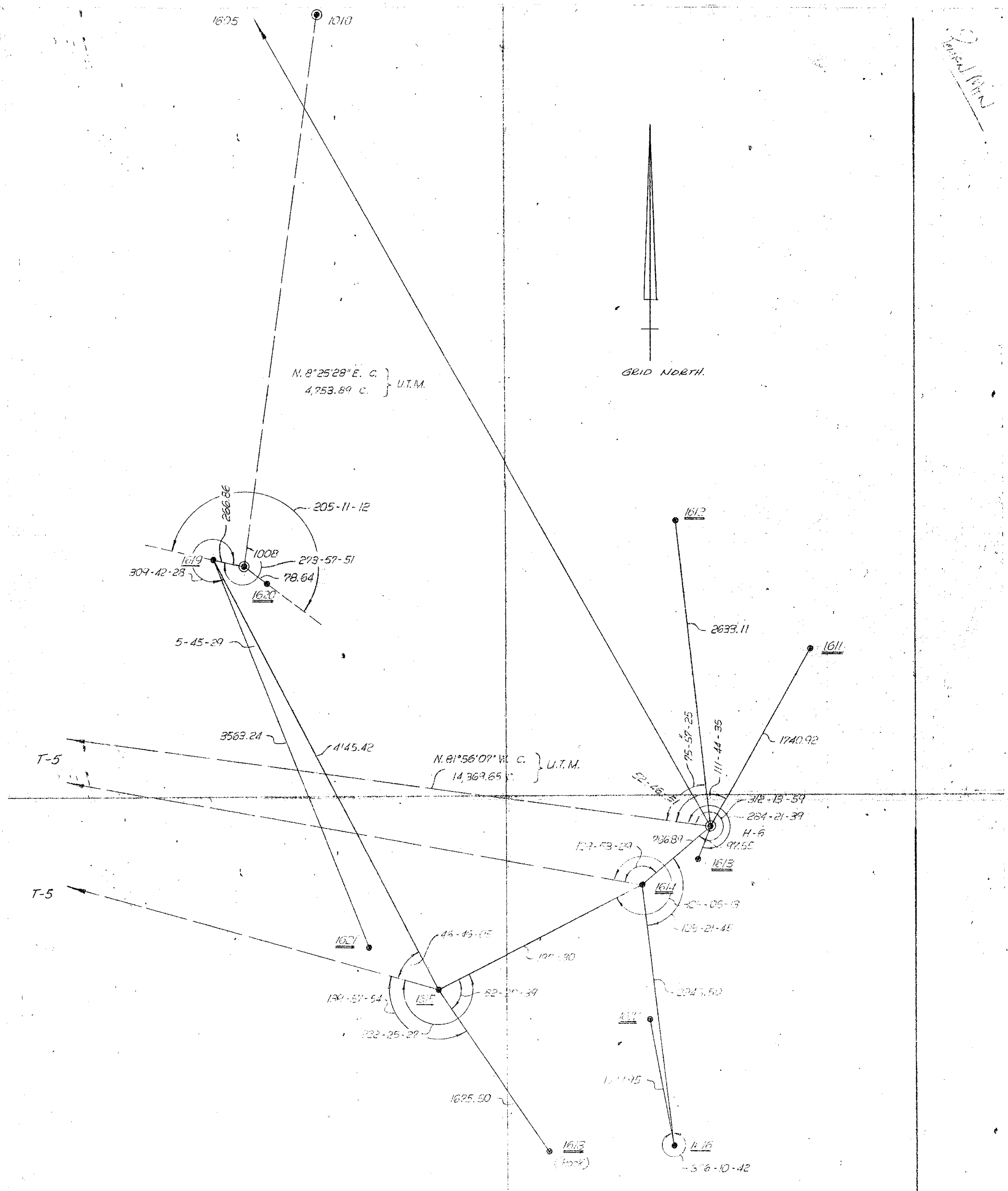
PR- QUINTETTE 75(2)A.

DENISON MINES (B.C.) LIMITED
(COAL DIVISION)
CALGARY ALBERTA

AERIAL PHOTO PROGRAM
INDEX MAP

DRAWN BY: E. Toth	DATE: Dec. '75	SCALE: 1 : 250,000
APPROVED BY:	DRAWING NO: QNTT 75 - 0621 - R01	



FOR UTM COORDINATE LIST SEE TABULATION OF NOV. 6 /75. PAGE 1

PR-QUINTETTE 75(2)A

DENISON MINES LTD

SKETCH SHOWING CONTROL SURVEYS UNDERTAKEN IN THE FALL OF 1975 - ROMAN MOUNTAIN AREA

N.T.S.

BURNETT RESOURCE SURVEYS LTD

FILE # 75-66 DWG # ROM-1

607

PR - QUINTETTE 75(6)A.

CONFIDENTIAL

OPEN FILE

QUINTETTE COAL LIMITED

1975 EXPLORATION & DEVELOPMENT REPORT

RESERVE ADDENDUM

March, 1976

The enclosed tables and drawings summarize the reserve calculations based on the 1975 Exploration Program on the Quintette Coal Licences. These reserves supercede those presented in the original text dated January, 1976

SUMMARY OF QUINTETTE OPEN PIT RESERVES

Pit	Theoretical Coal m.t. x 10^6 Total	Oxidized	Unoxidized	Estimated Mineable Coal (m.t. x 10^6) (True Coal Thickness - .3 m.)	Estimated Clean Coal (m.t. x 10^6) (.9 x mineable coal)	Unoxidized Raw Coal Strip Ratios* m^3/m.t.	yd^3/l.t.
Windy	16.255	2.782	13.473	11.613	10.453	4.98:1	6.62:1
Roman	22.812	1.637	21.175	19.732	17.758	5.40:1	7.18:1
Sheriff	25.23	9.00	16.23	15.17	13.67	3.52:1	4.68:1
Frame	36.36	7.27	29.09	25.62	23.06	8.71:1	11.58:1
TOTAL	100.657	20.689	79.968	72.135	64.941		

* - ratios of coal in place to rock in place, no deduction for mining loss.

OPEN PIT RESERVES SUMMARY - WINDY PIT

Seam	True Coal Thickness Range (m.)	Corrected Area ($x 10^6 m^2$)	Theoretical Coal m.t. x 10^6 Total	Oxidized	Unoxidized	Estimated Mineable Coal m.t. x 10^6	Estimated Clean Coal m.t. x 10^6
D	2.00 to 3.10	0.3500	1.534	.346	1.188	1.017	.916
E	1.80 to 1.80	0.5458	1.885	.380	1.505	1.292	1.163
F	1.95 to 2.55	0.4648	2.051	.614	1.437	1.242	1.118
G	1.20 to 2.55	0.5541	2.242	.483	1.759	1.160	1.044
J	3.7 to 4.6	1.0403	5.601	.624	4.977	4.622	4.160
K	2.15 to 2.95	1.0315	2.942	.335	2.607	2.280	2.052
TOTAL		3.9865	16.255	2.782	13.473	11.613	10.453

OPEN PIT RESERVES - WINDY PIT
SEAM 'D'

Block	True Coal* Thickness Range (m.)	Dip°	Corrected Area (x 10^6 m^2)	Theoretical Coal m.t. x 10^6 Total	Oxidized	Unoxidized	Estimated Mineable Coal m.t. x 10^6	Estimated Clean Coal m.t. x 10^6
A	2.00 to 2.70	7.0	0.1503	.662	.127	.535	.465	.419
B	2.00 to 2.70	9.2	0.1256	.505	.127	.378	.307	.276
C	2.00 to 3.10	7.4	0.0741	.367	.092	.275	.245	.221
TOTAL			0.3500	1.534	.346	1.188	1.017	.916

* - For details of actual thickness used in each block, refer to isopach sub-blocks.

OPEN PIT RESERVES - WINDY PIT
SEAM 'E'

Block	True Coal* Thickness Range (m.)	Dip°	Corrected Area (x 10^6 m^2)	Theoretical Coal m.t. x 10^6 Total	Oxidized	Unoxidized	Estimated Mineable Coal m.t. x 10^6	Estimated Clean Coal m.t. x 10^6
A	1.80 to 2.20	6.2	0.2520	.803	.111	.692	.587	.528
B	2.00 to 2.80	11.6	0.1130	.600	.231	.369	.322	.290
C	2.00 to 2.55	11.0	0.0897	.294	-	.294	.255	.230
D	2.00 to 2.15	11.7	0.0911	.188	.038	.150	.128	.115
TOTAL			0.5458	1.885	.380	1.505	1.292	1.163

* - For details of actual thickness used in each block, refer to isopach sub-blocks.

OPEN PIT RESERVES - WINDY PIT
SEAM 'F'

Block	True Coal* Thickness Range (m.)	Dip°	Corrected Area (x 10^6 m^2)	Theoretical Coal m.t. x 10^6 Total	Oxidized	Unoxidized	Estimated Mineable Coal m.t. x 10^6	Estimated Clean Coal m.t. x 10^6
A	2.00 to 2.55	5.8	0.1533	.620	.148	.472	.408	.367
B	2.00 to 2.55	8.4	0.2040	.941	.290	.651	.565	.509
C	1.95 to 2.40	8.7	0.1037	.461	.160	.301	.258	.232
D	2.40	11.3	0.0038	.029	.016	.013	.011	.010
TOTAL			0.4648	2.051	.614	1.437	1.242	1.118

* - For details of actual thickness used in each block, refer to isopach sub-blocks.

OPEN PIT RESERVES - WINDY PIT
SEAM 'G'

Block	True Coal* Thickness Range (m.)	Dip°	Corrected Area (x 10^6 m^2)	Theoretical Coal m.t. x 10^6 Total	Oxidized	Unoxidized	Estimated Mineable Coal m.t. x 10^6	Estimated Clean Coal m.t. x 10^6
A	1.35 to 1.90	7.8	0.1353	.451	.131	.320	.263	.237
B	1.70 to 2.25	9.4	0.2663	.951	.216	.735	.623	.561
C	1.20 to 2.55	11.4	0.1359	.796	.122	.674	.251	.226
D	1.30	14.0	0.0166	.044	.014	.030	.023	.020
TOTAL			0.5541	2.242	.483	1.759	1.160	1.044

* - For details of actual thickness used in each block, refer to isopach sub-blocks.

OPEN PIT RESERVES - WINDY PIT
SEAM 'J'

Block	True Coal* Thickness Range (m.)	Dip°	Corrected Area (x 10^6 m^2)	Theoretical Coal m.t. x 10^6 Total	Oxidized	Unoxidized	Estimated Mineable Coal m.t. x 10^6	Estimated Clean Coal m.t. x 10^6
A	3.7 to 4.45	8.6	0.4804	2.500	.392	2.108	1.953	1.758
B	4.15 to 4.6	9.9	0.2509	1.400	.161	1.239	1.153	1.038
C	4.2 to 4.6	3.6	0.2079	1.152	-	1.152	1.072	.964
D	4.2	12.0	0.1011	.549	.071	.478	.444	.400
TOTAL			1.0403	5.601	.624	4.977	4,622	4.160

* - For details of actual thickness used in each block, refer to isopach sub-blocks.

OPEN PIT RESERVES - WINDY PIT
SEAM 'K'

Block	True Coal* Thickness Range (m.)	Dip°	Corrected Area (x 10^6 m^2)	Theoretical Coal m.t. x 10^6 Total	Oxidized	Unoxidized	Estimated Mineable Coal m.t. x 10^6	Estimated Clean Coal m.t. x 10^6
A	2.2 to 2.35	4.6	0.1023	.268	.091	.177	.154	.139
B	2.2 to 2.95	7.7	0.4206	1.278	.075	1.203	1.059	.953
C	2.15 to 2.65	8.7	0.1965	.556	.100	.456	.398	.358
D	2.15 to 2.35	4.3	0.2071	.563	-	.563	.489	.440
E	2.15 to 2.30	12.3	0.1050	.277	.069	.208	.180	.162
TOTAL			1.0315	2.942	.335	2.607	2.280	2.052

* - For details of actual thickness used in each block, refer to isopach sub-blocks.

OPEN PIT RESERVES SUMMARY - ROMAN MOUNTAIN

Block	Average True Seam Thickness (m.)	Dip° Range	Corrected Area ($x\ 10^6\ m^2$)	Theoretical Coal m.t. x 10^6 Total	Theoretical Coal m.t. x 10^6 Oxidized	Theoretical Coal m.t. x 10^6 Unoxidized	Estimated Mineable Coal m.t. x 10^6	Estimated Clean Coal m.t. x 10^6
D	2.86	26 to 58	0.5356	2.147	.216	1.931	1.729	1.556
E	1.50	37 to 56	0.7487	1.572	.147	1.425	1.190	1.071
F	1.76	41 to 60	1.0191	2.516	.318	2.198	1.827	1.644
I/J	7.70	30 to 60	1.5380	16.577	.956	15.621	14.986	13.487
TOTAL.			3.8414	22.812	1.637	21.175	19.732	17.758

OPEN PIT RESERVES - ROMAN MOUNTAIN
SEAM 'D' (AVERAGE TRUE THICKNESS 2.86 M.)

Block	Average True Coal Thickness (m.)	Dip°	Corrected Area ($x 10^6 m^2$)	Theoretical Coal m.t. x 10^6 Total	Theoretical Coal m.t. x 10^6 Oxidized	Theoretical Coal m.t. x 10^6 Unoxidized	Extimated Mineable Coal m.t. x 10^6	Estimated Clean Coal m.t. x 10^6
1	2.86	48.5	0.0122	.049	.017	.032	.028	.025
2	"	42.0	0.0298	.120	.012	.108	.096	.086
3	"	49.1	0.0311	.125	.012	.113	.101	.091
4	"	48.0	0.0154	.062	.004	.058	.052	.047
5	"	57.7	0.0910	.364	.022	.342	.307	.276
6	"	26.6	0.0192	.077	-	.077	.069	.062
7	"	35.5	0.0284	.114	-	.114	.102	.092
8	"	50.2	0.0779	.312	.013	.299	.268	.241
9	"	47.2	0.0909	.364	.027	.337	.302	.272
10	"	58.2	0.0635	.255	.027	.228	.204	.184
11	"	38.7	0.0463	.185	.013	.172	.154	.139
12	"	51.3	0.0299	.120	.069	.051	.046	.041
TOTAL			0.5356	2.147	.216	1.931	1.729	1.556

OPEN PIT RESERVES - ROMAN MOUNTAIN

SEAM 'E' (AVERAGE TRUE THICKNESS 1.50 M.)

Block	Average True Coal Thickness (m.)	Dip°	Corrected Area (x 10^6 m^2)	Theoretical Coal m.t. x 10^6 Total	Oxidized	Unoxidized	Estimated Mineable Coal m.t. x 10^6	Estimated Clean Coal m.t. x 10^6
1	1.50	50.0	0.0302	.064	.006	.058	.046	.041
2	"	37.3	0.0294	.061	.005	.056	.045	.041
3	"	46.5	0.0244	.051	.003	.048	.039	.035
4	"	49.6	0.0483	.102	.007	.095	.076	.068
5	"	55.9	0.0922	.194	.013	.181	.145	.131
6	"	49.6	0.0352	.074	-	.074	.059	.053
7	"	40.6	0.0243	.051	-	.051	.041	.037
8	"	52.0	0.1081	.227	.031	.196	.157	.141
9	"	50.0	0.1177	.247	.011	.236	.226	.203
10	"	50.2	0.0746	.157	.011	.146	.128	.115
11	"	38.7	0.1075	.225	.040	.185	.148	.133
12	"	56.3	0.0568	.119	.020	.099	.080	.072
TOTAL			0.7487	1.572	0.147	1.425	1.190	1.071

OPEN PIT RESERVES - ROMAN MOUNTAIN

SEAM 'F' (AVERAGE TRUE THICKNESS 1.76 M.)

Block	Average True Coal Thickness (m.)	Dip°	Corrected Area (x 10^6 m^2)	Theoretical Coal m.t. x 10^6 Total	Oxidized	Unoxidized	Estimated Mineable Coal m.t. x 10^6	Estimated Clean Coal m.t. x 10^6
1	1.76	52.0	0.0453	.116	.012	.104	.086	.077
2	"	44.6	0.0378	.094	.010	.084	.070	.063
3	"	45.0	0.0301	.074	.007	.067	.056	.050
4	"	49.5	0.0650	.160	.009	.151	.126	.113
5	"	60.9	0.1225	.301	.032	.269	.224	.202
6	"	45.0	0.0291	.072	-	.072	.060	.054
7	"	41.0	0.0461	.114	-	.114	.094	.085
8	"	52.6	0.1175	.289	.022	.267	.222	.200
9	"	49.5	0.1457	.359	.028	.331	.275	.248
10	"	52.8	0.1057	.261	.021	.240	.199	.179
11	"	48.0	0.1901	.468	.124	.344	.286	.257
12	"	52.4	0.0842	.208	.053	.155	.129	.116
TOTAL			1.0191	2.516	.318	2.198	1.827	1.644

OPEN PIT RESERVES - ROMAN MOUNTAIN
SEAM 'I/J' (AVERAGE TRUE THICKNESS 7.70 M.)

Block	Average True Coal Thickness (m.)	Dip°	Corrected Area (x 10^6 m^2)	Theoretical Coal m.t. x 10^6 Total	Oxidized	Unoxidized	Estimated Mineable Coal m.t. x 10^6	Estimated Clean Coal m.t. x 10^6
1	7.70	54.4	0.0618	.666	.042	.624	.599	.539
2	"	42.7	0.0745	.803	.044	.759	.728	.655
3	"	45.5	0.0595	.641	.044	.597	.573	.516
4	"	50.5	0.1104	1.190	.043	1.147	1.100	.990
5	"	60.3	0.1507	1.624	.082	1.542	1.479	1.331
6	"	42.3	0.0339	.365	-	.365	.351	.316
7	"	30.8	0.0411	.443	-	.443	.426	.383
8	"	51.0	0.1575	1.698	.047	1.651	1.584	1.426
9	"	51.0	0.1875	2.021	.063	1.958	1.878	1.690
10	"	51.3	0.1636	1.763	.070	1.693	1.624	1.462
11	"	48.4	0.2851	3.073	.281	2.792	2.678	2.410
12	"	56.8	0.2124	2.290	.240	2.050	1.966	1.769
TOTAL			1.5380	16.577	.956	15.621	14.986	13.487

OPEN PIT RESERVES SUMMARY - SHERIFF & FRAME PITS

Block	Average True Seam Thickness (m.)	Corrected Area (x 10^6 m^2)	Theoretical Coal m.t. x 10^6 Total	Oxidized	Unoxidized	Estimated Mineable Coal m.t. x 10^6	Estimated Clean Coal m.t. x 10^6
SHERIFF PIT							
D	2.01	0.347	0.98	0.57	0.41	0.34	0.31
E	8.27 to 8.89*	0.826	9.68	3.89	5.79	5.38	4.84
G	1.32 to 1.67*	1.001	1.96	0.77	1.19	0.94	0.85
J	8.56 to 8.07*	1.070	12.61	3.77	8.84	8.51	7.67
TOTAL		3.244	25.23	9.00	16.23	15.17	13.67
FRAME PIT							
D	2.27	1.498	4.76	1.12	3.64	3.16	2.84
E	3.08	1.667	7.17	1.38	5.79	5.23	4.71
F	1.96	2.060	5.65	1.87	3.78	3.21	2.89
G	2.90	2.305	9.35	1.86	7.49	6.70	6.04
J	2.34	2.882	9.43	1.04	8.39	7.32	6.58
TOTAL		10.412	36.36	7.27	29.09	25.62	23.06

* - Average True Coal Thickness for Sheriff & Deputy respectively.

OPEN PIT RESERVES: SEAM 'D'

Block	Average True Coal Thickness (m.)	Dip°	Corrected Area ($x 10^6 m^2$)	Theoretical Coal m.t. x 10^6 Total	Oxidized	Unoxidized	Estimated Mineable Coal m.t. x 10^6	Estimated Clean Coal m.t. x 10^6
SHERIFF PIT								
A	2.01	21	0.168	0.47	0.11	0.36	0.30	0.27
B	2.01	22	0.105	0.30	0.26	0.04	0.03	0.03
C	2.01	5	0.074	0.21	0.20	0.01	0.01	0.01
TOTALS			0.347	0.98	0.57	0.41	0.34	0.31
FRAME PIT								
A	2.27	23	0.817	2.60	0.74	1.86	1.61	1.45
B	2.27	13	0.196	0.62	0.06	0.56	0.49	0.44
C	2.27	10	0.045	0.15	0.02	0.13	0.11	0.10
D	2.27	24	0.073	0.23	0.03	0.20	0.17	0.15
E	2.27	51	0.137	0.44	0.20	0.24	0.21	0.19
F	2.27	43	0.230	0.72	0.07	0.65	0.57	0.51
TOTALS			1.498	4.76	1.12	3.64	3.16	2.84

OPEN PIT RESERVES: SEAM 'E'

Block	Average True Coal Thickness (m.)	Dip°	Corrected Area (x 10^6 m^2)	Theoretical Coal m.t. x 10^6 Total	Oxidized	Unoxidized	Estimated Mineable Coal m.t. x 10^6	Estimated Clean Coal m.t. x 10^6
SHERIFF PIT								
A	8.27	28	0.098	1.13	0.34	0.79	0.73	0.66
B	8.27	11	0.039	0.46	0.07	0.39	0.36	0.32
C	8.27	19	0.138	1.60	0.32	1.28	1.19	1.07
D	8.27	25	0.359	4.15	2.02	2.13	1.98	1.78
E	8.27	10	0.063	0.73	0.33	0.40	0.38	0.34
F (Deputy)	8.89	22	0.056	0.69	0.37	0.32	0.30	0.27
G (Deputy)	8.89	7	0.027	0.34	0.11	0.23	0.21	0.19
H (Deputy)	8.89	29	0.046	0.58	0.33	0.25	0.23	0.21
TOTALS			0.826	9.68	3.89	5.79	5.38	4.84

OPEN PIT RESERVES: SEAM 'E'

Block	Average True Coal Thickness (m.)	Dip°	Corrected Area (x 10^6 m^2)	Theoretical Coal m.t. x 10^6 Total	Theoretical Coal m.t. x 10^6 Oxidized	Theoretical Coal m.t. x 10^6 Unoxidized	Estimated Mineable Coal m.t. x 10^6	Estimated Clean Coal m.t. x 10^6
FRAME PIT								
A	3.08	22	0.986	4.24	0.93	3.31	2.99	2.69
B	3.08	16	0.121	0.52	0.09	0.43	0.39	0.35
C	3.08	10	0.060	0.26	0.02	0.24	0.22	0.20
D	3.08	20	0.114	0.49	0.04	0.45	0.40	0.36
E	3.08	46	0.386	1.66	0.30	1.36	1.23	1.11
TOTALS			1.667	7.17	1.38	5.79	5.23	4.71

OPEN PIT RESERVES: SEAM 'F'

Block	Average True Coal Thickness (m.)	Dip°	Corrected Area ($x 10^6 m^2$)	Theoretical Coal m.t. x 10^6 Total	Theoretical Coal m.t. x 10^6 Oxidized	Theoretical Coal m.t. x 10^6 Unoxidized	Estimated Mineable Coal m.t. x 10^6	Estimated Clean Coal m.t. x 10^6
FRAME PIT								
A	1.96	23	1.265	3.47	1.56	1.91	1.62	1.46
B	1.96	13	0.131	0.36	0.03	0.33	0.28	0.25
C	1.96	11	0.090	0.25	0.03	0.22	0.18	0.16
D	1.96	24	0.054	0.15	0.00	0.15	0.13	0.12
E	1.96	31	0.135	0.37	0.01	0.36	0.31	0.28
F	1.96	51	0.385	1.05	0.24	0.81	0.69	0.62
TOTALS			2.060	5.65	1.87	3.78	3.21	2.89

OPEN PIT RESERVES: SEAM 'G'

Block	Average True Coal Thickness (m.)	Dip°	Corrected Area ($x 10^6 m^2$)	Theoretical Coal m.t. $x 10^6$ Total	Oxidized	Unoxidized	Estimated Mineable Coal m.t. $x 10^6$	Estimated Clean Coal m.t. $x 10^6$
SHERIFF PIT								
A (Sheriff)	1.32	28	0.087	0.16	0.05	0.11	0.08	0.07
B (Sheriff)	1.32	17	0.028	0.05	0.01	0.04	0.03	0.03
C (Sheriff)	1.32	17	0.140	0.26	0.06	0.20	0.16	0.14
D (Sheriff)	1.32	21	0.293	0.54	0.09	0.45	0.35	0.31
E (Sheriff)	1.32	0	0.091	0.16	0.13	0.03	0.03	0.03
F (Sheriff)	1.32	29	0.065	0.12	0.12	0.00	0.00	0.00
G (Sheriff)	1.32	10	0.041	0.08	0.02	0.06	0.04	0.04
H (Sheriff)	1.32	10	0.049	0.09	0.04	0.05	0.04	0.04
I (Deputy)	1.67	19	0.099	0.24	0.13	0.11	0.09	0.08
J (Deputy)	1.67	8	0.034	0.08	0.02	0.06	0.05	0.05
K (Deputy)	1.67	18	0.074	0.18	0.10	0.08	0.07	0.06
TOTALS			1.001	1.96	0.77	1.19	0.94	0.85

OPEN PIT RESERVES: SEAM 'G'

Block	Average True Coal Thickness (m.)	Dip°	Corrected Area ($x 10^6 m^2$)	Theoretical Coal m.t. x 10^6 Total	Oxidized	Unoxidized	Estimated Mineable Coal m.t. x 10^6	Estimated Clean Coal m.t. x 10^6
FRAME PIT								
A	2.90	22	1.457	5.91	1.41	4.50	4.03	3.63
B	2.90	15	0.187	0.76	0.09	0.67	0.60	0.54
C	2.90	10	0.105	0.43	0.05	0.38	0.34	0.31
D	2.90	22	0.058	0.23	0.00	0.23	0.20	0.18
E	2.90	26	0.096	0.39	0.01	0.38	0.34	0.31
F	2.90	44	0.402	1.63	0.30	1.33	1.19	1.07
TOTALS			2.305	9.35	1.86	7.49	6.70	6.04

OPEN PIT RESERVES: SEAM 'J'

Block	Average True Coal Thickness (m.)	Dip°	Corrected Area (x 10^6 m^2)	Theoretical Coal m.t. x 10^6 Total	Oxidized	Unoxidized	Estimated Mineable Coal m.t. x 10^6	Estimated Clean Coal m.t. x 10^6
SHERIFF PIT								
A (Sheriff)	8.56	24	0.057	0.68	0.23	0.45	0.44	0.40
B (Sheriff)	8.56	18	0.022	0.26	0.04	0.22	0.21	0.19
C (Sheriff)	8.56	18	0.141	1.69	0.42	1.27	1.22	1.10
D (Sheriff)	8.56	21	0.261	3.13	0.43	2.70	2.60	2.34
E (Sheriff)	8.56	10	0.072	0.86	0.33	0.53	0.51	0.46
F (Sheriff)	8.56	0	0.039	0.47	0.23	0.24	0.23	0.21
G (Sheriff)	8.56	0	0.121	1.45	0.39	1.06	1.02	0.92
H (Sheriff)	8.56	29	0.048	0.58	0.58	0.00	0.00	0.00
I (Deputy)	8.07	17	0.174	1.97	0.68	1.29	1.24	1.12
J (Deputy)	8.07	6	0.031	0.35	0.06	0.29	0.28	0.25
K (Deputy)	8.07	19	0.104	1.17	0.38	0.79	0.76	0.68
TOTALS			1.070	12.61	3.77	8.84	8.51	7.67

OPEN PIT RESERVES: SEAM 'J'

Block	Average True Coal Thickness (m.)	Dip°	Corrected Area $(x\ 10^6\ m^2)$	Theoretical Coal m.t. x 10^6 Total	Oxidized	Unoxidized	Estimated Mineable Coal m.t. x 10^6	Estimated Clean Coal m.t. x 10^6
FRAME PIT								
A	2.34	22	1.743	5.71	0.57	5.14	4.48	4.03
B	2.34	12	0.248	0.81	0.07	0.74	0.65	0.58
C	2.34	11	0.119	0.39	0.03	0.36	0.31	0.28
D	2.34	24	0.065	0.21	0.00	0.21	0.18	0.16
E	2.34	25	0.114	0.37	0.03	0.34	0.30	0.27
F	2.34	48	0.593	1.94	0.34	1.60	1.40	1.26
TOTALS			2.882	9.43	1.04	8.39	7.32	6.58

PR-QUINTETTE 75(10)A

QUINTETTE COAL LIMITED

OPEN FILE

INFORMATION SUMMARY

MAY 1975

QUINTETTE COAL LIMITED

Information Summary

This brief report introduces Quintette Coal Limited and its developing Quintette Project, located about 100 miles southwest of Dawson Creek, B.C. Quintette Coal Limited is a British Columbia company whose shareholders are Denison Mines Limited, Alco Standard Corporation, Mitsui Mining Co., Ltd. and Tokyo Boeki Ltd.

Exploration and development work has been in progress on the Quintette licence area for over four years and expenditures to date total more than $4,000,000. Sufficient proven and probable reserves have now been established to clearly indicate that the entire project area is capable of producing 5 million tons of coal per year over a 20 year period. These basic reserves include an ample back-up reserve in case mining problems are encountered or expansion is required to meet increased domestic requirements.

Quintette Coal Limited has now decided to test the economic viability of these metallurgical coal resources through a detailed feasibility study of an underground hydraulic mining operation with open pit support.

Denison Mines (B.C.) Limited has been named by the Quintette shareholders to manage the program and has retained Kilborn Engineering Limited of Vancouver as the primary consultant with responsibility for co-ordinating the engineering and technical consultants, including Mitsui Mining Co., Ltd. who will supply the feasibility data on hydraulic mining.

In addition to the investigation of mining techniques and coal preparation, the feasibility study will include a complete evaluation of all aspects of the related infrastructure from rail loading to port, labour availability, worker accommodation, power, and, most importantly, environmental and social impact studies. In this regard, B.C. Research has already been engaged to analyze the potential environmental effect of the project.

The present study will be completed by November, 1975 and, if it is favourable, the final full-scale feasibility study including detailed engineering studies and plant design will commence late this year and be completed by November, 1976. Construction of the mine and related facilities is expected to take 3 years, during which time sufficient mine development work will have been completed to allow the mine to commence production in late 1979 and build up production to 4.5 million tons per year in carefully planned increments as shown on the chart on the following page.

There is a strong demand for high-grade coking coal on the world market, and, although the initial overtures will be made in the traditional Japanese market, the Canadian market is also being vigorously investigated and all other sales opportunities will be seriously pursued.

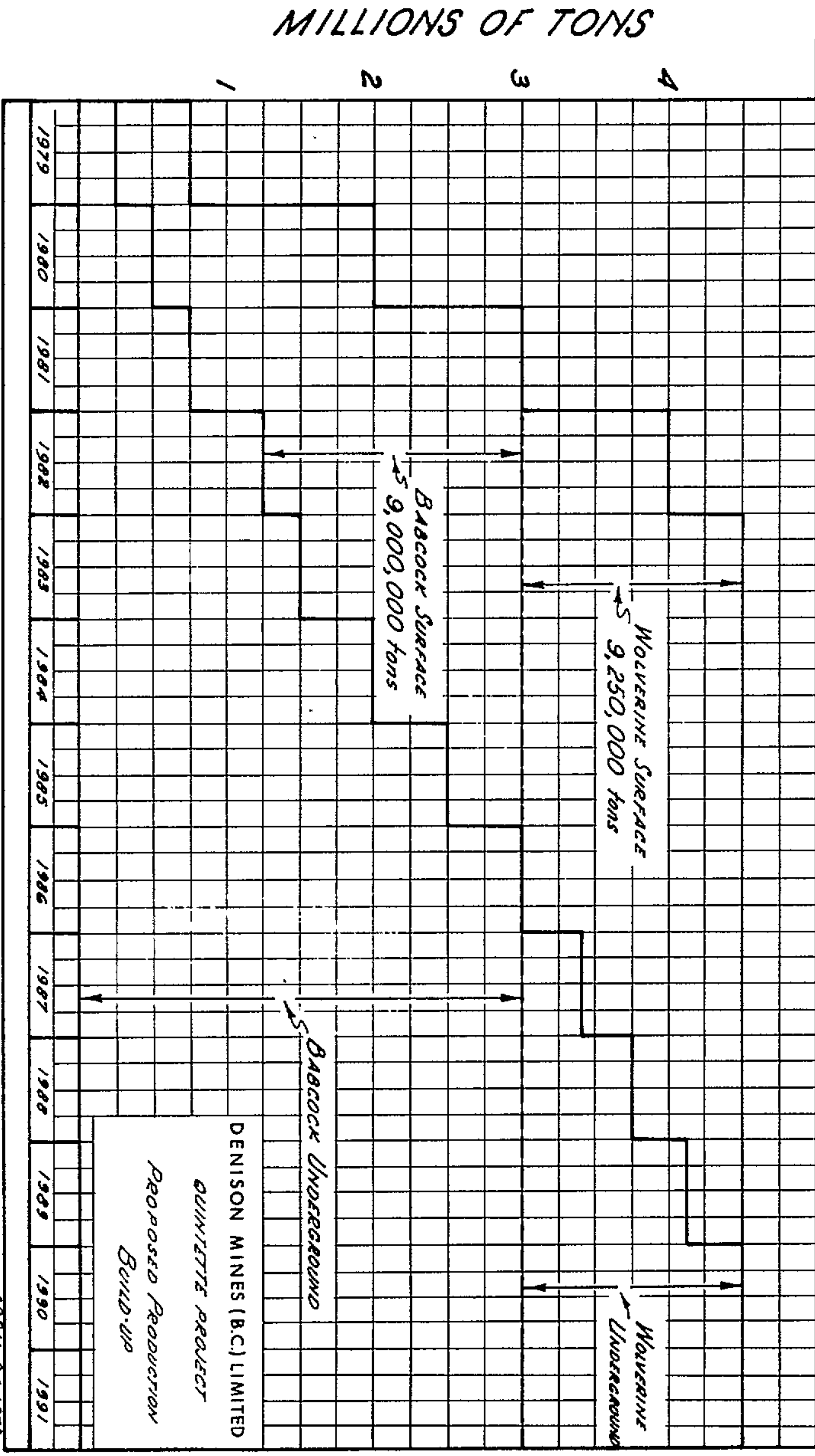
In addition to the coal resources in this area, there are well known forest, gas, and recreational resources, the development of which will be facilitated by the initial provision of access to the area. The potential for each of these to expand and contribute to the multi-dimensional resource base of the regional and provincial economy will form an essential part of the feasibility study.


YUKON
NORTHWEST TERRITORIES
BRITISH COLUMBIA
ALBERTA
PACIFIC OCEAN
UNITED STATES OF AMERICA
JUNEAU
FORT NELSON
LAKE ATHABASCA
LAKE CLAIRE
FORT McMURRAY
WILLISTON LAKE
FORT ST JOHN
CHETWYND
DAWSON CREEK
LESSER SLAVE LAKE
GRANDE PRAIRIE
QUINTETTE
75
PRINCE RUPERT
WHITECOURT
HANSARD
PRINCE GEORGE
EDMONTON
LLOYDMINSTER
BRÛLÉ
RED PASS
JASPER
RED DEER
GOLDEN
BANFF
CALGARY
REVELSTOKE
KAMLOOPS
MEDICINE HAT
FORT MACLEOD
LETHBRIDGE
FERNIE
BRITANNIA BEACH
HOPE
VANCOUVER
VICTORIA
LEGEND
PROVINCIAL BOUNDARY
INTERNATIONAL BOUNDARY
GEOGRAPHICAL LOCATIONS
CAPITAL CITIES
RAILWAY LINES
MILEAGES BETWEEN POINTS
PR-QUINTETTE 75(0)A.
kilometers
50 0 50 100 150 200 250
miles
50 0 50 100 150
DENISON MINES (B.C.) LIMITED
CALGARY ALBERTA
Location Map
QUINTETTE COAL LIMITED

DEVELOPMENT SCHEDULE

Present planning is aimed toward commencement of production from the new mine in mid 1979. To achieve this objective, the following interim dates must be met.

- Complete preliminary feasibility study	- November 1975
- Complete final feasibility study	- November 1976
- Commence mine construction	- November 1976
- Commence town construction	- November 1976
- Commence rail spur construction	- November 1976
- Commence port development	- November 1976
- Commence power line construction	- November 1976
- Commence underground development	- mid 1978
- Commence shipment of product	- Fall 1979



PRODUCTION			
U/G		SURF.	
B	W	B	W
250		500	
500		1500	
750		2250	
1250		1750	1000
1500		1500	1500
2000		1000	1500
2500		500	1500
3000		0	1500
3000	400	0	1100
3000	750	0	750
3000	1100	0	400
3000	1500	0	0

RESERVES

One of the real advantages that the Quintette project may have over other similar new coal ventures is that, in addition to the large primary reserves in the structurally attractive Babcock area, the coal licences extend over a variety of other geological structures with more limited, but significant potential for the development of mineable coal reserves. This fortunate circumstance presents the company with a number of development options. It assures that mining need not be restricted to one setting if trouble arises and that there will be ample opportunity to expand the operation while still maintaining substantial reserves to satisfy a growing domestic demand.

Over the past four years a considerable amount of geological mapping, diamond drilling, adit driveage, bulk sampling, trenching, and coke evaluation has been completed on or for the Quintette licences. This work has proven the presence of over 500 million tons of very good quality coking coal in place within the geological formations in the Babcock area of the property. In addition to this, concurrent exploration in other areas of the property has located over 200 million tons of less accurately defined coal in place and efforts are continuing to extend and determine the mineable portion of these reserves. While this is a very large amount of coal, it must be borne in mind that mining and cleaning losses, geological uncertainty, and the limitations of mine access, significantly reduce the amount of coal available as clean, delivered product. Nevertheless, even taking these factors into consideration the reserves in the Quintette licence area are sufficient to support production of 5 million tons per year for more than 20 years.

Quality

The Babcock coal is present in four main coal seams and, as a result, has a range of quality. The coal from all of these seams is a medium volatile bituminous coal with very good coking characteristics. On the basis of present mining plans, the average coal product from the property is expected to have the following analysis:

Ash	7.5%
Total Moisture	6.0%
Volatile Matter	21.2-23.2%
Fixed Carbon	63.2-66.2%
Sulphur	0.31-0.51%
Free Swelling Index	6½-7½

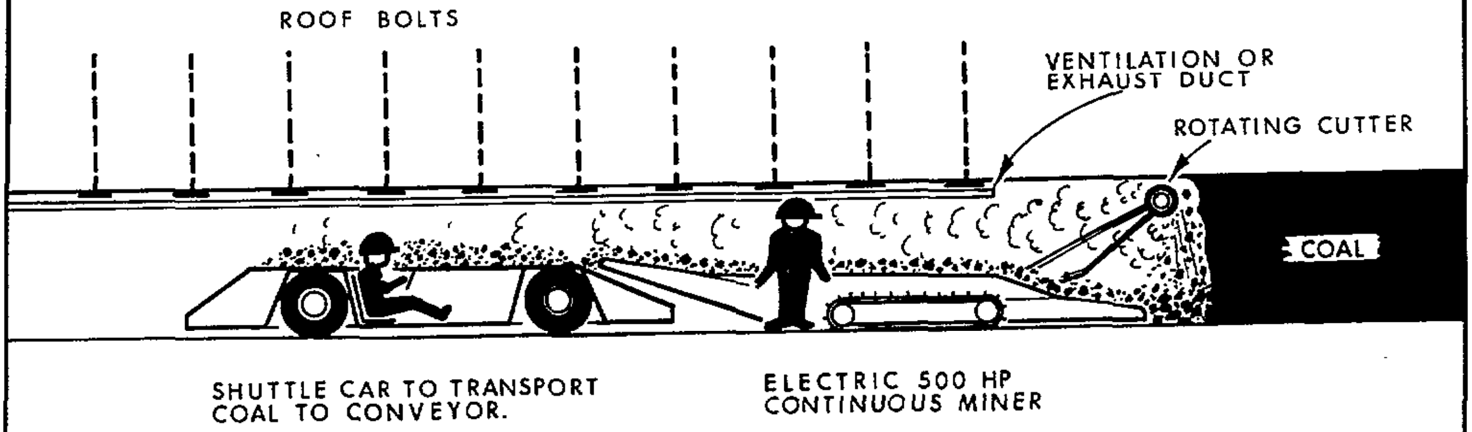
The coking characteristics of bulk samples of the coal have been extensively tested both at the Department of Energy, Mines and Resources facility in Ottawa and by various steel mills in Japan. The results have been consistantly good, indicating that the Babcock coal will be as good or better than any now produced in Canada.

MINING

Emphasis is being placed on hydraulic mining as the primary method of coal extraction on the Babcock portion of the Quintette Project. Reserves of open pit coal will also be delineated to provide readily available coal in the early stages of production and to allow the mine and preparation plant to reach their rated capacities as soon as possible. Some open pit coal will also allow for a more rational development of the underground labour force for the hydraulic mines which will produce most of the coal. The hydraulic system of mining coal has been in use for over 100 years. In the last 20 years it has been perfected in Britain, Germany, Japan and Russia. The most recent successful installation has been in British Columbia where production has exceeded the most optimistic predictions.

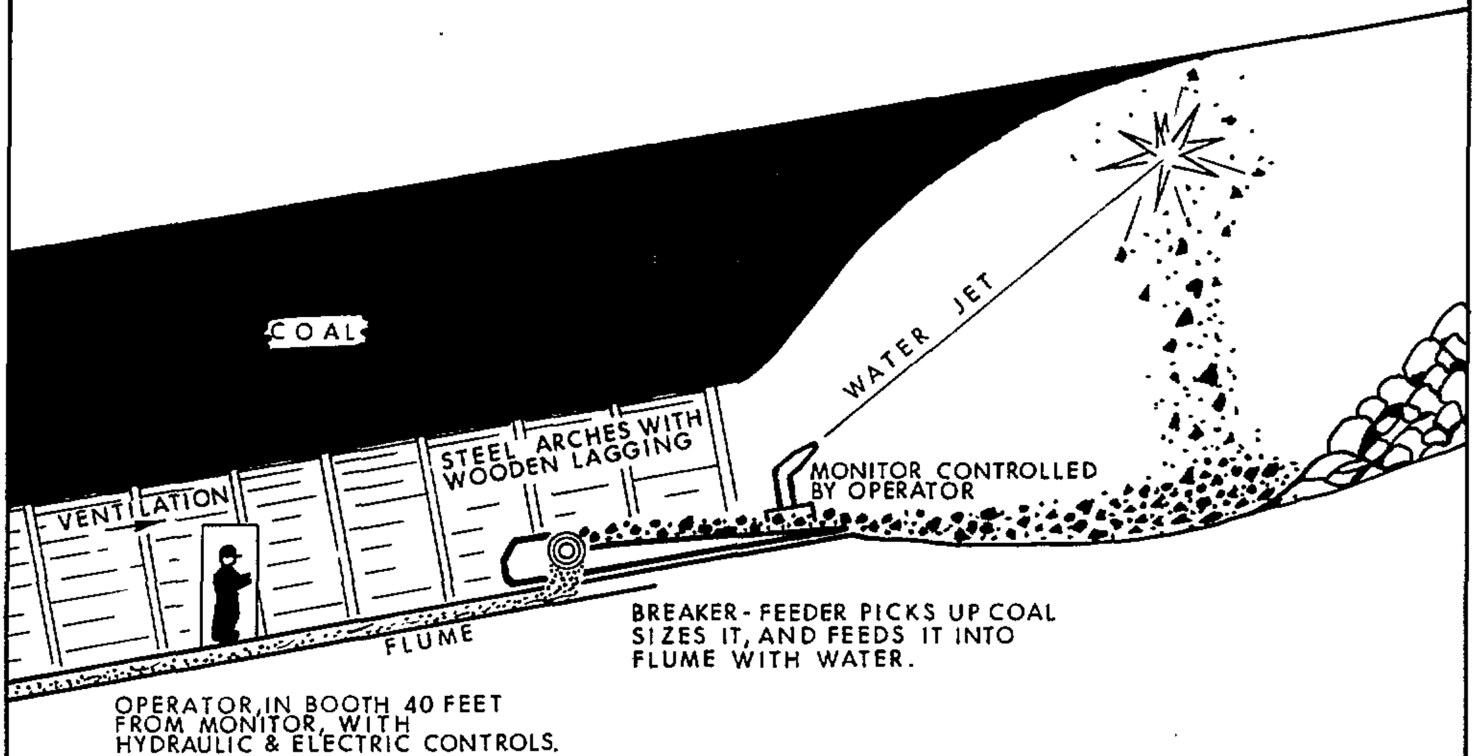
The sketch on the following page shows the essential differences between a normal, flat seam mining operation using continuous miners and a mining section in a steep seam equipped for mining with the hydraulic monitor.

The hydraulic system is particularly suitable in the steeper, thicker seams of coal so common in the Rocky Mountain Foothills. The method used consists of driving roadways in the coal near the bottom of the coal seam and then using a hydraulic monitor to cut out the coal above. The mined coal and water is crushed in a feeder-breaker and then allowed to flow to a collecting point either inside or outside the mine. Normally only two men are used on the monitor, with additional support personnel well back from the mining face.



ALL MACHINERY MOVES TO ANOTHER WORKING AREA AFTER CUTTING TWENTY FEET, SO BOLTING MACHINE CAN MOVE IN, DRILL ABOUT TWENTY-FIVE HOLES AND INSERT ROOF BOLTS.

CONVENTIONAL MINING

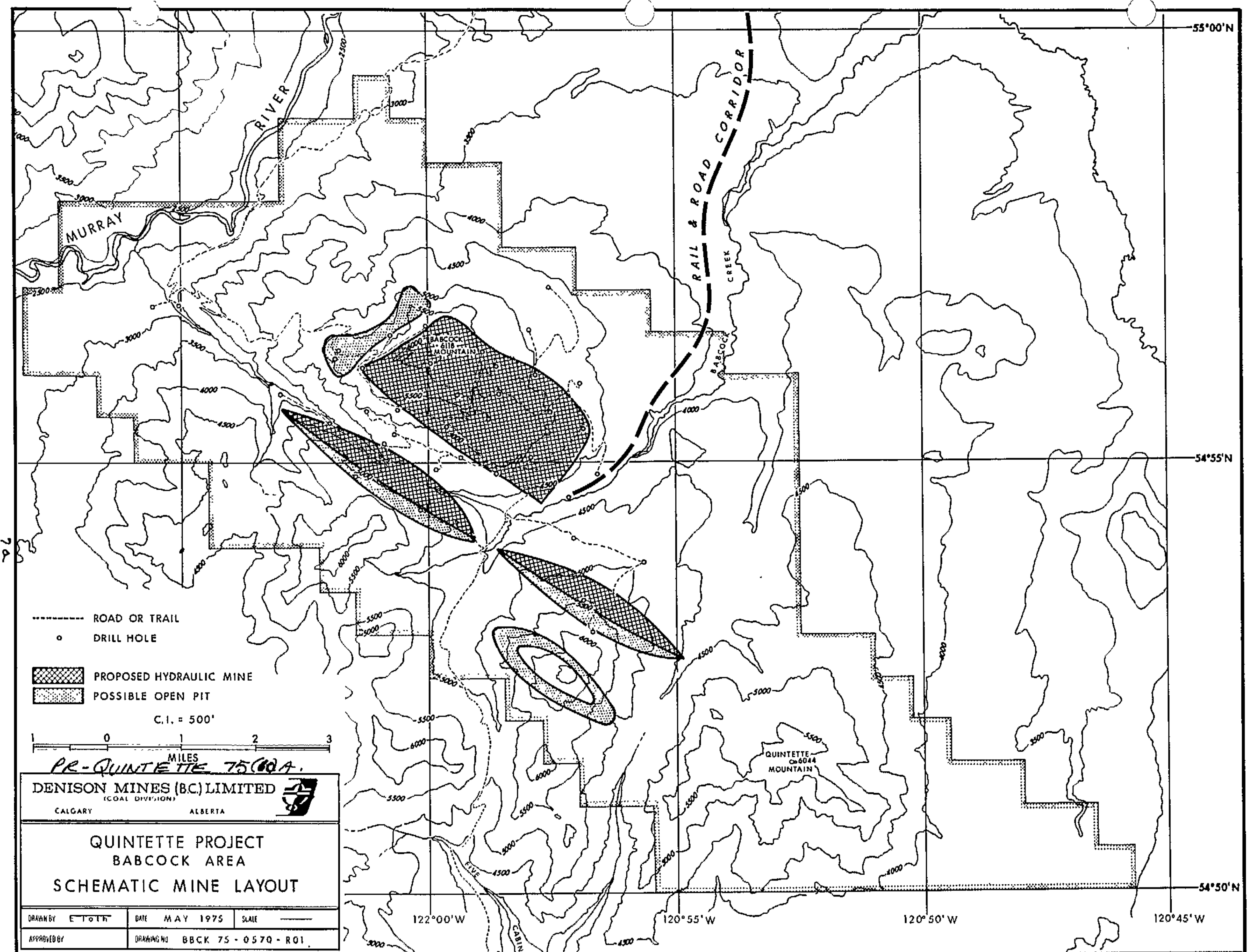


HYDRAULIC MINING

Another main advantage of the hydraulic system is that it removes more coal from a seam than conventional mining techniques. For example, where only 20 per cent of a 40 foot seam might be removed conventionally, 50 to 70 per cent will normally be extracted hydraulically. The reduction in development cost and the improvement in coal conservation is obvious.

The safety aspect of the system is also improved because most roadways are supported by steel arches; the monitor is swung by hydraulic cylinders (controlled from a manned station, under steel and well away from the mining area); dust is suppressed by the large amounts of water used; the explosion hazard is reduced since no sparks are produced by metal cutter picks breaking the coal; and, a large quantity of coal comes from one place, allowing the ventilation to be concentrated there.

Although hydraulic mining may be considered a new technique in some mining districts, and, as with all mining systems, it will require modification and adjustments before it works effectively in any given situation, there is now ample evidence that this method will have a very marked effect on the economics of coal mining in the Rocky Mountain Foothills. There is no doubt that the Quintette Project, and particularly the proposed Babcock mining area, with individual coal seams ranging up to 20 or more feet in thickness, has an excellent prospect of being developed with this mining technique.



55°00'N
54°55'N
54°50'N
122°00'W
120°55'W
120°50'W
120°45'W
MURRAY
RIVER
RAIL & ROAD CORRIDOR
BABCOCK CREEK
BABCOCK MOUNTAIN 6118
QUINTETTE MOUNTAIN 6044
FIVE CABIN
ROAD OR TRAIL
DRILL HOLE
PROPOSED HYDRAULIC MINE
POSSIBLE OPEN PIT
C.I. = 500'
1 0 1 2 3
MILES
PR-QUINTETTE 75(10)A.
DENISON MINES (B.C.) LIMITED
(COAL DIVISION)
CALGARY ALBERTA
QUINTETTE PROJECT
BABCOCK AREA
SCHEMATIC MINE LAYOUT
DRAWN BY E Toth
DATE MAY 1975
SCALE
APPROVED BY
DRAWING NO BBCK 75 - 0570 - R01

ENVIRONMENTAL IMPACT

The desirability of minimizing the detrimental environmental effects of the project is recognized and accepted. The first step in achieving this objective is to establish, through a base line survey, the environmental assets present in the affected area. Once the nature of these assets has been identified their degree of vulnerability to the proposed project can be established, and specific plans made for measures which will minimize any undesirable effects. This study has already been commissioned.

The environmental studies must recognize not only the direct effect of the project itself on the local environment, but also the indirect effect such as that caused by the impact of additional people who will visit the area simply because of improved access. The secondary effect at the port location, the supply centre of Dawson Creek, the new railroad spur, and the transmission line must also be assessed.

There is no doubt that there is an environmental cost of developing such a project. However, by intelligent management and control this cost can be kept to a minimum and will be insignificant in relation to the overall benefit inherent in the project.

ECONOMIC IMPACT

The feasibility study will include extensive investigation of the economic impact of the project on the local region, and on the province as a whole. It is expected that at the 3,000,000 ton per year production level the project will employ directly approximately 800 men. The total annual payroll for this force will be in the order of $15 million. As production increase to 4.5 million tons per year, in excess of 1,000 employees will certainly be required.

In addition to this direct employment on the site, there will be employment in the direct and indirect service industries necessary to support the project, such as the coal rail haul, port handling, supply of material and equipment, etc. to the project, stores, schools, shops, etc. Direct payroll in these industries together with the multiplier effect will have a major positive impact on the economy, and the feasibility study will include a detailed quantitative assessment of this impact.

LABOUR

It is anticipated that problems related to labour will be critical to the project. Major developments now planned for British Columbia and Alberta will create strong demands for all types of labour and will have a serious effect on labour availability. In addition, the remote location of the project will render it less desireable than some of the other projects now being planned.

Contacts have already been developed with local municipal leaders, the B.C. Department of Labour, and Canada Manpower. These contacts will be maintained and further expanded. A comprehensive training program will be developed, aimed at making the maximum possible utilization of local labour. All other potential labour sources will be investigated and utilized to the optimum extent.

INFRASTRUCTURE

Because of the remote location of the property, a substantial infrastructure will be required to support the development.

(1) <u>Railroad</u>

A rail spur will be required to connect the project with the existing main line of either the CNR or the B.C. Railway. A spur to connect with the B.C.R. at Chetwynd appears to be the most suitable, and this line, if finally selected, would have a length of approximately 75 miles. Some upgrading of existing track will also be required to accommodate the unit train movements.

(2) <u>Port</u>

New port facilities will be required to handle the production from the Quintette development. Prince Rupert and Britannia are both possible sites. The feasibility report will include a comparison of the relative merits of each of these sites, and others that may become apparent during the study.

(3) <u>Town</u>

The supply centre for the project during construction and the initial years of production will be Dawson Creek. However, the remote location of the site and the long term duration of the project dictate that a new town must be built within a reasonable distance of the project.

The probability that other resource industries will develop when access is provided to the area is a factor which must be taken into consideration when planning the location and capacity of the town. The major coal reserves in the area indicate a probable life expectancy of the industry in that area in excess of 100 years.

(4) Roads

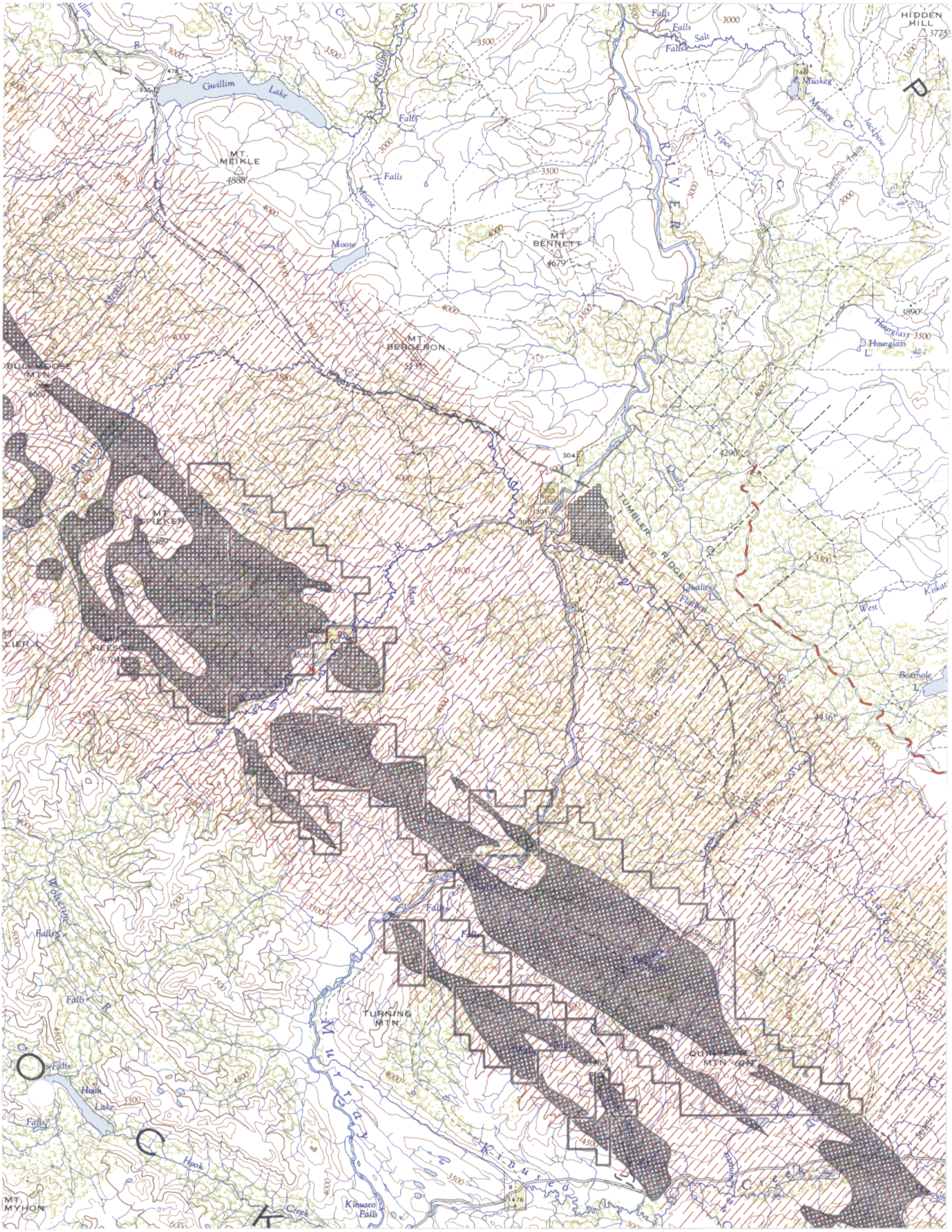
Existing industrial roads at present provide good-weather access to points near the site. To link the property directly with Dawson Creek approximately twenty miles of new road needs to be built to connect two of these roads and to build an extension to the property. The entire route needs to be upgraded to all-weather standards. In addition a major crossing on the Murray River will almost certainly be required to provide access to Chetwynd, Prince George, and points west.

(5) Power

A transmission system linking the project to the B.C. Hydro grid at Chetwynd will be required. Consideration will also be given to the construction of an on-site thermal generating station utilizing waste coal from the mine. Such a plant could be used to supply mine power and excess power if any could be sold to B.C. Hydro.

(6) General

During the planning of all elements of the infrastructure consideration must be given to existing and potential plans for other industrial development in the area, in order to ensure that facilities are adequately sized, and that maximum use is made of possible common facilities.



HIDDEN HILL
3775'
Guillim Lake
MT. MEIKLE
4888'
Falls
Salt
Muskeg L.
Muskeg Cr.
Jackpine
Tepee
RIVER
Moose
Moose L.
MT. BENNETT
4679'
MT. BERGERON
Seismic Trails
Hourglass L.
3890'
BUCKMOOSE MTN
MT. SPIEKER
MT. REESOR
TUMBLER RIDGE
Quality
Flatbed
West
Bearhole L.
4290'
4436'
Wolverine
Hook Lake
Hook
Creek
MT. MYHON
TURNING MTN
Murray
Kinuseo
Kinuseo Falls
QUINTETTE MTN
Quintette
3000
3500
4000
P
O
C
K

RESOURCE POTENTIAL

The area near and within the Quintette Coal field, which extends for some 50 miles both north and south of the Quintette property, is endowed with a variety of natural resources which will undoubtably contribute to the area's economic base and, in particular, will enhance the viability of the new community that must eventually be developed to service the coal field.

Petroleum and Gas

The Grizzly Valley gas field and its extensions have supported one of the most active exploration plays in northeastern British Columbia in recent years. While it is reliably reported that significant reserves of both sweet and sour gas have been discovered, exact estimates of the potential are not yet public knowledge. However there are good indications that this area will be a substantial gas producer in the near future. The area being explored for oil and gas (shown in pink on the map following) is almost coincident with the coal field, although most discoveries have been just east of it and therefore closer to the proposed town site.

Sulphur

The sour gas discoveries will require at least one, and possibly more, sulphur extraction plants. The production of sulphur would provide additional traffic for the British Columbia Railway and would make a small but significant contribution to the local population.

Timber

The logging industry is already removing timber from areas within the Quintette licences in the Wolverine River Valley and less than five miles from the proposed town site. There is no question that these operations are viable and that they would be improved significantly if the logs did not have to be trucked 60 to 80 miles to a mill.

Recreation

The Monkman Park proposal covering the Monkman Pass and Kinuseo Falls area has received universal support from local governments and businesses. Quintette Coal Limited and its shareholder companies encourage the government of British Columbia to establish a first class provincial park in this area. The only priviso we would add is that allowance be made for a transportation and utilities corridor along this historical route. The Monkman Park would be a valuable addition to the multi-dimensional resource base of the Quintette region's economy.

GOVERNMENT RELATIONS

The need for continuous dialogue with all concerned government departments is recognized and it will be the objective of Quintette Coal Limited to keep the various government departments fully advised at all stages of planning and development.

The desire of the government to scrutinize various aspects and the probable effect of the project is also recognized. It is Quintette's desire to work closely with the government, particularly during the early stages, in order to obtain input which will ensure that all studies consider those areas of governmental concern in such a way as to ensure that the results are in a form most useful to the various departments involved.